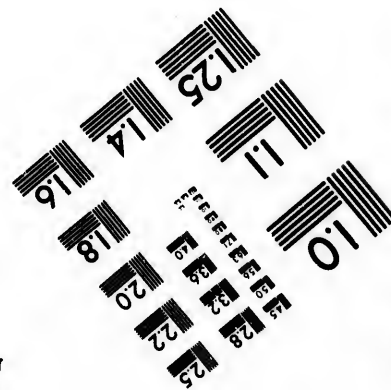
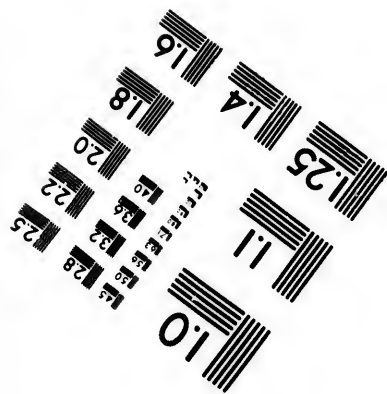
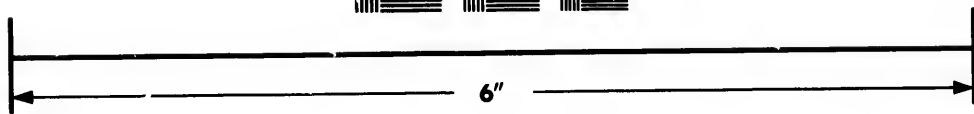
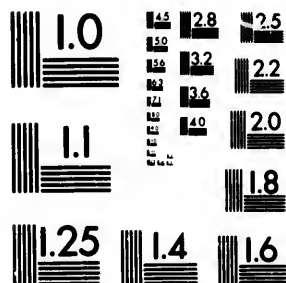


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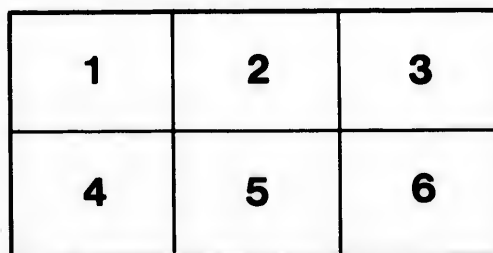
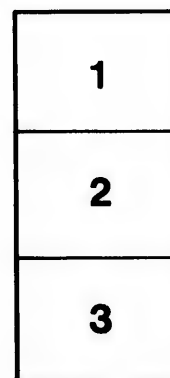
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# PORCELAIN

# DENTAL ART.



The New Process

OF

*RESTORING DECAYED AND DEFECTIVE TEETH  
TO THEIR ORIGINAL APPEARANCE, IN  
SHAPE, SIZE AND COLOR.*

BY  
C. H. LAND.



DETROIT, MICH.:

O. S. GULLEY, BORNMAN & CO., 19-18 LARNED STREET EAST.

1888.

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INTRODUCTION.

PORCELAIN DENTAL ART.

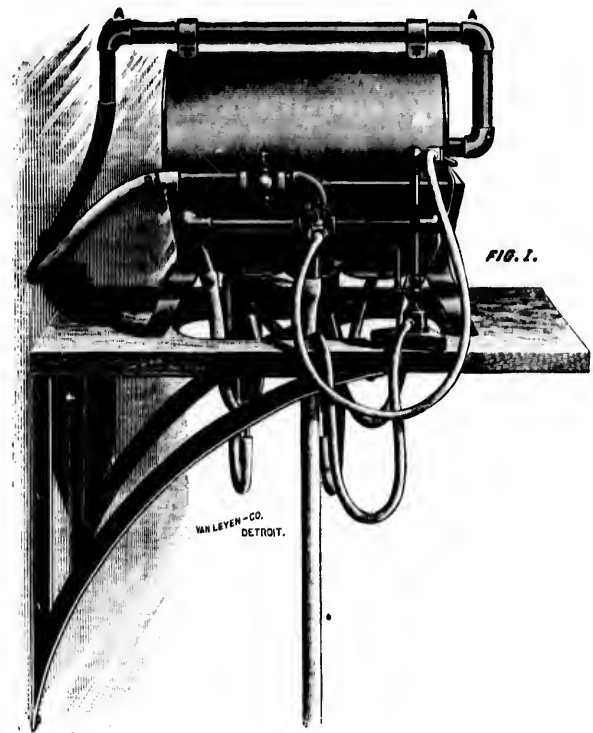
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THE practical application of porcelain to operative and mechanical dentistry is not possible without its necessary adjunct, a thoroughly reliable gas furnace; and this must be so arranged that all operations are reduced to the minimum cost of the material consumed and labor expended, and with the least fatigue both to the operator and his patient.

Twenty years of experience in the working of continuous gum work, sectional block and crown work, and three years constant and daily experience in inserting of porcelain fillings, etc., has demonstrated and brought out so many minor details that in order to comprehend them properly, nothing but actual practice will suffice to furnish anything like a correct idea of the great value of proper facilities; and, while it will be the aim of the author to simplify the instructions, the fact still remains that no matter how simple the art, there are always some features that need actual work. A very slight oversight on the part of the most careful observer may cost hundreds of dollars, where a little actual contact would save it all. A close inspection of any art reveals truths that can not be comprehended at a distance; therefore, to all those who will become interested, a week spent in our laboratory will be of the greatest value; however, as there are a large number in the profession who find it very difficult to get away from home, we have decided to do all that is possible by giving a series of illustrations and simple directions, and hope by this means to establish enough facts to enable them to make a beginning.

Respectfully,

C. H. LAND.



DR. C. H. LAND'S


COMPOUND

GAS OR GASOLINE FURNACE

PATENTED JANUARY 3d, 1888.

## Dr. C. H. Land's Compound Gas or Gasoline Furnace.

FIG. 1.

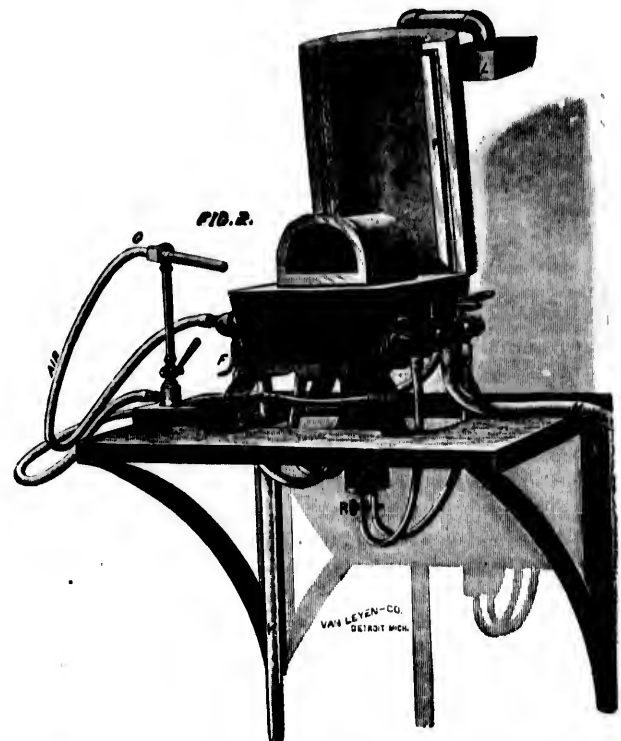


SIZE No. 1, especially adapted for continuous gum work, all kinds of muffle work, crucible work, blow-pipe work, forging and brazing. It is the most complete furnace ever devised for the chemist, assayer, jeweler, dentist and metallurgist. The range of work that can be accomplished with it is practically without limit. Iron, brass and steel castings weighing from 2 to 12 pounds can be made in from 7 to 30 minutes. A muffle 8 inches long,  $3\frac{1}{4}$  inches wide,  $2\frac{1}{4}$  inches high inside measurement, can be heated to over  $3240^{\circ}$  F. in 25 minutes, sufficient to melt wrought iron. Fig. 1 represents the furnace closed and ready for muffle work. A A is iron pipe, capable of both a sliding and swinging motion. (See L Fig. 2), to which the door or plug is securely attached. There is a small hole in the door, covered with a piece of mica, through which all operations can be seen. Observe that the iron pipe is connected to rubber tubing B, and with pipe having an air cock C, which regulates the quantity of air passing into the mouth of the muffle. It will also be noticed that the pipe passes over the two holes D D, thus by the escaping flame the pipe is heated to redness and provides a superheated air before reaching the muffle; this column of air forced into the muffle keeps up a counter pressure within, so much greater than the pressure produced by the blast within the fire chamber, that all foul gases are prevented from entering the muffle even though it is cracked; thus the most delicate porcelain can be baked without the least danger of so-called gasing. Also it will be seen that by connecting the rubber pipe with retorts or gasometers any desired vapor or gas could be forced into the muffle, making the furnace invaluable for scientific experiments.

