### SHIP MODEL SHAPING MACHINE.

We illustrate the model shaping machine which is in use in the experimental department of W. Denny & Brothers' shipyard at Dumbarton. This machine is a modification of the well-known apparatus invented by the late Dr. Froude. It is so designed that it can be made to cut any number of water lines on a model not exceeding 20 ft. in length, 3 ft. in breadth, and 2 ft. in depth.

As may be seen by the illustration, the machine consists of a horizontal bed, on which the model to be cut is fixed, in its proper position, by means of central pins passing through two wooden beams attached to the model. The latter, as most of our readers are aware, is made of paraffine wax, a substance that lends itself admirably to this description of work. The bed is supported on a traveling carriage by means of four screws. The carriage is made to move longitudinally by means of the hand wheels shown to the left of the operator's seat. There are two revolving cutters, which run at high speed, for removing the material. These are not shown in place in the illustration, but are held by the two supports depending from the cross beam. Vertical adjustment of the model is obtained by means of the four screws referred to, which are all operated by one handle.

The two cutters revolve at a speed of about 1,500 revolutions a minute. They are attached to vertical spindles, which in turn are supported by two frames. These can be made to move, by the second hand wheel shown, either toward or away from the middle line of the bed of the machine. A half breadth drawing of the water lines of the model is placed in a vertical iron frame. The latter is geared to the bed of the machine in such a way that it moves parallel to it, the ratio of travel of the frame being adjusted by means of gear wheels to the same ratio as the length of the drawing is to the length of the model. A tracer is brought to the lines on the drawing, and connects with the revolving cutters by means of lever and bell cranks in such a manner that, as it moves vertically on the face of the drawing, the ratio of travel of the tracer to the travel of the cutter is the same as the ratio of the breadth of the drawing is to the breadth of the model. This ratio can be regulated by means of the adjustable fulcrum shown in the engraving. The tendency of the cutters to vibrate is checked by a cataract, or "dash pot," shown in the center of the framing.

