

BENZINE BLOWPIPE.

Dr. Paquelin has recently made to the Academy of Sciences two communications on the subject of some new apparatus, to which we believe it our duty to call the attention of our readers. Let us begin with the new mineral oil blowpipe, Fig. 1. This apparatus consists of two rubber bulbs forming a double bellows operated either by the foot or hand, of a metallic receptacle forming a carbureter, and of a blowpipe properly so called. The air expelled from the bellows traverses the carbureter and becomes charged therein, in passing through a plunge tube, with benzoline, the fuel of the Mille lamp. This product weighs from 700 to 710 grammes per liter. Mr. Paquelin employs also as a saturator an atomizer of the Giffard system, by means of which the air expelled by the bulbs, after atomizing the liquid combustible, becomes impregnated with its vapors. The carbureter is characterized by its measuring and mixing cock, the plug and shell of which present a special structure. In fact, the plug, whose travel is a half circumference, is provided on the surface with a channel inclined upon its axis. The seat is so channeled that a portion of the air from the bellows goes directly to the carbureter and another part directly to the blowpipe, becoming mixed in so doing with the hydrocarbureted air that issues from the carbureter. This point is indicated by the aspect of the flame of the blowpipe. This flame, in the first place either strongly tinged with white and fuliginous or else insufficiently supplied with hydrocarbureted vapor, becomes purified to a greater and greater degree, until it assumes a very pure violet blue color of extreme clearness. It is then at its maximum of calorific intensity and its color has the brilliancy and softness of a water body-color painting. The combustible is thus utilized with its maximum of effect.

The blowpipe is formed of a single tube, like the jeweler's blowpipe. Its originality resides in the arrangement of its burner, which emits two kinds of flames—a central flame with a very finely tapering point and two small lateral flames in the form of petals or crown, according to the direction of their channels, these latter serving to light the first and keep up its activity.

The melting of platinum may be begun with the flame obtained. Upon placing a cock of ordinary structure between the bellows and the measuring cock, the height of the blowpipe flame may be graduated at will. We can also graduate the diametrical dimensions of it. To this effect, it suffices to modify the ratios between the section of the orifices of the burner and that of the lateral orifices. We thus obtain a series of flames, which measure from one millimeter at the base to three or four millimeters or more.

The blowpipe which we have just described will find an application in workshops and laboratories. Pyrogravure artists also will be able to make use of it for stumping their wood. Fig. 2 represents a new model of Mr. Paquelin's well known thermo-cauter. The carbureter is of metal as in the preceding model, but of octagonal section, and may be adapted, through a large hook, to a girdle between the body and clothing. Owing to this, it is possible to transmit to the combustible liquid a constant temperature. The rings of the hook serve as pinchers for dividing the cauter in case of gripping. Here there is no plunge tube. The mineral oil is contained in sponges, and there is thus no upsetting of the liquid.

The charge of the carbureter suffices to supply the cauter for ten hours at the least. The products of combustion are expelled beyond the hand of the operator.

In the use of the large cauters, one of these products, steam, which is formed at a temperature of about 1,800°, is used for refrigerating the starting point and the channels that form a continuation of it. The handle is swept internally from one end to the other by a jet of air coming directly from the bellows, and which is divided at the lower part so as to form around the cauter holder three zones of isolating air.

These different conditions permit of reducing the handle of the instrument to such dimensions that it may be used as a crayon, and that the hand may be in close proximity to the operating field. It measures but 12 millimeters in diameter.

The older cauters widened out from the point to the base, but Mr. Paquelin has reversed that arrangement, for the new cauters widen out from the base to the point, the penetrating part only preserving its former dimensions. The instrument thus, with a great saving in platinum, possesses all its old advantages, and by this fact becomes a sort of *passe-partout* cauter.

The large cauters differ from the others in dimensions only in the diameter of the part formed of platinum.

Both the large and small cauters are mounted upon

a piece which is less than six millimeters in diameter and all screwed to the same handle. The manufacturer has reduced the variety of the forms of the cauter to two main types—the handle and the point; and, taking into account the thermo-cauter of 1876, has arranged his new carbureter in such a way that the old cauters may be utilized.