S

NACE

Fig. 2 illustrates the furnace thrown open, being swung on hinges at the back, exposing the muffle E. The groove P P is packed with asbestos fibre, so that when the sections are brought together the furnace will be perfectly air and gas tight. The hooks F F are to hold the upper section secure to the lower. The gas and air connections are so arranged that the ordinary blow-pipe can be attached as shown at G. When the muffle E is removed, it exposes two burners and a fire-brick surface made to fit the various appliances for crucible, ladle and blow-pipe work. One or both burners can be operated in conjunction with the blow-pipe G. The air-cock R is to provide a means for shutting off the air supply from either burner when required. H is the gas supply, K air-pipe connecting with the



bellows. Size of muffle, inside measurement, 8 inches long,  $2\frac{1}{2}$  inches high,  $3\frac{1}{2}$  inches wide. With gasoline gas porcelain teeth can be enameled in from 10 to 15 minutes; ordinary city gas in from 15 to 25 minutes, according to quality. In 30 minutes a heat sufficient to destroy the muffle can be produced, which indicates a temperature of over  $3240^{\circ}$  F., much higher than is ever needed for all kinds of work, except the fusing of platinum. Three-eighths-inch gas pipe will supply sufficient gas, and can be worked with ordinary foot bellows.

### THE CROWN FURNACE

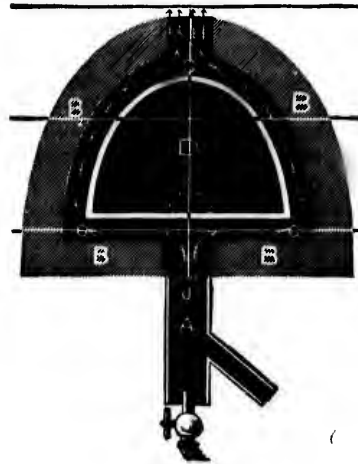
Is about one-fourth the size of No. 1—muffle 3 inches long,  $1\frac{1}{4}$  inches in diameter. It is a *fac simile* of No. 1, having blow-pipe and crucible attachment, and is especially adapted for enamel fillings, crown and sectional block work; is much easier to operate than No. 1, and does the work more rapidly.

Reprinted from "Items of Interest," October, 1886.

## ARE HYDRO-CARBON OR GAS FURNACES A SUCCESS ?

By Dr. C. M. LAND, DETROIT, MICH.

For those who are not familiar with the nature of hydro-carbons, the philosophy of their combustion, etc., gas furnaces are not satisfactory; but the mastery of a few definite facts will make the whole subject plain, and the process easy. During the past year it has been my pleasure to bake over one hundred sets of continuous gun work, also sections of block work, porcelain, etc. This I have done with no more trouble than to turn on the desired quantity of gas and air and wait till the operation of baking was completed. Starting from a cold muffle it requires but fifteen minutes for the first biscuit, ten minutes for the second, and fifteen minutes to enamel, and where two furnaces are employed a slab of sectional block teeth can be enameled every five minutes, in the most perfect manner, with unerring precision. Some gas furnaces have been a failure principally on account of their liability to gas the teeth. The accompanying illustration will make the philosophy of combustion more clear, and give the reasons why teeth are injured. A represents the burner; B B B fire-brick lining; C C C combustion cham-



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ber; D interior of muffle. The arrows indicate the direction of the blast. The space in the combustion chamber between the lines E E is where carbon monoxid (c o) is formed,—a gas containing one equivalent less of oxygen than carbon dioxid—simply an imperfect state of combustion. It is this gas that injures the body and the enamel. By reference to the illustration it will be seen that the little arrows are made to appear passing through the pores of the muffle, and as the direction of the blast from the burner A is directly against the bottom of the muffle, with a pressure of one pound to the square inch, a portion of the carbon monoxid (c o) is extremely liable to be forced through its pores, and will be taken up with the body during the first and second biscuiting, here to remain until the enameling process; and as this takes a much higher degree of heat, it causes the gas to be eliminated, as shown in the numerous small bubbles on the surface. The space between the lines E E and within the combustion chamber C C C, should be known as the first stage of combustion, where a certain portion of carbon monoxid (c o) is always present, and the space between the lines G and E, within the chamber C, should be known as the second stage of combustion. In the first stage of combustion one equivalent of oxygen from the atmosphere unites with the hydro-carbon to form carbon monoxid (c o); in the second stage, two unite to form carbon dioxid (c o<sub>2</sub>), or carbonic acid. In my first experiments in baking porcelain with hydro-carbon fuels, nitrogen was injected into the muffle as a protection to the teeth, and proved highly successful. Further investigation has shown that porcelain can be baked satisfactorily by using a little air. Fig. 1 represents my new furnace closed and ready for muffle work. In Fig. 2, see exposed position of muffle. A A, Fig. 1, is iron pipe capable of both a sliding and a swinging motion (see I, Fig. 2) to which the door or plug is securely attached. Rubber tubing B, Fig. 1, connects with air supply at cock C. This regulates the quantity of air passing into the muffle. In the illustration you have seen that the monoxid of carbon (c o) is extremely liable to penetrate the muffle. We will assume that a small portion has entered the muffle; then what could be more reasonable than to force in a small quantity of air to unite with (c o) to form (c o<sub>2</sub>). To prove the theory correct, the entire upper portion of the muffle can be perforated with holes; this will allow the products of combustion (c o) to pour in it a constant stream, and yet a set of teeth can be baked successfully without any danger of gasing, though, owing to the one equivalent of carbon a slight discoloration of the enamel will be observed. By perforating the muffle with three  $\frac{1}{4}$  inch holes on the upper portion of the rear

end it will give vent to foul gases, and when a current of air is passed in at the front the tendency would be to pass out at the rear. As this current of air consists of nitrogen and oxygen, the latter would unite with any (c o) that might be present, leaving an excess of the former. Nitrogen not uniting radically with anything, serves as a protection to substances placed within the muffle.

It has been customary to perforate the end of the muffle in coal or coke furnaces, and as the natural draft would draw a sufficient quantity of air through the muffle, any monoxid of carbon present would be eliminated, consequently teeth were not gased unless placed in a cracked muffle. In all hydro-carbon furnaces it is necessary to use a blast to secure the required amount of heat, and the pressure must be at least one pound to the square inch; this is to force the proper amount of oxygen into the combustion chamber. Perfect combustion will not take place in natural-draft gas furnaces, because a sufficient quantity of air cannot be drawn into the combustion chamber without the use of a positive blast; it therefore becomes necessary to force both the air and the gas under pressure into the combustion chamber, the higher the pressure the greater the heat. My office is located in a building where steam power is available; from this I secure an air supply, conducted by means of gas pipes into my laboratory, so that by simply turning on a supply of gas and air, teeth are baked with much less trouble than vulcanizing. Where it is customary to bake every day a motive power is the most desirable, but where only an occasional set of teeth is required, the ordinary foot bellows answers better. But fifteen minutes of pumping is sufficient for each bake, and with a little assistance the work is comparatively easy.

*The Use of Gasoline.*—During the past year I have been using 74 gasoline with as perfect results as any other hydro-carbon; and with the ordinary foot bellows, as manufactured by the Buffalo Dental Manufacturing Co., I can bake a set of continuous gum-work in fifteen minutes, starting from a cold muffle. All kinds of crucible work and soldering with the blow-pipe, can be done equally well as with city gas. One gallon of gasoline, costing 15 cents, will bake a set of teeth. Therefore, dentists living in localities where there is no gas can secure equal advantages in the use of 74 gasoline. City gas, at \$2.50 per thousand feet, will cost about the same.



### DIRECTIONS FOR SETTING UP THE FURNACE.

Adjust the bracket so that the top will be three feet from the floor, or the same if placed on the bench. The hole should be eleven inches in diameter each way, and seven inches from the wall. The bench should be twenty-four inches in extent from the wall, and twenty-two inches wide. The groove P P should be packed with asbestos fibre. Roll the fibre into a loose rope about half an inch in diameter. This is intended to secure an air-tight joint between the upper and lower sections of the furnace.

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### ADJUSTING THE MUFFLE.

