No. 869,311. PATENTED OCT. 29, 1907.

A. LEUCHTER.

PROCESS OF PRODUCING GELATIN FORMS OR MOLDS.

APPLICATION FILED FEB. 23, 1905.

Fig. 1.

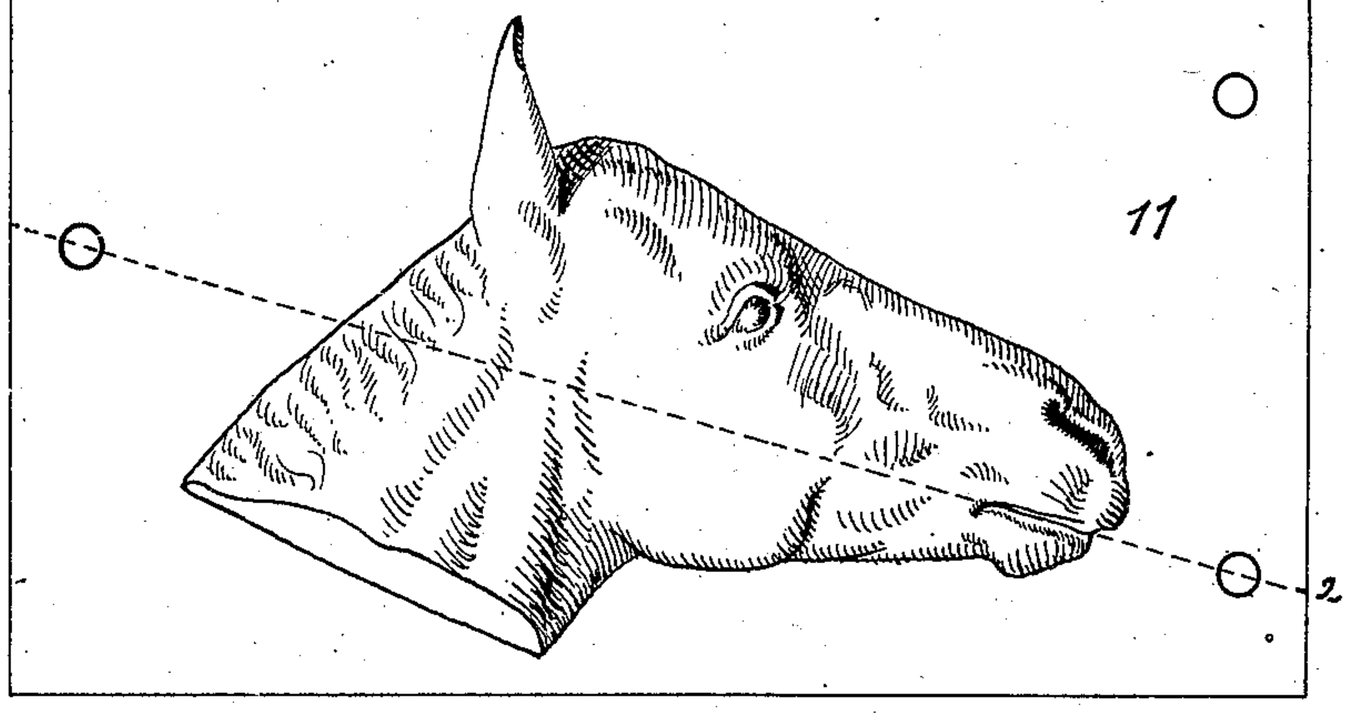


Fig. 2.