The alcohol lamp of the first thermo-cauter is done away with. Use is made of but one kind of combusti-



GERNSHYM'S KNITTED FABRIC.

ble—mineral oil. The cauter is lighted by any flame whatever or by means of the blowpipe described above, which serves also to clean it in case of need.

The applications of the Paquelin thermo-cauter are various, by reason of the forms and dimensions of the cauter. It answers the requirements of all kinds of surgery.—*La Nature*.

Pressure of Electrolytic Gas.

An interesting experiment has been lately made by M. Chabry, of the Societe de Biologie, with regard to the pressure which can be produced by electrolytic generation of gas in a closed space. While the highest pressure before realized in this way was 447 atmospheres (Gassiot), M. Chabry has succeeded in getting

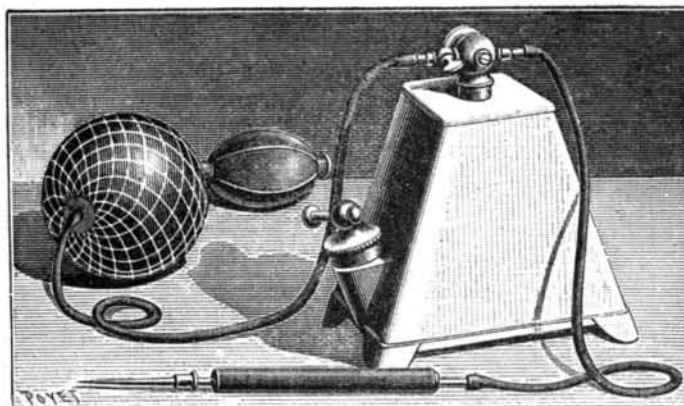


Fig. 1.—PAQUELIN'S BENZINE BLOWPIPE.

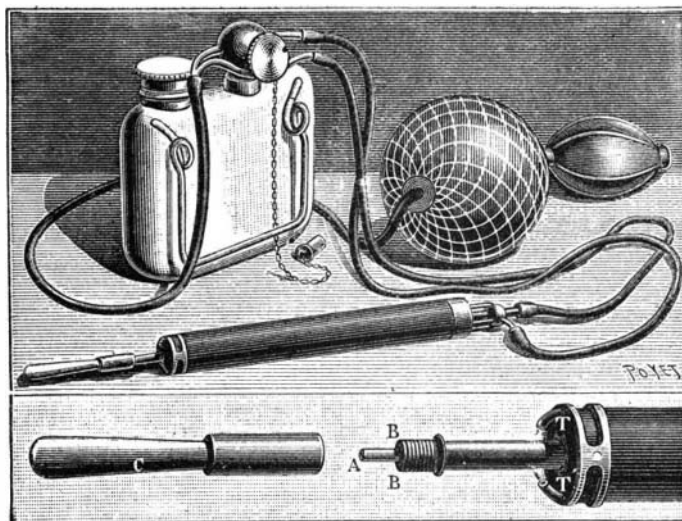


Fig. 2.—NEW MODEL OF THE PAQUELIN THERMO-CAUTER.

C. Details of the point of the thermo-cauter. A. Tube to carry carbureted air. BB. Tube for the return of products of combustion. TT. Condensation canals.

as high as 1,200, or 18,000 pounds to the square inch; and the experiment was broken off merely because the manometer used got cracked (without explosion). The electrolyzed liquid was a 25 per cent soda solution. Both electrodes were of iron; one was the hollow sphere in which the gas was collected; the other an inner concentric tube. The current had a strength of

1½ ampere, and was very constant during the experiment, which was merely one preliminary to a research in which very high pressures were desired.

AN IMPROVED KNITTED FABRIC.

Mr. Max Gernshym, of the firm of Henry Gernshym & Bro., manufacturers of cardigan jackets, No. 85 Franklin Street, New York City, having mills at Nos. 32 to 50 Stockton Street, Brooklyn, N. Y., has recently patented a new knitting machine for making tubular knit fabrics. The fabric is used for producing a new style of highly ornamental garments, such as cardigan jackets, as represented in the annexed cut.