The groove across the front end of the base of the furnace is intended for asbestos packing, and as a guide to set the muffle in its proper place. The raised or thick part of the front of the muffle should come exactly even with the groove, or there should be a space of three-eighths of an inch wide between and around the muffle within the combustion chamber. If the muffle is too close to the rear end of the combustion chamber, the liability to gas the teeth is increased, and the necessary degree of heat will be too slow in developing. Also, it will be more difficult to light the furnace. Combustion will be imperfect.

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### ADJUSTING THE BURNERS.

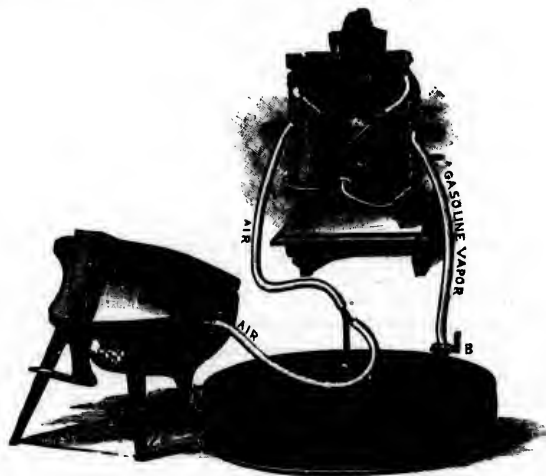
Previous to putting the burners in place, the small piece of woven wire is pushed up into the tubes. Asbestos fibre is then wound around the head of the burners, and serves as an air-tight packing, then they are retained by means of thumb screws. After the screws are turned so as to secure the burners, a little additional asbestos fibre is packed between the tubes and the burners; this makes the joint perfectly air-tight. To the right side of the furnace the letters M M mark the point where rubber tubes conduct the air supply to the burners; R R is stop cock to regulate the quantity of air passing into the burners; O O, pipes to the left that convey the gas to the burners.

### LIGHTING THE FURNACE.

A little trouble is sometimes experienced in lighting the furnace. The flame will start beneath the furnace, in the lower part of the tubes. When this takes place, if continued, it will melt the wire screen at the head of the burner. To prevent this, a steady current of air, uniform in pressure, will avoid the danger of starting the flame below the combustion chamber. When it does take place, the gas should be shut off at once, and try to light it again.

### THE USE OF GASOLINE.

A convenient way in which to use gasoline, is to pass a current of city gas through the generator. This gives a rich hydro-carbon, and is less liable to gas the teeth than when city gas is used. When gasoline is used alone, a current of air from the bellows must be passed through the generator; this carries the vapor into the combustion chamber, mixed with the proper quantity of air. The generator should not be more than half filled with gasoline; if filled too full the fluid will be forced up the pipe and is liable to overflow and ignite outside the furnace. After passing a current of air through the generator for some time, a heavy residue will accumulate; this should be thrown out, as it will not vaporize.



FURNACE.

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Fig. 1 in the engraving B indicates the manner of making the connections for the use of gasoline; here the large size furnace is shown standing on its end, so that all the connections may be better understood.

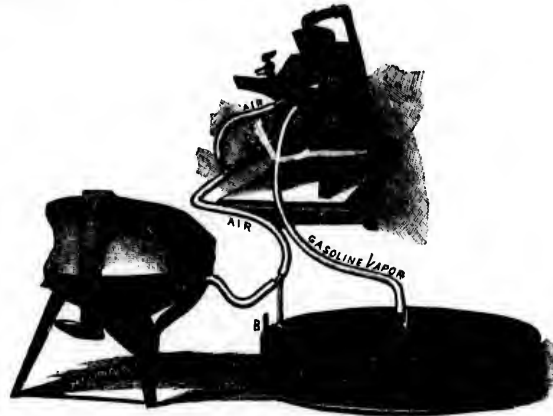


Fig. 2 illustrates the smaller size or crown furnace. This is especially adapted to do the smaller kinds of work, such as fillings, sectional block work, and the various kinds of crowns, pivot teeth, etc. The operating of this furnace is very easy and simple; in from five to ten minutes porcelain can be fused in the most complete manner, and this with comparative ease, using the ordinary foot bellows, as seen in the engraving, and to those who do not care to do continuous gum-work it will be by far the most desirable, and entirely satisfactory. Size of muffle, one and a quarter inches in diameter and six inches long.

#### TO REPAIR CRACKS IN THE MUFFLE.

Take pure asbestos fibre in an old muffle, heat it up to about the same heat as it would take to melt gold, say 2200° F., then mix, grind to a powder in a mortar, and mix with two-thirds more of powdered fire clay, make into a paste by the addition of water, carefully work this paste into the cracks in the muffle and let it dry by a gradual heat.

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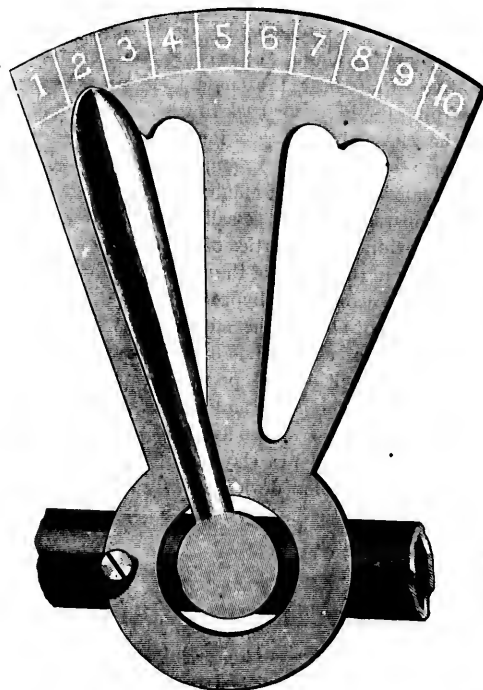


FIG. A 1.

#### COUNTER-BLAST AND REGULATOR.

The importance of this valuable adjunct to Dr. Land's furnace will become the more appreciated as the operator is made familiar with the simple facts relating to the philosophy of combustion, and to those who will carefully investigate, a very rich and interesting field is presented, not only for the dentist but also the chemist, the assayer, the metallurgist, and the scientist. However, in this instance I must confine my efforts to dentistry. The illustration, Fig. A 1, is a regulator that is attached to the counter-blast. This device is to definitely control the quantity of air passing into the muffle. The object of forcing a current of air into the muffle is two-fold, in one instance the oxygen will unite with any free carbon that might be present, and the counter pressure produced from the blower would force any foul gases out, even though the muffle becomes cracked, which is liable to take place eventually in every muffle.

In baking continuous gum-work, the indicator is set at a num-

ber on the dial, so that in the beginning of the operation a very large volume of air enters the muffle, and is continued until the temperature is almost to a white heat, the amount of air is then gradually reduced by turning the indicator back to the smaller numbers, 3, 4, 5, etc. Since the materials that are incorporated in the bodies and enamels are formed largely of oxygen, in combination with other elements, and realizing the great affinity that carbon has for oxygen, it will become apparent that the so-called gasing of porcelain is due directly to the deoxidizing properties of the carbon, which penetrates through the muffle in the shape of the fixed gas monoxide of carbon; or, it may be some unconsumed hydro-carbon; in either case, the passage of a current of air into the muffle would convert any excess of either into dioxide of carbon, and thus prevent any detrimental effects. The arrangement of parts provides a sure preventive of any injurious effects, even though the muffle should break down during the baking process. As there is no available substance that can take the place of well prepared fire clay, muffles will continue to be made of it; therefore, this new device is likely to become a permanent and necessary part of a thoroughly reliable gas furnace.

#### BAKING CONTINUOUS GUM-WORK.

When the first lot of body is spread over the plate, the piece can be placed in the cold muffle, the door closed, and then the counter-blast set at Fig. 7, 8 or 9. This keeps a full and steady supply of air in the muffle until the heat has increased to a bright red appearance, or almost a white heat can be attained. Then it will be time to reduce the quantity of air by shifting the indicator back to a number where just a small amount of air is passing into the muffle. The operation is then continued until the body is fused to a partial glaze. This completes the first biscuit. The piece is then removed, and as quick as possible placed in a cold muffle, the air excluded by closing the mouth with a suitable door or stopper. Here it is allowed to gradually cool, which requires about twenty minutes. It is then ready for the second application of body. This consists simply in filling up the cracks due to the shrinkage of the body when fused in the first instance. It should not occur in the second operation. Any defects of the first manipulation can be corrected by adding additional body, all cracks being filled and a thin coat of body spread over the entire first biscuit. The piece will be ready for the second fusion, which should be conducted in the same

manner as the first. It will then be ready for the enamel, and passed through the muffle following the same directions. While it may be possible to fuse porcelain in other gas furnaces, without the use of a counter-blast, and occasionally produce a fairly good piece of work, it will eventually be demonstrated that the current of air will always be a necessary element in order to obtain that rich color so desirable to imitate the natural gum, and to guarantee toughness to the porcelain, and not be made brittle from the action of even the smallest portion of carbon.