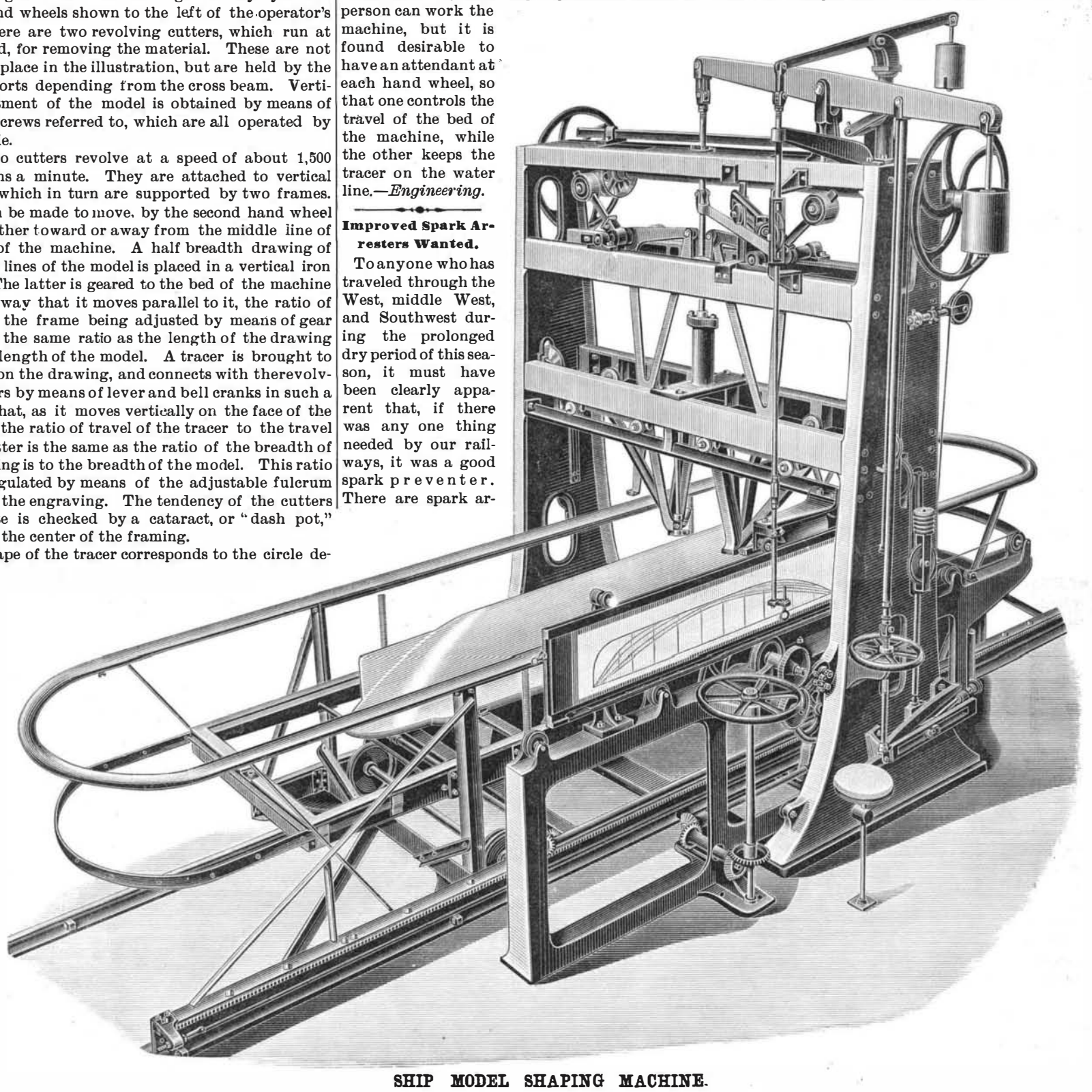
The shape of the tracer corresponds to the circle described by each cutter. It is generally an ellipse, the major axis being vertical. The reason for this is that the breadth scale is, for convenience, usually made greater than the length scale. The ellipse is drawn in ink on a gummed surface of glass, the line being very close to the drawing when the tracer is in position.

To set the machine for working, the height of the model is adjusted so that the position of the cutters, with respect to it, will correspond to the position of a particular water line. When the model is at the required level, it can be seen by means of a pointer moving vertically on a scale, the scale being divided according to the water lines of the model. The pointer is fixed to the bed of the machine, and the scale is attached to the carriage which supports the bed. The tracer is adjusted by means of a right and left handed screw, cut on the rod carrying it. When the cutter circles touch, the tracer is at the center line of the drawing.

To work the machine, the operator moves the two hand wheels on the right and left of the seat. By means of these, the tracer is made to follow the lines on the drawing, and it will be easily seen, from the foregoing explanation, that the cutters will move in harmony with the tracer, and so reproduce the lines on the model. In order to insure greater accuracy in tracing, the stool on which the operator is seated is connected to the moving levers, so that the vertical rise and fall of the stool is exactly the same as that of the tracer. In this way, the operator keeps his eye always on the same level as the tracer.

After cutting one line, the height of the model is adjusted to another water line position, and the corresponding water line is cut. The operation is then repeated until the whole of the lines have been reproduced on the model.

In our illustration, a finished model is shown. The machine, however, does not produce a smooth surface as represented, but cuts the material away in a series of horizontal terraces. These have to be removed by hand, the operator working to the lines left by the machine, and only removing superfluous material. One person can work the machine, but it is found desirable to have an attendant at each hand wheel, so that one controls the travel of the bed of the machine, while the other keeps the tracer on the water line.—*Engineering.*



SHIP MODEL SHAPING MACHINE.