The back of the garment is of the ordinary style, made with plain ribs formed with cardigan or other stitch, while the front is knitted to produce artistic designs to heighten the appearance of the garment, without impairing the quality of the goods, but, on the contrary, making a more durable and better fitting garment. Buyers of such goods, who are always on the lookout for novelties suited to their trade, should not fail to inspect the line of garments made by this new invention. On this machine all grades of cardigan jackets are produced.

Damage to Cloth.

A case of more than usual interest to makers and users of cloth has recently been decided in the Sheriff Court of Glasgow. The pursuer was Mr. Jas. Dyson, muslin manufacturer in Manchester, who got some gray cloth made to order by a manufacturing company. On delivery the cloth was examined, but not analytically, by Mr. Dyson, and sixty-four pieces were sent to Messrs. A. Macnab & Co., calico printers, near Glasgow, to be printed with handkerchief designs. Messrs. Macnab, in accordance with their usual process, singed the cloth with a gas-singeing machine and then wet it with cold water by means of a bleaching machine preparatory to bleaching. In the process of wetting the cloth several pieces burst in the washing machine, and on examination it was discovered that the weft of the cloth was sound and that the damage was caused by the warp having given way. The cloth was returned to Mr. Dyson and he then raised an action against Messrs. Macnab & Co. for its value, amounting to about £75, alleging he had supplied good cloth and that it was destroyed by Messrs. Macnab through carelessness and negligence in the process to which it had been subjected. The trial lasted two days, and the pursuer endeavored to show that the cloth as delivered to Messrs. Macnab was good, sound, merchantable cloth and that it had been damaged in the process of singeing, either by inequality in the gas jets or by one side of the cloth being subjected to greater heat or to greater tension than the other. The defendants, on the other hand, led proof to the effect that their machinery was in good order and condition, that the gas jets were all equal, that it was impossible for one side of the cloth in the process of singeing at their works to be subjected to a greater heat or to a greater tension than the other, that even assuming one side was subjected to a greater heat or tension than the other, the weft and warp would in that case both be damaged, whereas in the cloth in question the warp only was damaged, that the cause of the damage, therefore, must be something in the warp, which was not in the weft, that the warp which was subjected to chemical analysis contained both chloride of zinc and chloride of magnesia, that the weft was free from these ingredients, and that chloride of zinc and chloride of magnesia when subjected to heat, such as the cloth would be subjected to in the process of singeing, could tender cloth, and that the cloth was tendered in the singeing through the warps containing these chemicals and not through the defendants' carelessness or negligence. Mr. Sheriff Guthrie, before whom the case was tried, found for the defendants.

Depilatory Powders.

Dr. Clasen says (*Monatshefte f. prakt. Dermat.*, 1889, ix. 541) that among the best depilatory powders are sulphohydrate of sodium and sulphide of barium. As to the sulphohydrate of sodium, he says that used as a paste, one part to eight of water, and allowed to remain on for a very short time, it acts well. But it deteriorates very rapidly and is dangerous to give to a patient, as it is quite capable of producing scars. The sulphide of barium is a safer powder for the purpose. It may be used by mixing 50 parts of it with 25 parts each of starch and oxide of zinc. This is mixed with water so as to form a soft paste and spread upon the face. After ten minutes it is scraped off, and leaves a smooth skin.—*Medical Tribune*.

DOCTORS say a healthy adult should eat at least ten ounces of meat each day.

New Automatic Electric Weighing Scale.