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### IMPORTANT.

In the use of Dr. Land's Continuous Gum Furnace it must not be supposed that the mere baking of porcelain dentures is its greatest value, for where one opportunity of this kind is needed five hundred other opportunities will be presented for various other applications of dental porcelain. In Dr. Land's practice it has been thoroughly demonstrated that the time has arrived when it is entirely feasible to mould sections of porcelain into the exact form of the cavity of a tooth, and in every case secure an adaptation of about the two thousandth part of an inch. These results are possible in every form of the cavities in decayed teeth, starting from the most minute cavity until the entire tooth becomes involved, and with the various shades of body each tooth is imitated in shade, shape and size to a remarkable degree of perfection.

The products of the furnace consist of continuous gum-work porcelain dentures, the making of any desired form of teeth for sectional block work, the changing of forms of sectional gum teeth for rubber work, the making of any desired form of pivot teeth or any style of tooth crown to be found on the market, and a variety of original forms that could not be made as articles for the trade, but must always be the result of each dentist's brain. The building up of roots, the enlarging of undeveloped teeth, porcelain bridge work, etc., are among the most important features of modern dental art that are made practicable with the aid of a gas furnace.

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Reprinted from "Independent Practitioner" of August, 1887.

## METALLIC ENAMEL COATINGS AND FILLINGS.

Read Before the Central Dental Association of Northern New Jersey.

By Dr. C. H. LAND, DETROIT, MICH.

In the absence of practical demonstrations it is difficult to comprehend all the advantages brought about by improvements. The accompanying engravings, Figs. 1 and 2, are taken from practical cases that have at this date been in use for one year.\* In the case represented by Fig. 1, the patient was about sixty years of age.

The right lateral incisor was prepared with a Howe post, shown in its relative position. The five remaining teeth, after the cavities were prepared, contained tooth substance as represented by the dark surfaces, the white representing the lost portion of each tooth, restored with sections of porcelain made to imitate the exact color and contour of the original tooth substance.

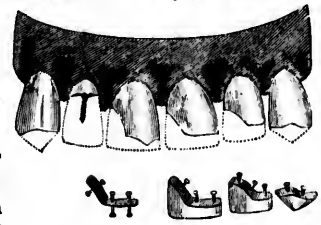


FIG. 1.

The cavities are prepared as for gold filling, when a thin piece of annealed platinum plate, No. 35 standard gauge, is placed over the tooth, and, by means of burnishers made to take a perfect impression of the outer rim of the cavity, after which platinum pins are attached as shown at A. The object of the pins is to serve as a fastening, both for the porcelain paste or body and as retainers to hold the completed section in the cavity of the tooth. The porcelain paste or body is built upon the platinum disk and made to imitate the lost portion of the tooth. It is then baked in a gas furnace, requiring but twenty minutes for the first biscuit and fifteen for the second, and when finished it appears as shown at B, ready to be cemented with oxy-phosphate. C and D are modifications for the other teeth, and Fig. 2 illustrates porcelain facings for molars.

The especial feature of this system, to which I wish to call your attention, is the large amount of tooth substance preserved above the gum, there being no necessity for telescoping the root so far below as to sever the tissues. This mode of practice also dispenses

\*August, 1888, still in excellent condition.

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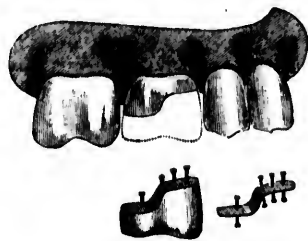


FIG. 2.

with the long operations and protracted use of the rubber dam; it almost entirely obviates the use of amalgam, and saves the necessity for large gold fillings; there is no malleting, no long and tedious operation either for the patient or dentist, while at the same time teeth are perfectly restored both in appearance and usefulness.

There is another advantage in the use of the enamel coatings which is not, in my opinion, a trivial matter. When large metallic fillings are inserted, the constant thermal changes consequent upon their alternate heating and cooling must exercise an unfavorable influence upon the tissues about the tooth. Even if the pulp is dead and the root be filled, there will be a checking and fracture of the tooth in time from the continually varying changes of temperature. An inflammation of the membranes will also be likely to occur from the same cause, and thus the tooth will in time be lost from the mere influence of the presence of a large mass of metal.

It is also a fact that large gold fillings cannot be inserted without so much malleting that the strength of the tooth is gone, and frail walls are cracked beyond the possibility of repair. These dangers are all obviated by the use of the porcelain fillings, while teeth so restored are much more natural in feeling and more grateful to the touch of the tongue than any metallic filling can be.

Reprinted from the "Independent Practitioner," February, 1887.

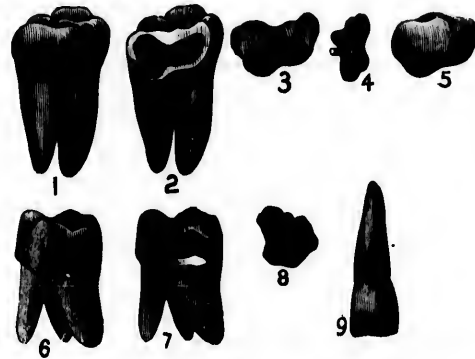
### METALLIC ENAMEL SECTIONS, A NEW SYSTEM FOR FILLING TEETH.

By DR. C. H. LAND, DETROIT, MICH.

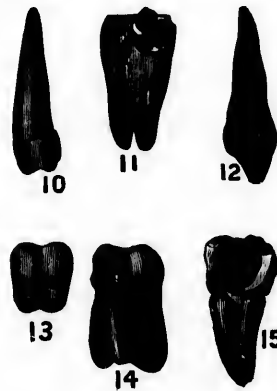
In the July number of the *Independent Practitioner*, a description is given of my new process of coating badly decayed teeth. In addition to this, I have devised a means of filling teeth with prepared sections of porcelain, or it may be designated as a system of partial crown work. By reference to the engravings,



Figs. 2, 7, 10, 12 and 15, there will be seen characteristic conditions of decay suitable for this class of work. Figs. 2 and 7 are the prepared cavities on anterior sides of molars. The manner of procedure is to burnish a thin piece of annealed platinum plate into the cavity. This takes a perfect impression of its outlines. The surplus edges are trimmed off and platinum pins attached, using pure gold leaf for solder. See Figs. 3 and 4. The pins serve as a fastening,



both to secure the completed section in place and as retainers for the porcelain body. Figs. 5 and 8 illustrate the completed sections, showing contour of the original shape of the lost portion of the natural tooth. Figs. 1 and 6 are prepared sections cemented in place.



Having secured the prepared sections as shown in Figs. 3 and 4, porcelain paste or body is built upon them and carved so as to imitate the original contour of the lost portion of the tooth, as shown in Figs. 5 and 8. They are then placed on a bed of siliceous sand and fused in a gas furnace. This requires twenty minutes for the first biscuit and fifteen for the second. When completed, they will be a reproduction in porcelain of the lost parts of the natural organs, resembling nature perfectly, both in color and shape. They are then

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anterior side of a molar or bicuspid is decayed,  
as shown in Figs. 10 and 15, the enamel front  
or veneer, 13, is added to the porcelain body,  
and when completed it will appear as shown in Fig. 14. This  
veneer serves as a ready and efficient means of securing the proper  
shade and contour of each class of teeth: To those who are not  
familiar with the use of a gas furnace this class of work may seem  
difficult, but a little experience with the modern appliances now  
within the reach of every dentist, makes the operation a compar-  
atively simple and easy one. Figs. 17, 18, 19 and 20 are a modifica-  
tion. Fig. 17 represents a tooth filled with gold, having two pins  
attached. Fig. 18 is a platinum disk, with tubes adjusted  
to correspond to the position of the pins in Fig. 17. Porcelain body  
is built about the tubes, and when fused in the furnace the whole  
will form a porcelain crown as shown in Fig. 19. Fig. 20 illustrates  
the relative position of the tubes, which are designed to form  
countersinks for the pins in Fig. 17. When cemented in place, it  
makes a very durable and beautiful piece of work. Fig. 16 is an  
incisor constructed in a similar manner. From this will be seen the  
great advantage of being able to have the porcelain in a plastic  
state, as it enables the dentist to perfectly adapt the form of each  
peculiar case with the utmost precision, and this could not be so  
admirably done with manufactured crowns.