### Improved Spark Arresters Wanted.

To anyone who has traveled through the West, middle West, and Southwest during the prolonged dry period of this season, it must have been clearly apparent that, if there was any one thing needed by our railways, it was a good spark preventer. There are spark arresters almost without number, but. they do not seem to arrest the sparks. Field after field has met our view this summer all ablaze or blackened with the ruin of burned crops. It is all well enough to carry a device that will prevent fires when the fields are snow covered or rain soaked, but the time for spark arresters and extension fronts, etc., to demonstrate their usefulness is during the dry summer months, when sheaves and shocks of treasured grain rest upon a dried stubble that blazes with the first hot cinder. The fact of the matter is that the problem of spark arresting has been given a labored attention that should have been given to spark burning. The work has been done at the wrong end of the engine. Provide good combustion, and your sparks will take care of themselves. We do not wish to depreciate the industry and talent directed to the problem of spark arresting, but do contend that more ought to be done in the way of finding out how to burn sparks. It would be interesting to know how much it has cost our railways in the way of damages for fires caused by sparks from locomotives. We already know that locomotive sparks caused five-tenths of 1 per cent of the fires of 1884 in the United States. And we would add that this percentage covers only those fires coming under the immediate notice of the fire insurance companies, and does not include the multitude of minor field and fence blazes. Perhaps, if the figures regarding these expenses were gotten together, we might have a wider recognition of the fact that there is more money to be saved by studying the firebox end of the locomotive than by unceasingly tinkering with the front end.—*Railway Review.*

### Electrical Foot Warmers.

The acetate of soda foot warmers now used for French railway carriages gradually become cool by radiation; but M. Tommasi, the French electrician, proposes to keep them up to a certain temperature by means of the heat due to an electric current traversing a high resistance. Only the heat lost by radiation is thus compensated for, so that the original high temperature is obtained on the cheaper plan of heating by a fire, or rather by plunging the warmers in boiling water. The current employed to maintain their heat is to be supplied by a dynamo driven off an axle of the train, and the circuit passes through all the warmers. A simple device allows of the foot warmer being thrown out of circuit should it become unbearably hot. The plan will require fewer foot warmers than are now used, since it will be unnecessary to change them during a lengthy journey. This combination of fire and electric heating is perhaps more likely to be successful for the present than a purely electrical arrangement. Warmers on the latter plan which have been devised are of feeble power.

FOR a soap to clean clothes without rubbing: Take 2 pounds sal soda, 2 pounds yellow bar soap, and 10 quarts water. Cut the soap in thin slices, and boil together 2 hours; strain, and it will be fit for use. Put the clothes in soak the night before you wash, and to every pailful of water in which you boil them, add a pound of soap. They will need no rubbing, but merely rinsing.

### Lake Tahoe.

So many reports are spread about concerning the depth of this wondrous sheet of water that but few really know which to accept. Some reports go to show that no soundings were ever obtained in the center of the lake, and others that the greatest depth is 2,300 feet. The following, ascertained from John McKinney, one of the oldest residents on the lake shore, and who assisted in taking the soundings, may prove interesting to the general public:

Fifteen miles of the lake on the State line average 1,400 feet. The center of the line is 1,500 feet deep. Three hundred yards from the mouth of Emerald Bay the water is 790 feet deep, and four miles east thereof the soundings are 1,400 feet. At Rubicon Rock, 300 feet from shore, the water is 850 feet deep, and four miles out, easterly, it reaches 1,460. At Sugar Pine Point, one-half mile south, the depth is 770 feet, and four miles out, pitching to the north, 1,500 feet. Half a mile from Idlewild the depth is 780 feet, and six miles out, 1,525 feet. At Saxton's old mill, near Tahoe City, 772 feet of water is found one-quarter of a mile from shore, and five miles east by north 1,603 feet is reached. At Observatory Point, one-quarter of a mile northeast from Tahoe City, soundings are 1,300 feet, and four miles east 1,640. Four miles south of Hot Springs 1,645 feet, the greatest depth in the lake, is found. Blue water in any portion of the lake averages 1,300 feet.