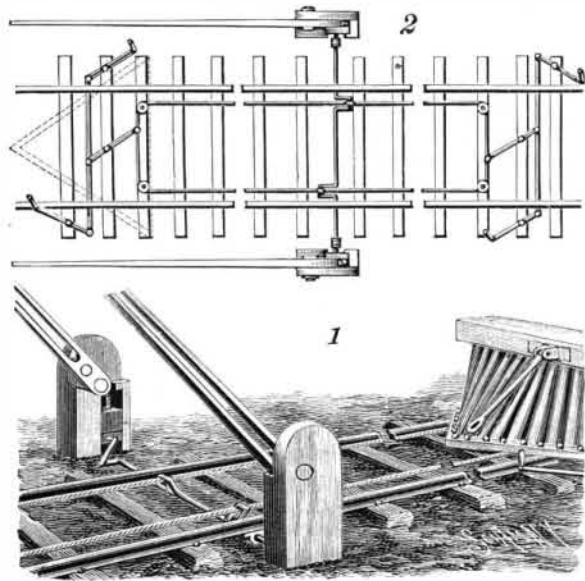
A patent has recently been issued to The Electric Scale Co., Covington, Ky., for an invention calculated to greatly facilitate the weighing of merchandise, etc., besides procuring more accurate results than are possible where the poise is manipulated by hand.

In this improved scale the counterpoise is moved lengthwise of the beam by a screw actuated by an electric motor attached to the scale beam, the motor being provided with a field magnet placed in a shunt circuit, the armature connections being furnished with a pair of contact springs for receiving the actuating current from either of two pairs of fixed contact points, the electric connections of the contact points being oppositely arranged with respect to each other, so that the current in the armature is reversed when the contact springs are shifted from one pair of points to the other, thereby causing the screw to revolve and shift the poise according to the position of the scale beam.

By means of this arrangement accurate results are quickly arrived at. The beam is provided with ticket-printing mechanism, which is capable of delivering a ticket upon which is recorded the exact weight indicated by the scale.

AN AUTOMATIC RAILROAD GATE.

The improvement shown in the accompanying illustration is designed to obviate the necessity of keeping watchmen to close and open gates at railroad crossings, such gates being, with this construction, closed and opened by a train passing in either direction. The barrier at each side of the track is fulcrumed in a post, the inner end of the barrier being connected with a weight sliding in the post, and the weight serving to hold the barrier in raised position. Sliding in guide-ways in the post below the weight is a block pivotally connected by a link with a crank arm on the outer end of a shaft which extends transversely under the track rails, where it is held to turn in suitable bearings. There are also two crank arms between the rails in this transverse shaft, one near each rail, arranged at right angles to each other, and both are connected with an endless rope or chain, arranged in a square, and passing over pulleys at some distance from the crossing in both directions, as shown in Fig. 2. Each end portion of this rope, between the pulleys, is connected with one end of a lever, pivoted on the ties, and the other end of the lever is connected with a transverse rod reaching to the outside of the rails, each of these rods being pivotally connected at its ends with short levers pivoted on the ties outside the track rails, and the short levers carrying each an arm or projection adapted to be engaged by the cowcatcher or other projection on the locomotive. The arrangement is such that when a train approaches, as shown in Fig. 1, the cowcatcher, engaging a short lever at one side of the crossing, shifts the transverse rod, whereby the rope is drawn upon to turn the cranks and cause the blocks to slide upward in the barrier posts, thereby allowing the barriers to swing downward and close the crossing. When the train has left the crossing, as shown in Fig. 2, the cowcatcher engages one of the short levers connected with the rope on the farther side of the roadway, shifting the cranks back to their former position, when the weights in the barrier posts slide down and the barriers are raised, opening the crossing. No matter in which way the train is passing, the barriers are thus automatically opened and closed, the improvement being designed to prevent the great number of fatalities constantly occurring at

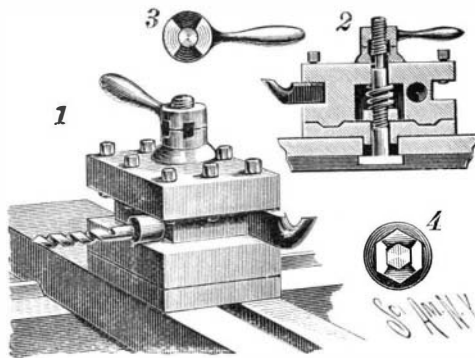
**CLOSE'S RAILROAD GATE.**

unguarded railway crossings where the travel is not sufficient to justify the employment by the companies of regular watchmen.

Further information relative to this invention may be obtained by addressing the patentee, Mr. Wilbur H. Close, in care of the Beck Steam Laundry Co., Atlanta, Ga.