In bringing this new mode of practice to the notice of the den-  
tal profession, I wish to call especial attention to the large amount  
of tooth substance preserved. In nearly all the modern systems of  
crown work there seems to be too much good tooth material cut  
away, and I think a careful investigation will demonstrate this new  
process to be far superior, making it possible to save the greater  
portion of the crown, it not being necessary to cut beneath the gum.  
In nearly every case, sufficient tooth substance can be retained to  
preserve the pulp alive, and when the teeth are devitalized, the  
major portions of the crown can be left intact, serving for retaining  
purposes and making it unnecessary, in the majority of cases, to  
resort to screws or posts. Fig. 16 illustrates a section of porcelain  
adjusted to a central incisor, which, when carefully done, makes a  
very acceptable piece of work. Although the joint may sometimes

be conspicuous, it is not nearly as much so as a glaring piece of gold.

The numerous opportunities presented in which this porcelain process will prove to be of great value, is almost without limit, and has enabled me to practice dentistry on an entirely new basis, so that to-day I can say to my patients that their teeth can be perfectly restored, both in appearance and usefulness, no matter how badly they are decayed. No pulps will be destroyed, and very little tooth substance need be cut away. The use of the rubber dam is largely dispensed with; there are no long and tedious malleting operations as in large gold fillings, and no use for amalgam, yet the teeth can be perfectly restored in shape, color and size, with very little pain or fatigue either to the operator or patient.

#### FILLING TEETH WITH SECTIONS OF PORCELAIN.

PATENTED DECEMBER 20th, 1887.

Starting from the smallest sized approximal cavities in the teeth, it is now possible to restore the proper color in the most perfect manner; and when we take into consideration that this



PLATE A.



PLATE B.

process can be continued until the entire tooth becomes involved, also that as the progress of decay becomes more serious this work becomes the most effectual, constant practice has shown that while the smaller cavities may not be as reliable as gold, and that in this class of work they are more difficult to insert, yet in many instances nothing could be more desirable as a means to restore the proper appearance and thus conceal the defects of decay. Finally we have this consolation, to know that when our best efforts in approximal gold fillings have failed, that when all our best contour work has repeatedly given out, and but a skeleton of a tooth left,

process can be continued until the entire tooth becomes involved, also that as the progress of decay becomes more serious this work becomes the most effectual, constant practice has shown that while the smaller cavities may not be as reliable as gold, and that in this class of work they are more difficult to insert, yet in many instances nothing could be more desirable as a means to restore the proper appearance and thus conceal the defects of decay. Finally

that it is then our best and most effectual work begins.

Plate A illustrates decay on the anterior surface, presenting an excellent opportunity for this class of work.

See Plate B, showing sections of porcelain cemented in the cavity; and, although the outlines of the joint may be somewhat perceptible, it is not nearly so conspicuous as teeth filled with gold or amalgam, and when care is taken to make a close joint they are almost imperceptible.

Plate C illustrates other modifications, showing a slight irregularity. Imperfections of this character can be corrected and made to appear as seen in Plate D.

The manner of securing a practical and durable fastening device is shown in Plate E. The cavity is prepared as seen in Fig. 3.

A thin piece of platinum is burnished into the cavity, and then holes are drilled through this matrix, through which platinum pins are passed. A piece of wax is then pressed on to the pins and the matrix. This holds both in position until investment.

When the wax is removed and porcelain body put in its place, and when completed, would appear as seen below.



PLATE D.

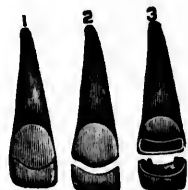


PLATE E.

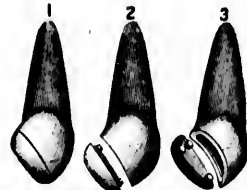


PLATE IV.

Fig. 3, Plate IV, illustrates the appearance of the prepared cavity and the completed section ready for adjustment. It will be observed that in the preparation of the cavity it is cut abrupt in order to avoid any thin edges of the porcelain. See Figs. 2 and 3 in Plate V.

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The sections of porcelain are prepared in the following manner: First prepare the cavity, and then burnish a thin piece of annealed platinum plate into the cavity. This will form a mold or matrix—a metallic impression—the exact counterpart of the cavity in the tooth. When the matrix is established in place in the cavity of the tooth, three holes are drilled through the prepared matrix and into the dentine of the tooth. Platinum pins are then passed through the matrix and into the holes in the dentine. Wax or moulding compound is then pressed into the matrix. This adheres to the matrix and the pins, and holds them in their exact position ready for investment.

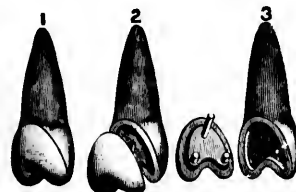


PLATE V.

The investment is composed of equal parts of asbestos and plaster of Paris. This will hold the pins in place during the baking.

#### PORCELAIN FILLINGS AND CROWN SECURED BY SCREWS AND ANCHORING DEVICES.

Plate VI, Fig. 1, illustrates screw passing through the porcelain and into a nut that is held in place by means of oxyphosphate cement. This establishes the nut firmly in position, and the screw

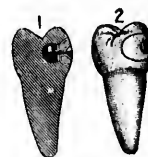


PLATE VI.

can serve as a very substantial means for securing the section of porcelain in place. In some instances it might be of advantage to use a solution of gutta-percha between the filling and the wall of the cavity, and thus have an indestructible cement that will not wash out; or this section can be forced on to a lining of sponge gold, Robinson's felt foil, etc.

#### CEMENTS.

There seems to be a great want of confidence in the stability of cements, and the surprising feature of this outcry, is especially directed against the introduction of this new process, just as though there could be any practical difference between the same application of the cements in this particular instance and the various other methods that are constantly practiced, and which are the mainstay of some of the most expensive and valuable results in modern dental



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art. When we take into consideration that our whole system of crowning, comprising upwards of twenty-eight various methods, are almost entirely dependent upon the cements for their proper adjustment, will it not be glaringly apparent that either we are guilty of falsifying to our patients in representing the permanency of bridge work and all our crown work, else those who challenge the durability of an improved modification of the same principles, are blindly prejudiced.

However, in order to accommodate the most incredulous, the following devices may be of interest: (See Fig 1, Plate VII.)

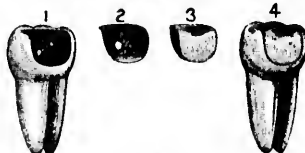


PLATE VII.

cavity No. 1 is lined with a gold matrix as represented at Fig. 2. This has been formed by burnishing a piece of platinum foil into the cavity. It is then removed and gold plate fused over the surface by the aid of the blow-pipe. This will form a gold and platinum lining that conforms to the exact outlines of the cavity. A hole is drilled in the center, through which a screw passes as shown in Fig. 1. The screw is provided with a shoulder, which is intended to force the matrix on to a solution of gutta-percha, or it may be asphaltum, sponge gold, Robinson's felt foil, or any other indestructible material. The object is to first establish a thoroughly reliable foundation for the section of porcelain as seen in Fig. 3. Fig. 4 indicates the completed work, the section being secured with oxy-phosphate cement. The latter material being between two indestructible surfaces, will be of little consequence if a portion should become disintegrated.

Fig. VIII illustrates an incis-  
or manipulated in the same  
manner. Fig. 2 in this drawing  
illustrates the matrix, 5, adjusted  
over the screw post, as seen in  
Fig. 1. Fig. 3 is the completed  
tooth crown, which is made in the

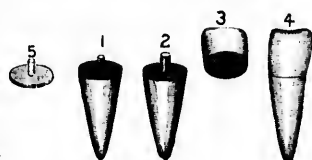


PLATE VIII.

following manner: The matrix, 5, forms the base or support on which to build the porcelain body. This, when mixed with a sufficient quantity of rain-water—preferred on account of having no lime in it, or distilled water can be had of your druggist—to form into a stiff putty or paste, in this plastic condition the body can be moulded or carved into any desired shape. The body is built on the matrix, 5, in the shape as seen in Fig. 3. It is then

placed in the muffle of the furnace and fused. When removed from the muffle it is then placed in a cold muffle and the air excluded until sufficiently cool, and when removed a shrinkage of about one-fifth in bulk will have taken place. This is known as the first biscuit. It will also be observed that cracks have formed; in some instances the body has separated from the matrix. These inevitable results make it necessary to resort to the second biscuit. A quantity of body is mixed to a creamy consistency. This is carefully jarred into the cracks, and in order to keep it from flowing out a clean and dry napkin is pressed against the surface. This absorbs the excessive moisture, and then it will be comparatively easy to mould the stiffer body and restore the original carving. It is again passed through the furnace, and should come out almost a perfect tooth in shape. But in order to imitate the natural expression with greater precision, the anterior surface of this prepared base is ground off sufficiently to make room for a prepared veneer, a front having the proper blending of color and shading to correspond with its natural neighbor, a more precise manner than could be accomplished by depending on the mere individual carving and shading before fusion.