The temperature of the lake water at 800 feet is found to be 42°; at 1,506 feet, 39½; at the surface in winter time, the temperature is 44°, and in deep water, during the summer, 65°.

The above will doubtless attract both interest and comment, but coming from the source it does, must be entitled to consideration. The theory of Mr. McKinney as to the original formation of the lake is that it occurred in the glacial period, and not from volcanic action, and if space permitted, his opinions on the subject would be given at this time; but it is certain that the bottom of the lake is riven, as are the surrounding mountains, into chasms and ravines, leaving plateaus that extend for miles, as do other valleys or land. Could the water be drained from the lake, the bottom would be several hundred feet lower than Carson valley, which valley was undoubtedly caused by the same operation as the lake, and was itself an inland sea or fresh water lake.

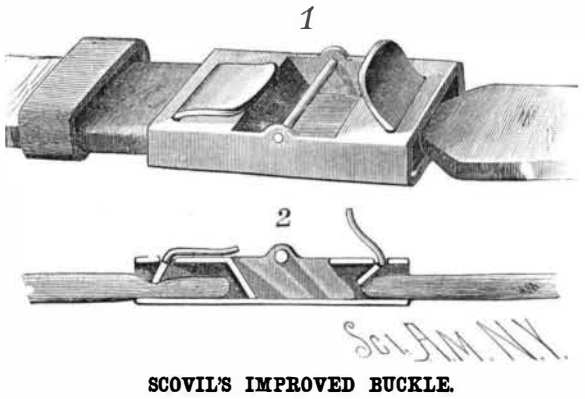
A deal of sound sense and deep study is evidenced by Mr. McKinney's theories and argument, and it would be much to the benefit of science if they could be published.—*Carson Tribune.*

### African Indigo.

In his report on the trade of Tunis during last year, Mr. Consul Sandwith remarks that the cost of dyeing calico with indigo is a much more expensive operation in England than it is in Tunis. While the cost in England is, he estimates, from 5d. to 8d. per lb. of cloth, in Tunis the dyeing of a piece of cloth weighing 5½ lb. costs only 10d., or less than 2d. per lb. If, he adds, cotton goods were allowed temporary admission into Tunisian territory, so as to permit of their being dyed for re-export without duty, the establishment of indigo dye works on a large scale, and the importation of large quantities of cotton goods for dyeing and re-export to central, eastern, and northern Africa, where the color is so much appreciated, might be expected.

### IMPROVED BUCKLE.

The engraving represents a buckle of simple construction, designed particularly for use on pantaloon and vest straps, to which it can be applied without stitching. In the top of each end of the frame is a slot,