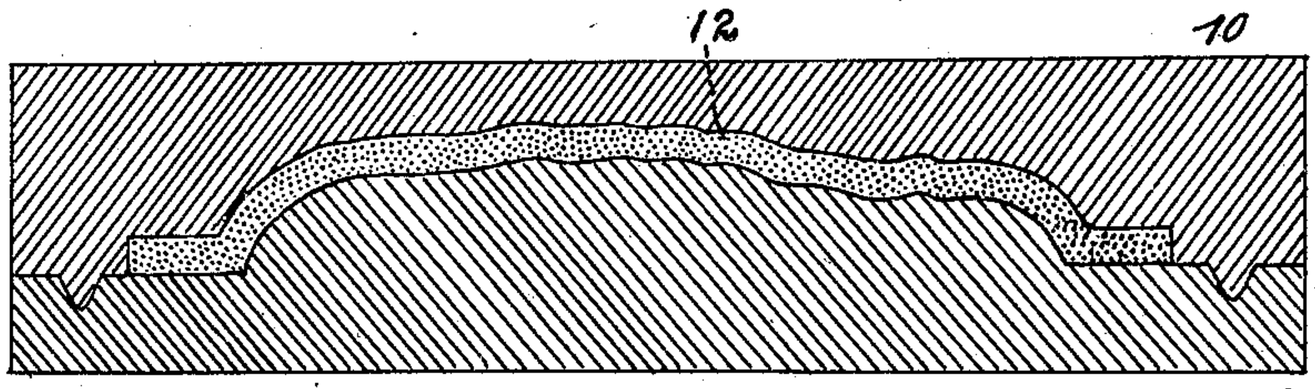


Fig. 3.

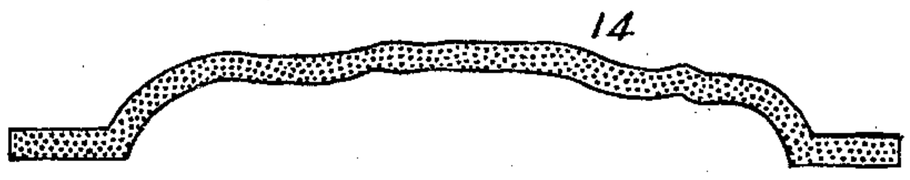
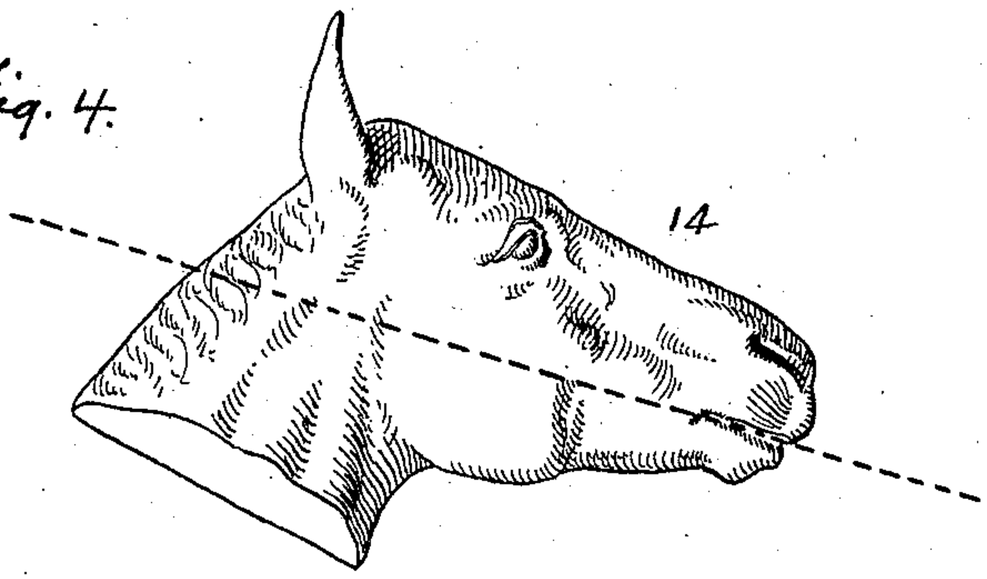


Fig. 4.



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PROCESS OF PRODUCING GELATIN FORMS OR MOLDS.

No. 869,311. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed February 23, 1905. Serial No. 246,900.

To all whom it may concern:

Be it known that I, AUGUST LEUCHTER, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Processes of Producing Gelatin Forms or Molds, of which the following is a specification.

The invention relates to improvements in methods of producing forms or molds in gelatin or other suitable material in reproduction of original models or articles, the said forms or molds being utilized in the manufacture of molds in plaster or other soft mold-material for use, in the customary way, in the final production of the articles represented by the gelatin forms or molds.

It is common in the art to produce gelatin forms or molds from and in the exact size of original models or designs and to utilize these forms or molds in the making, from them, of molds in plaster or other soft mold material.