#### FORMING THE MATRIX—Plate IX.

A piece of platinum, No. 60, is prepared as seen at A. The hole in the center is somewhat smaller than the tube, E. By means of the small pointed instrument, asbestos fibre is made into a rope as shown at B. The

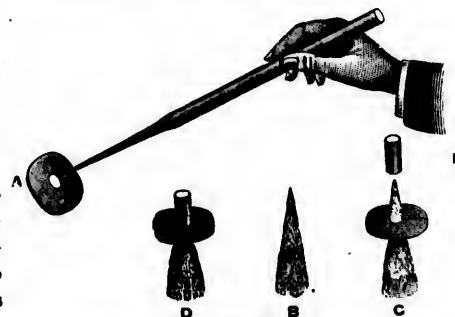


PLATE IX.

tube, E, is then passed over the fibre as indicated at C, and when packed by means of the instrument it will appear as seen at D. This will be found a very convenient and rapid method of holding the platinum tube firmly in position while soldering it to the base.

**PLATINUM PINS.**

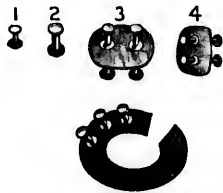


PLATE X.

Plate X illustrates a new form of double-headed platinum pins especially designed for the new process, and other applications, as an important aid to dental operations. In the engraving they are shown soldered to a gold clasp which is intended for rubber work. Also they are shown attached to both sides of a metallic

matrix. They are a very useful device for attaching rubber to gold plates, etc. Both heads are perfectly flat, and are designed to stand on end without danger of falling during the process of soldering.

Plate XI illustrates an anchoring device. By reference to Fig. 1 it will be observed that gold nuts have been previously imbedded in the body of the cement. The screws

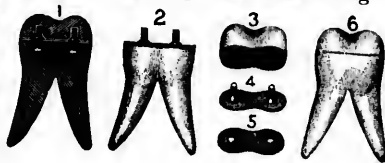


PLATE XI.

are shown as being engaged with them and into the tubes provided for their reception, in the body of the crown. Notice that the screw posts are provided with a shoulder. This is intended to force the metallic plate, Fig. 5, on to a surface of indestructible material. The platinum matrix, 4, is designed to fit over the posts, as seen in Fig. 2, and when the porcelain is added, will resemble Fig. 3. Fig. 6 is the completed tooth crown.

**A SYSTEM OF PARTIAL CROWN WORK.**

PATENTED DECEMBER 20, 1887.

These improvements have developed a new and practical method of preparing and attaching artificial sections of teeth which may be appropriately designated as partial crowns. From a series of different shades of porcelain body, these

sections can be made to imitate the various colors of the natural teeth perfectly. Fig. 1, Plate A, illustrates a bicuspid with anterior portion of the natural tooth intact, having Howe post attached. Fig. 2 represents a platinum matrix



PLATE A.

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that has been carefully fitted about the post and burnished to the tooth. Fig. 3 illustrates the approximate surface of matrix, showing counter-sink for the post or screw, and on the anterior side part of the fused porcelain body can be seen. This forms a complete section ready to be cemented to the tooth, as shown in Fig. 4. From Figs. 1 to 5, in Plate B, are modifications of the same for molars.



PLATE B.

### IMPORTANT.



PLATE C.

Plate C will be interesting from the fact that it demonstrates a practical means of adjusting a porcelain section without resorting to posts or screws, and is especially appropriate where the pulp has not been destroyed. Fig. 1 represents anterior side of molars, showing the prepared cavity. Fig. 2 is the platinum matrix.

In the interior of this will be seen a piece of platinum in the form of a pyramid. This has been soldered to the matrix, and is intended to form a countersink in the completed section, as shown in Fig. 4. Fig. 3 is the completed section showing anterior surface, and Fig. 5 is the section cemented in the tooth.

Referring to Fig. 1 in this engraving, attention is called to the fact that where a cavity is deep and the angles are abrupt, that no countersinks or screws are needed; also that after the matrix has served the purpose of forming the section, the platinum is removed. This leaves a section of porcelain the exact counterpart of the cavity. When cemented in place would appear as shown in Fig. 4.

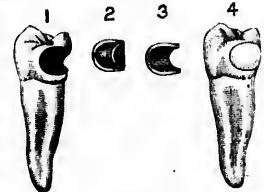


PLATE D.

Plate E is a modification of the same process, involving two-thirds of the crown of a molar. Fig. 1 indicates that about one-third of the crown is left intact, showing large cavity prepared with suitable undercuts. Fig. 2 is platinum foil No. 60. This has been burnished over the horizontal portion of crown, then the prepared

countersink, Fig. 3, which, it will be observed, has a large-headed platinum pin soldered in the interior. This prepared countersink

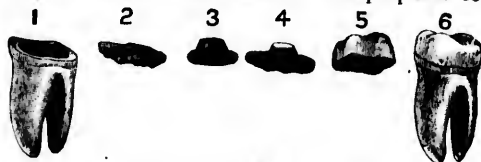


PLATE E.

is then carefully laid on the burnished piece of platinum, as shown in Fig. 4. Body is then built about it and fused in the gas furnace, and would appear as seen in Figs. 5 and 6. By carefully burnishing the platinum to the surface of the tooth, every little indentation is impressed on the surface; in fact, the platinum takes a perfect impression of the tooth. Notice that the countersink, Fig. 3, is simply laid on the platinum, and not soldered to it, so that when the porcelain body has been fused the platinum can be peeled off. This leaves the approximate surface of the crown the exact counterpart of the horizontal surface of the natural tooth. The countersink being embedded in the central portion, the adaptation can be made remarkably perfect. The cavity in the tooth and the countersink in the crown is then filled with cement, and the two pressed together and allowed to harden, making a very desirable and durable piece of work.

### A DEVITALIZED CENTRAL INCISOR.

PATENTED JULY 10TH, 1888.

No. 1 illustrates the anterior surface reduced about one-half the thickness of the tooth; Fig. L is platinum matrix; Fig. M, porcelain veneer; Fig. 3 is platinum matrix and veneer fused together; Fig.

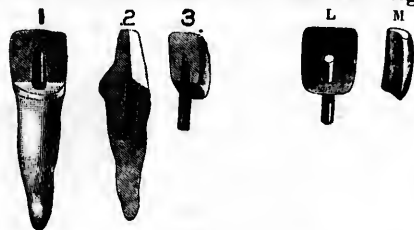


PLATE F.

2, the same adjusted to the tooth. This has proved to be a very satisfactory method of restoring the color of teeth, in place of the usual mode of bleaching.

Reprinted from the "Independent Practitioner" of August, 1896.

## A NEW SYSTEM OF RESTORING BADLY DECAYED TEETH BY MEANS OF AN ENAMELED METALLIC COATING.

By DR. C. H. LAND, DETROIT, MICH.

This invention consists of a coating of platinum made to fit the outside of the teeth, after which the anterior surface is coated with a porcelain enamel front, made to imitate the natural organs so perfectly that the art is concealed. Many of the long and tedious operations, where it has been deemed necessary to insert large and conspicuous gold fillings, may by this process be avoided, while better results are attained.



FIG. 21.

Fig. 21 is a typical case, where in place of inserting the usual gold fillings, the anterior surface may be reduced by means of small corundum wheels used in the dental engine, as indicated in Figures 1 and 2, Plate A.

Fig. 13, Plate B, is the prepared crown, ready for adjustment to the same by the use of oxy-phosphate cement. Fig. 22 represents a typical case of undeveloped lateral incisors, which can be enlarged to the proper size by the same means.

Fig. 4, Plate A, represents a decayed molar. Fig. 8 is the same prepared to receive the amalgam filling, which, when sufficiently hard, is prepared as shown in Fig. 12, ready to have the crown, Fig. 16, cemented to it with oxy-phosphate cement. Fig. 9 is a central incisor, Fig. 10 is a cuspid and Fig. 11 a bicuspid. Figs. 13, 14 and 15, the crowns ready for adjustment. Those who object to the use of amalgam may use white cement or gutta-percha for fastening.