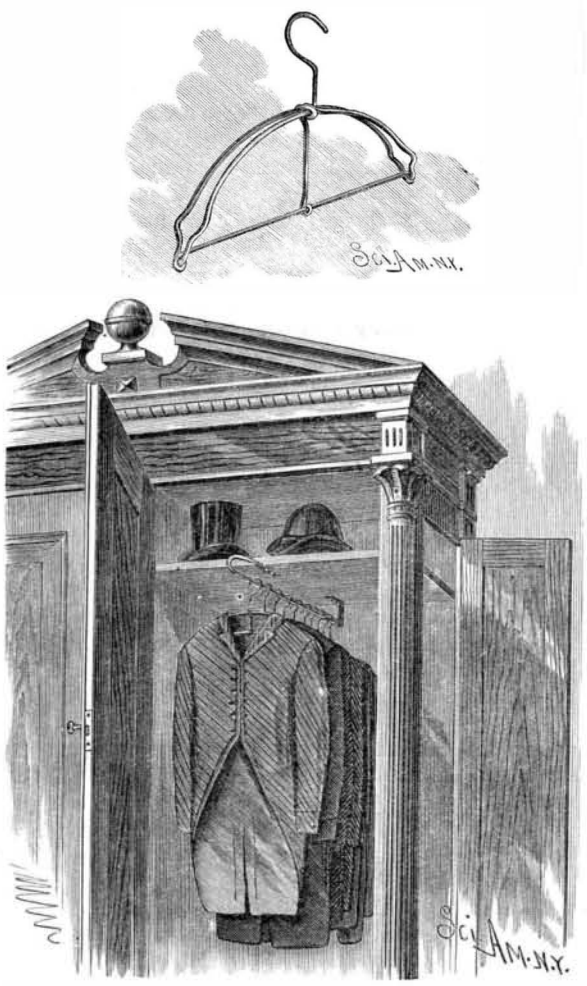

SCOVIL'S IMPROVED BUCKLE.

in which is pivoted a lever, bent at an angle, as shown in the sectional view, Fig. 2. The lower end of this lever forms a jaw for grasping and holding the strap, and the upper end forms a handle piece, by which the lever can be turned to release the strap. At the right in the lower figure the strap is shown just entering the buckle, the handle of the lever being raised, and at the left the strap is shown held by the lever, whose upper arm rests upon the top of the frame.

This invention has been patented by Mr. Samuel J. Scovil, of Jamaica, N. Y.

### WARDROBE ATTACHMENT AND GARMENT HANGER.

This wardrobe is so arranged that its available storage capacity is doubled, and any garment hung in it can be readily reached without removing any other garment hung within it. Secured to the rear end of the usual upper shelf is a metallic rod which extends forward beneath it in a line substantially parallel with it. The forward end of the rod is curved to form a




CAZIER'S WARDROBE ATTACHMENT AND GARMENT HANGER.

nose-like projection, and is secured to the shelf. The garment to be suspended is hung upon a yoke formed with a hook, which is caught upon the rod. In the end panel of the case is a door, so that after the garments have been hung up, any one of them may be removed without disturbing the others, by simply opening the door and taking out the garment. In a large sized wardrobe two rods may be used, and a door placed in each end panel. Or the rod can be attached to the shelf of a closet or clothes room, and used in the same way.

The garment hanger is clearly shown in the small view. A length of wire is bent in a peculiar way to form the suspending hook and upper portion of the yoke, the extending looped ends of the wire being united by a horizontal brace. This forms a cheap and durable yoke, which may be made from much smaller wire than the ordinary form.

These inventions have been patented by Mr. M. H. Cazier, of 100 Lake St., Chicago, Ill.

### The Products of Coal.

Few persons have any idea of the wonderful products from a lump of coal—a lump of coal that is placed in the retort of a gas manufactory. Ordinarily burned, the combustion of a lump of coal results in carbonic acid smoke (which is merely soot, or, rather, the visible portion of smoke is soot) and the ash, in which are found silica, alumina, oxide of iron, phosphoric acid, sulphuric acid, potash, sodium, combined sulphur, sometimes traces of chlorine, titanic acid, and other substances. In the gas retort a variety of products are obtained. The gas as it is carried through the hydraulic main to the purifying rooms takes with it tar and ammonia, the latter evolved from the nitrogen. The ammonia has to be washed out with water in an arrangement by which the ammonia is gathered and saved. Tons and tons of sulphate of ammonia are thus made, and become an article of commerce. The sulphur is removed by caustic lime or oxide of iron. The carbonic acid is also removed by lime, but the sulphurous acid cannot be removed, and, with several others, remains in the gas after all efforts to remove it. The others give the gas its smell.

By distillation, naphtha and asphaltum are obtained. Asphaltum is a dead oil, very useful to preserve wood. From this, too, carbolic acid is obtained—very important in surgical operations, as being the most valuable antiseptic known. From naphtha, benzole, eumol, toluol, and cymol are obtained. Naphtha, as is well known, isused as a burning fluid. Benzole is a solvent for grease and oils, very useful in cleaning kid gloves and things of that kind.