My invention resides in methods of procedure by which I am enabled to produce gelatin forms or molds in proportionately reduced size from an original model or article and to vary this reduction as may be required, whereby with the use of one original model or design to be copied I am enabled to produce a gelatin form or mold exactly representing such model or article on a reduced scale, and whereby also if a still further reduction is required I am enabled to reproduce in the gelatin composition this first form or mold and obtain a reduction of it, and so on.

I prepare the gelatin composition for the form or mold in a special way and first produce this form in the exact size of the original article or model to be copied, and then I submit this form to a special bath whereby it is proportionately reduced in size. If a further reduction is desired I make another gelatin form or mold from the thus reduced first form and then subject it to the reducing bath whereby I obtain a second proportionate reduction from the original model or article, and I may secure a third and then a fourth reduction, and so on, in the same way.

My invention has a wide application, but its utility may be appreciated in connection with the manufacture of ornamental bands or figures for sets of silverware, the different pieces of a set requiring the same design but on a reduced scale, and also in connection with the manufacture of silver spoons in which the same design must appear on at least three sizes of spoons, to-wit: the table-spoon, dessert-spoon and tea-spoon. In accordance with my invention it is only necessary in the first instance to provide a model of the table-spoon, since from this one model I can produce three gelatin forms or molds of the exact size for the table, dessert and tea spoons, each of the two latter bearing the exact design of the original model proportionately reduced. The first gelatin form or mold I would produce from the model if intended for table-spoons would be made in the ordinary way and would not necessarily involve the use of my invention, since my invention comprises the production of the forms or molds on reduced scales from the original. Hence in carrying out my invention, aside from preparing the special gelatin form or mold to be used for table-spoons, I produce from said model a gelatin form or mold of the size of the table spoon but intended for dessert spoons, and I subject this form or mold to my reducing bath whereby it becomes proportionately reduced in size and to the requirements for dessert spoons. This reduced gelatin form may now be utilized in the proper way as an original model from which (by forming a plaster casing thereof and casting therefrom) a further gelatin form or mold may be prepared, and which when prepared will be subjected to the bath and reduced to the proper size for a tea-spoon. Thus from the one original model I am enabled to produce forms or molds for table, dessert and tea spoons, whereby the expense of producing a special original model for each of these sizes of spoons is avoided.

In many instances several of the gelatin forms or molds, all of the same size, may be produced from the one original model and variously reduced in accordance with the length of time they are permitted to remain in the reducing bath, but there is a limit to which a form or mold may be properly reduced and hence where excessive reductions are desired, as from a table-spoon size to a tea-spoon size, I first reduce the table-spoon form or mold to the proper size for a dessert spoon and from this prepare a second form or mold and reduce it to the tea-spoon size.

My process carried out in the natural way will produce exact proportionate reductions, but there are instances in which some modifications of the modeling are desirable and these may be readily produced, with simple manipulation, while carrying out my invention, it being convenient with my invention to reduce the height of the elevations of a design without reducing the area of the design, and also convenient to distort the outline of a design either laterally or longitudinally. These modifications in design are sometimes desirable in, for illustration, a silver service so that there may not be too great an exactness of reproduction in the several pieces of the service; and such modifications are also desirable in a set of spoons, so that the spoons of different sizes may not be all of exactly the same proportionate shape. In the case of many other articles the preservation of proportionate shapes in the reductions is absolutely essential, as for instance in the production of medallions of the human face, statuary, etc., and this result is accomplished naturally and in the regular practice of my invention.

My invention is based on the principle of incorporating a large amount of water into the gelatin solution

I use for the forms or molds, and in thereafter compelling the forms or molds to yield up the excess of water and become proportionately reduced in size, this second step being accomplished by simply allowing the gelatin forms or molds to lie submerged a suitable length of time in my reducing bath.

I illustrate in the accompanying drawings, as nearly as may be, my invention, Figure 1 being a top view of the lower half or section of a casing in plaster or other suitable material bearing a model prepared in exact size from an original article intended to be copied and reduced, the article in this instance having been a representation of the head of a horse; Fig. 2 a vertical section through the two sections of said casing on the dotted line 2—2 of Fig. 1 and showing the gelatin form cast therein; Fig. 3 a like section of said gelatin form after it has been removed from the casing and reduced in and by the reducing bath, and Fig. 4 a top view of same.