The manner of procedure in the case of devitalized and discolored incisors is first to prepare the teeth as shown in Plate A, Figs. 1 and 2. Then a thin piece of platinum plate, No. 30, standard gauge, should be fitted accurately to the



FIG. 22.

tooth, forming a hollow shell. Enamel fronts are now ground to fit, as shown in Figs. 17, 18, 19 and 20; after which they are fused to the platinum in the same manner as continuous gum work, by

using a porcelain body prepared expressly for the purpose. By the use of Land's Gas Furnace this can be done in ten minutes. The enamel fronts and body are also manufactured and for sale by the Wilmington Dental Manufacturing Co.

Fig. 9 represents a central incisor built up with amalgam or cement, to which the platinum is closely fitted, after which the enamel front, Fig. 17, is ground to fit and fused to the shell, as shown in Fig. 13, ready for adjustment to Fig. 9. Figs. 10, 11 and 12 are modifications for canine, bicuspid and molars, ready to receive the prepared coatings, Nos. 14, 15 and 16.

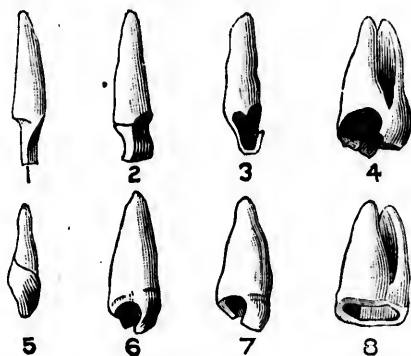


PLATE A.

In introducing this class of work to the dental profession, a means is afforded through which a much better artistic effect can be attained and the preservation of a larger amount of tooth structure be secured. Add to this the fact that there is but very little pain or fatigue, either for the patient or operator, and it will be doubly appreciated.

During the past year this class of work has been thoroughly tested as to durability and found to be much more reliable than gold fillings. In large contour work the frail walls of the tooth must be the main dependence of support, while with the hollow shell the weak tooth is held together. Thus it will be seen how much more complete is the preservation of tooth substance, it not being necessary to make undercuts or retaining pits.

A young lady recently presented herself with both central incisors broken off by accident, the left one having lost about half its crown, with complete exposure of the pulp, the right one having only about one-sixth of its substance gone. Her teeth were unusually

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well preserved, while they were large and quite conspicuous. The right central was easily restored to a good contour by a little grinding. The left, after necessary treatment, was simply ground down upon the anterior surface, an operation demanding less than ten minutes of time. In twenty minutes more a platinum overcoat was fitted to it, and the enamel front ground to it. This completed the first sitting. In the afternoon of the same day it required but a sitting of fifteen minutes to adjust the prepared coating. The result was

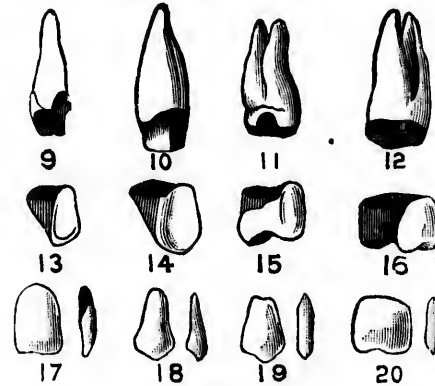


PLATE H.

a complete restoration, with the least possible amount of inconvenience to the patient and the greatest amount of tooth substance preserved. Contrast this operation with what it would have been necessary to do had I attempted to restore the tooth by means of a gold filling, or to place upon the root a properly prepared gold crown. Think of the long and tedious operation, and when completed what a conspicuous piece of mouth jewelry it would have presented, and you may, perhaps, realize a part of the degree of satisfaction which I felt when I finished my operation.

#### SIGNIFICANT.

The mere coating of a metallic tooth crown with enamels, in all my former experiments, proved to be impracticable. This was especially so in the case of front teeth, for the following reasons:

*First*—It was impossible to secure the proper tint or shading.

*Secondly*—The contour of the surface of the tooth could not be produced with that accuracy and finish as obtained in the case of

moulded teeth; hence my reasons for resorting to the prepared veneers.

The next difficulty to overcome was to provide a metallic base, constructing it in such a manner whereby a sufficient quantity of body could be provided, in order to gain more strength, as well as to make more room for reliable fastening devices. In addition to this, it required a greater depth of body over the platinum base, on account of the dark gray color of the metal being transmitted through the translucent body. It was, therefore, found impossible to succeed with a thin coat of enamel or body and at the same time secure the proper color of the natural tooth substance. In addition to the above, I found it necessary to provide a series of prepared veneers as separate articles of manufacture, producing them in a great variety of forms, sizes and shades. From a selection of them the dentist could obtain results that represented an expenditure of time, expense and labor, impossible for him to secure by any other method. In a series of devices of this kind, a ready and reliable means was made available in which to obtain the proper blending of colors, accurate contour of surface, finish, etc. An illustrated description will make it better understood. (See the following article, Plate XX.)

### IMPROVEMENT IN OPERATIVE DENTISTRY.

PATENTED JULY 10TH, 1868.

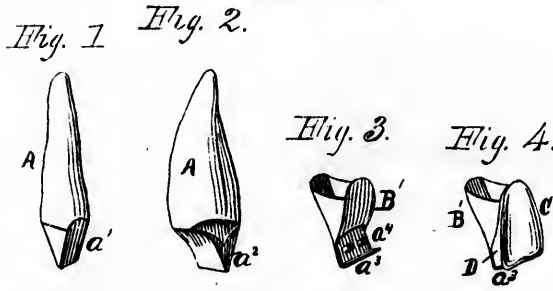
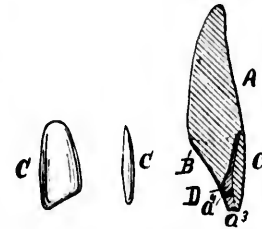


PLATE 20.

This invention has been nominated an improvement in operative dentistry, from the fact that it consists of much more than the mere coating of a metallic base with enamel; also that it covers more than a single result, being applicable for both partial and entire

crowns, fillings, etc. Fig. 1, A, illustrates the shape in which to prepare the crown by reducing the natural tooth substance. Fig. 2, A, indicates the same shape built on a root. Fig. 3 is the platinum matrix, showing its proper shape and having pins attached. Fig. 4 is the completed metallic overcoat; C, C, veneer. When the matrix is ready as shown in Fig. 3, the first stage of the operation is to lay a coating of body about the pins, filling the depression so as to produce an angle as seen in Fig. 1, A. It is then passed into the furnace and the body fused to a glaze. It is then removed and placed into a cold muffle to cool. This is known as the first biscuit. At this stage of the process it is ready to receive the veneer, as shown at Fig. C, C. The veneer is secured by placing a portion of body between it and that which has been fused to the base, Fig. 3, when it is ready for the final bake, and would appear as shown in Fig. 4.



#### INCIDENTS OF OFFICE PRACTICE.

Patient, lady of 30 years, presented the irregular position of the root of left lateral incisor. An artificial tooth crown, Logan pattern, had been adjusted to the root, but proved to be unsatisfactory.



PLATE R.

This singular defect was restored in a most satisfactory manner as follows: The Logan crown was removed, and a screw-post adjusted as seen in the engraving, Plate R. The platinum telescope as shown beneath, was made to fit over the root and post. After the telescope is removed—being in the form of a tapering cylinder—it will be found necessary to first grind off the lingual surface in order to have it present corresponding angles with the adjoining teeth. Having cut away this portion of the cylinder, a piece of plate is cut, and then burnished to conform to the shape of the angle of the lingual surface of the corresponding members. It is then soldered with puro gold to the

cylinder. The next stage of the operation is to grind the anterior surface of the cylinder very thin; then adjust it to the root. Hold it firmly in its place until, by means of a round-ended burnisher, it can be malleted in such a manner as to reduce the front sufficiently to make room for the prepared veneer. In the engraving, Plate S, the completed operation is shown, indicating that not only the veneer has been fused to the prepared cylinder, but also a portion of artificial gum was added; thus restoring the proper length of tooth and completely concealing the position of the abnormal root. In many instances both tooth substance and gum can be restored artificially, and to a degree of perfection that will be a surprise to the uninitiated in the art.



PLATE S.

Miss —, 14 years of age, healthy and well developed, except the defect in the teeth, presented a condition as illustrated in the engraving Fig. 1, Plate G.