Benzole treated with nitric acid produces nitrobenzole. This, singularly enough, is used as a flavoring extract by confectioners and for perfuming soap. When used for this purpose, it is known in commerce as the essence of myrrhbane, which it is not, although it smells and tastes something like essence of myrrhbane or oil of bitter almonds. Nitrobenzole is terribly poisonous, but not more so than other adulterants used by confectioners.

From nitrobenzole, aniline is obtained. This when first obtained is a perfectly colorless liquid, but darkens as it grows older. From aniline are obtained the coal tar colors, which are so very brilliant. The colors are of all hues. The one known as "Turkey red" is exactly similar to the red that used to be made from the madder root. Since the discovery of this aniline, it has almost completely broken up the raising of madder in Holland. There thousands of acres were devoted to the raising of madder root to get the Turkey red dye. It can be made much cheaper from the product of a gas factory.—*The Coal Trade Journal.*

### Eugenol.

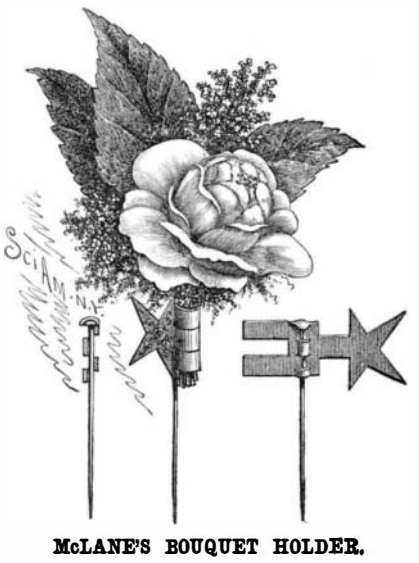
I do not remember to have seen anywhere a fully appreciative notice of *eugenol* among the lists of drugs used as disinfectants, antiseptics, deodorizers, and obtundents. It is a superior agent in all these particulars, and is free from the objectionable characteristics usually belonging to the class. Though sharp to the taste, it is not especially disagreeable. It is not caustic, like carbolic acid and creosote. It is not destructive to the tissues, and there is nothing to fear from a little excess in using. It can be employed without extra caution for thorough saturation of infected dentine, or passed freely to the extreme points of root canals. While it thoroughly disinfects, it does not cauterize. It does not coagulate the albumenoid surface, leaving material for putrefaction beyond in pulp canal and dentinal tubules, as carbolic acid does, but penetrates, saturates, mummyfies, and *stays*. A root canal in which it has remained a day and a night is safe to fill, though previously septic.

Eugenol represents the strength of the essential oil of cloves. Whether its virtue comes from additional oxygen, as claimed by some, or mere exclusion of non-essential elements, I know not; but this I do know, that it is good. I have used it, to the exclusion of other agents in most cases, for nearly three years, and with great satisfaction. No other agent has contributed so much to my success in the treatment of pulpless teeth. As a pain obtundent, by application to super-sensitive dentine, eugenol has the virtues multiplied of the time honored oil of cloves. This, with its disinfectant qualities and general innocence, gives it a value above any other agent with which I am acquainted for use in teeth containing living pulps.

I believe eugenol has not yet found its way into the stock of druggists generally. Care must be exercised in ordering, that the common oil be not substituted. Every dentist should have it. It is indispensable.—*Garrett Newkirk, Dental Cosmos.*

### BOUQUET HOLDER.

The pin held to the head or clasp is passed into the article to which the holder is to be held. The clasp is made with two fingers at one end and with a central




McLANE'S BOUQUET HOLDER.

finger at the other end. These fingers, being made of thin, flexible metal, can be easily bent by the hand around the stem of a flower or other article to clasp and hold it. The extremity of the single finger may be provided with an ornament of any preferred design. This holder can also be used for fastening price tickets to goods in show windows, and is adapted for holding a variety of articles, for purposes both useful and ornamental.

This invention has been patented by Mr. Alexander McLane, of 157 Oliver Street, Paterson, N. J.