In the drawings, 10, 11 respectively denote the upper and lower sections of the casing of plaster or other suitable material prepared from an original article, 12 the gelatin form cast therein in exact size of the said original article, and 14 the same form after having been reduced in and by the reducing bath.

In preparing the gelatin solution I prefer to employ about one part of dry gelatin to five parts of water. It is desirable to embody as much water as possible in the solution, since by reason thereof the greatest reduction, at one operation, of the form or mold may be accomplished in the bath. It is essential, however, that the reduced form or mold shall have a reasonably firm and elastic body, especially where undercut modeling is involved or when it is desired to stretch or press the reduced form or mold or a part thereof out of its normal proportionate reduced dimensions, and hence too great an excess of water should not be incorporated in the solution but in each instance as large an amount of water as may be consistent with the degree of reduction desired at each operation and the production of a reasonably firm form or mold, should enter into the solution. One effect of the reducing bath is the creating in the gelatin form or mold both firmness and elasticity and the capability of being stretched within reasonable requirements. The gelatin solution employed by me thus differs from other gelatin solutions only in the fact that I incorporate a large proportion of water in the same, with the definite purpose of removing this water from the form or mold to accomplish the proportionate reduction of the latter. The gelatin form or mold after leaving the bath differs however from other gelatin forms or molds due to the characteristics imparted to it by the bath.

The reducing bath into which I submerge the gelatin forms or molds is a strong alkali solution capable of evenly and proportionately reducing the gelatin forms or molds, except when the contraction of the latter is influenced mechanically as hereinafter explained, and by preference this bath is a silicate or waterglass solution of about thirty-six degrees (Baumé hydrometer), this being a heavy and strong alkali solution. The gelatin forms or molds when composed of about one part of dry gelatin to five parts of water will, when allowed to remain about six or eight hours in the bath, contract from three-sixteenths to one-quarter inch per inch of form or mold. When a greater proportion of water is incorporated in the gelatin form or mold, a greater contraction thereof in the bath will naturally take place, and the proportion of water employed will depend somewhat upon the nature of the mold and the reduction desired. Where the gelatin form or mold may be taken off from the original model or pattern with ease, it is possible to increase the amount of water in the gelatin solution from five to seven parts. No matter how weak a gelatin form or mold may appear before subjecting it to the reducing bath it will, after removal from the bath, be found to have changed very materially and to have become very elastic, strong and pliable and capable of being easily forced, when desired, out of its natural and proportionately correct educed form into irregular and special shapes, thereby rery greatly increasing the field of application of this rocess.

Having prepared the gelatin solution and also the reducing bath, the process of creating the gelatin forms or molds and then reducing them may be proceeded with. The first step necessary is in performing the usual preliminary work of making the plaster molds or casings to surround the models or designs to be copied and into which the gelatin solution is poured to fill the space between the inner wall of the plaster casing and the surface of the model or design to be reproduced, and I need not specifically describe the method of preparing these plaster molds or casings, since I follow the ordinary methods in use in taking an elastic or glue mold from a model or pattern. I may say, however, that care should be taken in preparing the plaster mold or casing with the view of having the space between the inner wall of the casing and the face of the model or pattern of as nearly uniform diameter as may be consistently possible, so that the gelatin form or mold when removed from the model or pattern may be as nearly as possible of uniform thickness.

Having prepared the plaster casing I proceed at once in the ordinary way of pouring the gelatin solution, as prepared by me, into the said casing, and thereafter, at the proper time, remove the casing and strip the gelatin form or mold from the model or pattern. The gelatin form or mold thus produced is immersed into the reducing bath and allowed to remain until the desired reduction in its size has taken place or until all of the reduction that can well take place in one operation has occurred. The action of the bath on the gelatin form or mold may be observed and when the form or mold has become reduced to the desired size it may be removed from the bath. I will assume that the gelatin form or mold has been allowed to remain a proper length of time in the bath and has become reduced to just the desired size for use. At this time the gelatin form or mold is immediately taken from the bath and quickly rinsed with cold water and dried, by means of blotting paper for illustration, whereupon I proceed to treat the gelatin form or mold so that it may become indifferent to both moisture and warmth. Prior to this treatment the gelatin form or mold is not in a state to copy from since moisture would cause it to swell and become distorted and warmth would soften or melt it. I, therefore, proceed to at once treat the gelatin form or mold so that a cast in plaster or other soft mold material may be taken from it, and this treatment consists in first