BEFORE THE [PLATE G.] OPERATION.

This will be interesting both to the dentist and the physiologist. Notice that the roots of the teeth have grown to almost their normal size, and are evidently still progressing. It will be observed that the enamel of the crowns is perfectly developed for a short distance from the roots, and that it ends abruptly, the rest of the crowns showing a want of development, principally on that portion of the teeth where enamel alone should form; it will also be seen that the defect involved all of the front teeth and a portion of those at the back. On the lower jaw marked traces of the same defects were apparent and correspond to the same conditions as above. The indications are that in childhood local causes had in some way retarded the building up of the functions during the greatest period of the development of these particular teeth, which was verified by the statements of her parent, who informed me that her daughter, when a child, had been in feeble health for several years, and this after a severe attack of scarlet fever. Here then is a beautiful illustration of the



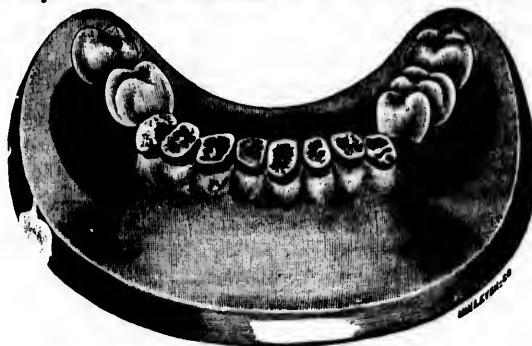


APPEARANCE AFTER [PLATE II.] RESTORATION.

allied interests of medicine and dentistry. Evidently the primary cause of the disease originated at that period of life when the application of medical skill was the only remedy that could be applied, and years after the opportunity arrived when it was time for the dentist to complete the healing art. Fig. 2, Plate H, illustrates the same case restored by means of metallic enamel coats. Practically, that which nature had been unable to provide had been accomplished artificially, and the most important feature of the work is that this has been done without the necessity of destroying any pulps or injuring any of the sensitive tissues. The teeth are now thoroughly protected from decay and are restored perfectly in shape, size and color, serving their purposes as completely as though no disease had occurred.

#### PATIENT No. 2

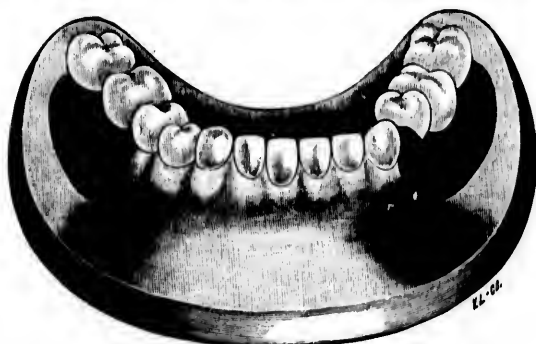
Age 48 years; lower incisors worn off by abrasion, as shown in the engraving, Fig. 1. This involved the eight lower anterior teeth, the molars being substituted with a partial denture of continuous gum work. The patient having a vigorous constitution, the teeth were well set in the process and gums. Pulpas had receded and partial ossification taken place. The work demanded was not only to adjust crowns on the roots but to restore the proper length



BEFORE THE [PLATE I.—FIG. 1.] OPERATION.

both in the artificial denture and crowns, so that the antagonisms would be the same as when the teeth were in their normal condition. In preparing the metallic enamel coats an alloy of platinum and iridium was used; the object sought was to have the metal as thin as possible and at the same time be sufficiently strong to withstand the use required in mastication, etc. Also realizing the advantage of having the metal coats as thin as possible about the necks of the teeth, which would secure a very close adaptation and take up the least space between the roots.

In this alloy the desirable qualities were found especially for the lower incisors. Fig. 1, Plate J, illustrates the appearance of the work when completed, and is at present giving the utmost satisfaction. Four years previous these teeth had been built up with gold



APPEARANCE AFTER [PLATE J.—FIG. 1.] RESTORATION.

by an experienced and careful operator, but as usual the gold had gradually become battered down and completely worn off. In comparison I have a large number of crowns that were adjusted to the roots of teeth eight and ten years ago, and this was done in a crude way, and at the present time doing good service. I therefore can speak with confidence as to the greater durability of this more perfect method of adjusting porcelain coats, sections and fillings, whereby every possible condition of decay can be arrested and the teeth restored perfectly to their natural appearance in shape, size and color. Add to this the fact that these operations are accomplished without pain or fatigue to either the patient or dentist, that the long and tedious malleting is dispensed with, the protracted use of rubber dam not required; therefore will it not be considered as one of the greatest boons to suffering humanity.

**VALUABLE ADVICE.**

Do not imagine that a blacksmith's bellows will answer the purpose of an air supply for the furnace; while it may have plenty of volume, it lacks the pressure. Nor will hydrostatic apparatus do; it may furnish the pressure, but lacks the volume.

If the gas meter is more than thirty feet from the furnace, and the supply of gas not enough to give a rich and full volume, it will be due to want of pressure at the works, or to the small size of the pipes at the point of delivery. When there is not enough gas the first step will be to have the pipes replaced with a three-quarter-inch main from the meter close up to the furnace.

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**IMPORTANT.**

The rubber tubing connecting with the bellows and the furnace should be as short as possible. The longer the pipe the greater friction there is to overcome, and strain on the bellows. Also the increased work of the operator will be materially affected. Even one foot of extra pipe will make a decided difference, not only with the extra exertion of the operator, but the lack of a strong jet of air into the burner will retard combustion, thus interfering with the successful operating of the furnace.

A piece of wire cloth—very fine mesh—should be placed over the air supply pipe or at the orifice of the blower. This will prevent any small particles of dirt from getting into the small tubes of the blow-pipe to clog them.

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**NECESSARY MATERIAL FOR PRACTICING  
THE ART.**

For preparing sections for fillings, Platinum Foil No. 60, standard gauge, is the proper thickness, and for large cavities No. 50 or 55 is recommended. For making the telescopes for crown work use Nos. 28 to 32 Plate. All should be well annealed by heating with the blow-pipe to a white heat.

Where the lower front teeth are to be crowned an alloy of Platinum and Iridium is used. This is much stiffer and can be rolled to No. 35 Plate. Where it is desirable to take up less room between the roots of the teeth this is recommended.

There are now five standard shades of bodies or enamels, put up in one ounce packages; and by mixing these in various proportions a great variety of tints may be had. Also a great variety of

prepared veneers, representing the anterior surface of each class and size of teeth, are put up in packages of 100, assorted incisors or molars and bicuspid, or cuspid.

Long and short flat-headed Platinum Pins may be had, put up in dozen or two dozen packages. These are very useful in making attachments for fillings, for clasps, for rubber work and backings, for plate, teeth, crowns, etc.

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### TO THE DENTAL PROFESSION.

In dividing our interests, it has not been without a careful consideration of the rights and the protection of others as well as our own. Of the several methods of handling patented inventions, and after testing other ways of making our interests mutual, have found the license plan the only practical and satisfactory method of securing equal privileges to all.

We realize that these improvements are to be observed strictly as an art, and do not expect that every one who may assume to so practice it will be successful. Our terms and conditions may have a tendency to keep many from investing. This we anticipate, but are of the opinion that better protection will be maintained by upholding the highest standard in excellence of products, etc.

The first mutual act will be the opening of our office and laboratory, free to instruct all those who will see enough value in what we have to offer for reasonable considerations. We cordially invite an investigation, and feel sure of being able to offer a series of improvements that have a real, substantial value. Dr. Land has, for the past eighteen years, enjoyed a select practice exclusively with the wealthy and influential citizens of Detroit and vicinity, making a specialty of high grade dental operations, both in the mechanical and operative branches of the art, and hereafter will give especial attention to visiting dentists who wish to investigate.

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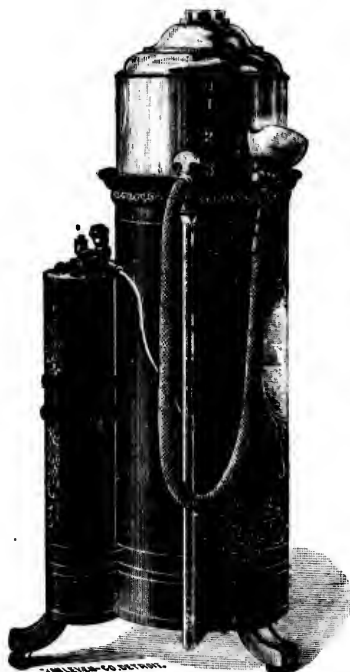




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