A TOOL HOLDER FOR ENGINE LATHES.

The device herewith illustrated is designed to efficiently retain cutting tools in proper position to engage work on a lathe and facilitate the quick adjustment of a tool, or its release to substitute another tool therefor. It has been patented by Mr. Karl J. Pihl, of No. 35 Fifth Avenue, Brooklyn, N. Y. Fig. 1 shows the device in perspective, and Fig. 2 is a sectional side view. A transverse rib near the center of the base plate fits a groove in the top plate of the lathe slide rest, a standing bolt holding the parts together by an

**PIHL'S TOOL HOLDER FOR ENGINE LATHES.**

adjustable nut. The tool-holding block is centrally apertured to pass over the standing bolt, and has a recess in its lower surface around the adjusting nut, and affording a space above the nut for a stout spiral spring. On the upper surface of the base plate is a recess forming a rectangular shaped marginal channel, receiving a correspondingly shaped rib on the lower surface of the tool-holding block. There is a channel in each side wall of the tool-holding block to receive a lathe tool, held in place by set screws inserted from the upper side, there being a number of these screws provided for each side of the block, as well as an aperture to receive a drill. The upper portion of the standing bolt, where it projects from the tool-holding block, is hexagonal in form, and is loosely engaged by a locking washer, the top portion of the bolt being coarsely threaded to receive a correspondingly threaded handle bar. The engaging faces of the handle bar and washer are shown in Figs. 3 and 4, their notches being so formed relatively to the pitch of the thread on the bolt that the rotation of the handle forces the tool-holding block firmly down upon the base plate, and the entire tool rest is rendered rigid to support a tool at work. To release the block, the handle is partly revolved, when the block is forced upward by the central spiral spring, and the block may be revolved on the standing bolt to bring a different tool into position.

Dead Sea Water as an Antiseptic.

The *Daily News* Paris correspondent gives particulars of an interesting communication which has been made by M. de Chauveau in the name of the well known Pasteurian chemist, M. Lortel, who has long thought of turning the most accessible part of the Dead Sea into an Asiatic Runcorn, studying how, with a siphon, to bring to the top water from the bottom, which is heavily charged with calcium salts and bromide of magnesium. Another of his ideas was to export water from the Dead Sea as an antiseptic for use in hospitals, it being reputed mortal to every kind of animal life, and necessarily, as he supposed, to microbes. But a savant whom he consulted said, "Take care, there is hardly a fluid in nature in which a virulent microbe of some sort may not find a good soil." He therefore cultivated various kinds of bacilli in the densest Dead Sea water that had ever been fetched to his laboratory. The diphtheria, measles, scarlatina, small pox, and other fell creatures of the animalcular world were experimented upon. All died but two, with which in forty-eight hours the fluid was alive. The one shaped like the clapper of a bell and the other like a tack nail with a round head were the microbes of tetanus and of gangrene.

A New Fluid for Natural History and Microscope Work.

Mr. A. Haly, of the Colombo Museum, has been experimenting with carbolized coconut oil as a preservative. His experience, he states, seems to show (it does not do to speak too confidently in a climate like that of Ceylon) that it is one of the most perfect preservatives known, both for form and color. Coconut oil and carbolic acid freely mix in all proportions. The mixtures at present under trial are oil raised to the specific gravity of 10° and 29° below proof spirit by the addition of acid. While the gum and glycerine process is absolutely useless for any animals except certain families of fish, this mixture is good for every kind of vertebrate. The most delicate frogs are quite uninjured by it, and snakes undergo no change. The delicate plum-like bloom on the geckoes, the fugitive