brushing over the gelatin form or mold, with a soft brush, a limited quantity of formaldehyde of about forty per cent strength, and then, at intervals of about five minutes each, applying a second and then a third coating of the formaldehyde. It is essential on the first application of the formaldehyde that the latter be sparingly used, as the same is a fluid and might affect the reduced form or mold. The formaldehyde immediately begins to harden up the form or mold and finally transforms the soft flexible and springy material to a hard and brittle mass not capable of changing its previously assumed shape and quite indifferent to moisture or warmth, so that a plaster cast or even a wax or other soft mold may be taken from it. The gelatin form or mold becomes affected by the bath and after leaving the bath the gelatin-silicate substance of which the reduced form or mold then consists, while being soft, flexible and springy possesses considerable tensile strength and may be stretched within limits to distort its proportionate reduced shape if so desired. The reduced mold or form preserves every bit of the surface modelation, even to the finest detail of a chased pattern, and without the least distortion, the reduced form or mold possessing identically the form of and all of the modelation on the original article on a proportionately reduced scale.

Having removed the gelatin form or mold from the bath and transformed it into a hard and brittle condition, a plaster cast or other soft mold may be taken from it in the ordinary way, and this will end one method of carrying out my invention, since the essential feature accomplished by my invention is the production of the reduced forms or molds in condition for use in preparing therefrom the plaster casts or other soft molds. There are, however, several modifications which may be followed with advantage in carrying out my invention in its wider application. In my reducing process I often use a positive form of my reducing substance instead of a negative form or mold, more especially when a pattern is not undercut or is only slightly so and a cast in plaster or sulfur may be readily taken from it. After producing the negative form or mold and when I desire to use a positive instead of a negative, I take the cast from my negative, in the usual way, with the result that I obtain a positive form or an exact duplicate of the original mold or pattern in my reducing substance. It is a matter of judgment when to use the positive and when to use the negative form, but in both methods excellent results are secured.

If it should happen that the gelatin form or mold after remaining in the bath as long as it should stay there has not become reduced to the extent it is desired, this being in a case where an excessive reduction is required, I remove the form or mold from the bath and treat it with the formaldehyde as above-described, and take a plaster cast from it and then make a new gelatin form or mold from this reduced form and subject it to the reducing bath, whereby I may obtain a form or mold in exact reproduction, on a reduced scale, of the original model or design, but more greatly reduced than any reduction could take place in one operation of the bath. In carrying out this method of procedure, I now have one form or mold representing one reduction and a second form or mold representing a still greater reduction, and it is obvious that I may repeat the operation until I obtain the several sizes of forms or molds I may desire or the final small size of mold that I require. This operation of securing the several reductions involves simply a repetition of the operation of securing one reduction.

If it is found that a mold has been reduced to too great an extent in the reducing bath, it may be easily corrected by placing it in a bath of plain cold water and allowing it to swell to the size required, whereupon it will be treated with the formaldehyde and made ready for the casting operation.

In the natural reducing process carried on in the bath the gelatin form or mold will be proportionately reduced in size, and since this may not always be desired, I should explain that the character of reduction may be controlled in some ways by mechanical manipulation. There might be an instance in which a design possessing a bold and high modeling may be required for certain articles in a silver service and that the same design and covering the same area but with shallower and more delicate modeling may be required for other articles of the service, and in such instance I would prepare the gelatin forms or molds from the original model or pattern showing the bold modeling in the manner above described and then by mechanical means prevent the lateral and longitudinal shrinkage of the same in the bath and allow only a vertical reduction in the form or mold; in this way only a vertical reduction of the gelatin form or mold can take place and no lateral or longitudinal contraction can occur, and the result will be the gradual changing from a bold and high to a shallow and low modeling without altering the area of the pattern at all. In carrying out this method of utilizing my process, I would clamp the gelatin form or mold in an open frame, the edges of the frame binding against the edges of the gelatin form or mold so as to prevent the latter, while in the bath, from contracting either laterally or longitudinally. After this form or mold, held by the clamp-frame, is removed from the reducing bath it must be treated with the hardening fluid before being released from the frame, after which the form or mold will present the same size of pattern as the original model but of low modeling. There are various other ways of mechanically manipulating the gelatin form or mold so as to obtain varied results due to controlling the contracting action of the bath.

Various other ways of manipulating the gelatin form or mold and the reduced form or mold may be resorted to in obtaining casts presenting more or less irregularities of form from the original model or design. In the case of preparing from one original model or design the several sizes of forms or molds for a set of tea-spoons, it is desirable that the several sizes of spoons should not all possess the same identical form and outlines, and in this instance the reduced forms or molds may be either stretched or compressed either laterally or longitudinally, to vary the general outline of the pattern, and held in their distorted position while being subjected to the hardening action of the formaldehyde. For instance the reduced form or mold for a tea-spoon might be stretched longitudinally or laterally or longitudinally in one part and laterally in another part and held in the distorted condition until the substance has become hardened by the formaldehyde,

after which the mass then being hard and set may be at once utilized in the production of the proper casts.

There are thus many ways of utilizing the present invention. If the process is followed along its natural course without special manipulation the reductions will all be proportionate, and where proportionate reductions are not desired the gelatin forms or molds, either while in the bath or after leaving the bath and before becoming hardened, will be subjected to such manipulation as may be required to attain the desired end. There are many instances in which the exact proportionate reductions are absolutely essential.

It is to be understood that I do not limit my invention to the use of any special gelatin substance, sinec by the term gelatin I mean to include all appropriate substances of a gelatin character.

What I claim as my invention and desire to secure by Letters-Patent, is:—

1. The process of producing gelatin or like forms or molds on a reduced scale from an original model, which consists in incorporating a large proportion of liquid in the gelatin or like solution and therewith making the form or mold from the model, then subjecting the form or mold thus produced to the action of a silicate or waterglass bath for effecting a contraction of the same, and then hardening the thus reduced form or mold; substantialy as set forth.

2. The process of producing gelatin or like forms or molds on a reduced scale from an original model, which consists in incorporating a large proportion of liquid in the gelatin or like solution and therewith making the form or mold from the model, and then subjecting the form or mold thus produced to the action of an alkaline bath adapted to effect a contraction of the same; substantially as set forth.

3. The process of producing gelatin or like forms or molds on a reduced scale from an original model, which consists in incorporating a large proportion of liquid in the gelatin or like solution and therewith making the form or mold from the model, then subjecting the form or mold thus produced to the action of an alkaline bath for effecting a contraction of the same, and then hardening the thus reduced form or mold; substantially as set forth.

4. The process of producing gelatin or like forms or molds on a reduced scale from an original model, which consists in incorporating a large proportion of liquid in the gelatin or like solution and therewith making the form or mold from the model, then subjecting the form or mold thus produced to the action of a silicate or water-glass bath for effecting a contraction of the same, and then hardening the thus reduced form or mold by the application of formaldehyde thereto; substantially as set forth.

5. The process of producing gelatin or like forms or molds on a reduced scale from an original model, which consists in incorporating a large proportion of liquid in the gelatin or like solution and therewith making the form or mold from the model, then subjecting the form or mold thus produced to the action of an alkaline bath for effecting a contraction of the same, and then hardening the thus reduced form or mold by the application of formaldehyde thereto; substantially as set forth.

6. The process of producing gelatin or like forms or molds on a reduced scale from an original model, which consists in incorporating a large proportion of liquid in the gelatin or like solution and therewith making the form or mold from the model, and then subjecting the form or mold thus produced to the action of a silicate or water-glass bath for effecting a proportionate contraction of the same; substantially as set forth.

7. The process of producing gelatin or like forms or molds from a model, which consists in making the form or mold with a gelatin solution from the model, subjecting the form or mold thus produced to a silicate or water-glass bath, and then hardening the same; substantially as set forth.

8. The process of producing gelatin or like forms or molds from a model, which consists in making the form or mold with a gelatin solution from the model, subjecting the form or mold thus produced to a silicate or water-glass bath, and then hardening the same by the application of formaldehyde thereto; substantially as set forth.

Signed at New York city in the county and State of New York this 21st day of February A. D. 1905.

AUGUST LEUCHTER.

Witnesses:
ARTHUR MARION,
CHAS. C. GILL.