reddish tint on such snakes as *Ablabes humberti*, are beautifully preserved by it. Another most important use is in the preservation of large fish skins, which can be packed away in it for an indefinite period, and mounted when wanted. These skins do not require varnishing, neither do they turn brown, but although, of course, they do not preserve their sheen like fish in the oil itself, they always maintain a silvery and natural appearance, quiet different from that of ordinary museum specimens. Species prepared in this way would form a most effective exhibition. It appears also to be a most excellent preservative for crustacea and the higher orders of arachnids, and also for centipedes; but it has proved a failure for marine invertebrates in general. Its absolutely unevaporable nature makes it invaluable in a tropical climate, quite apart from its other qualities. The acid also enables coconut oil and turpentine to be mixed together, forming a splendid microscopic fluid, in which objects may be allowed to soak without any previous preparation, and in which they become very transparent. A minute species of crustacean, of the order Copepoda, and the leg of a fly, simply laid on a slide in a drop of this fluid, and covered with an ordinary covering glass, without any cell being made or cement employed, have lain on Mr. Haly's table unaltered for ten months.

A PRACTICAL, DURABLE, METALLIC RAILWAY TIE.

The improved metallic tie shown in the accompanying illustration has been patented by Mr. Ellison Saunders, of Austin, Texas. Its base plate is preferably made of wrought iron or steel, and has downwardly and outwardly turned ends, rail-supporting blocks of cast or malleable iron being secured to the base plate by rivets or bolts, as shown in Figs. 2 and 3. The two blocks of each tie are connected with each other by a tension rod, by adjusting the nut on which any desired strain may be given to the blocks and base

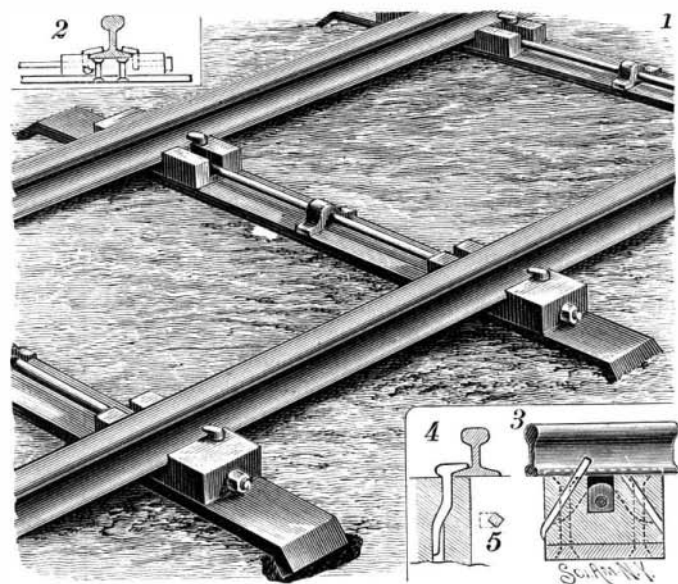
**SAUNDERS' METALLIC RAILROAD TIE.**

plate to prevent spreading of the rails, the base of each rail resting in a longitudinal recess in the block. Centrally on each base plate is a block, through which the tension rod passes, to prevent accidental displacement, the block being held in place by a rivet or bolt. The rails are secured in their seats in the blocks by spikes driven as shown in Fig. 3, the point of the spike being clinched against the outer side of the block, while another form of fastening is shown in Fig. 4. In this case the apertures for the spikes are made with a bend and twist, so that the upper half is out of alignment with the lower half of the aperture, as shown in Fig. 5. The ordinary spike, driven in such a block, follows the shape of the aperture, and is bent at the middle and twisted in for its lower half, so that the spike is not liable to get loose. On curves or switches the guard or switch rails are fastened on an extension of the block, formed with a recess under the rail for the nut or head of the tension rod.

This tie has been in practical use for five months on a portion of a trunk line railway in Texas, where the work is very heavy, and is said not to show any evidence of wear, but to be still as firm as a rock, while wooden ties at the same point have had to be retamped and respiked. A yet more comprehensive testimonial is that of Mr. Robert White, Supervisor at the Grand Central Station, New York City, who writes, under date of October 24, 1891: "I have had some of your metallic ties in use in the yard at this station for the past three months, at a point where some of the largest engines pass over them each day, with a large number of switching engines and cars. They have had no attention paid to them since being put in, and still remain in perfect order. The spikes have not started, but are the same as when put in."

THE product of tobacco in Europe is nearly equal in quantity to the average production of the United States.