How Magenta is Made.

The London *Chemical Review* translates from Dingler's *Polytechnisches Journal* an article by P. Schoop on the arsenical process of manufacturing magenta, containing facts all the more interesting here, now that Americans are embarking in the anilin industry.

The melting pot used is of cast iron, 1·35 meters in diameter and 1 meter in height, set over a suitable furnace. The lid can be lifted, if need be, and pushed out of the way by means of a pulley and crane. The stirring apparatus is kept in action during the entire time of heating. A small aperture serves for taking out samples of the melt. The charge consists of:

Arsenic acid, 194° Tw	75 kilos.
Arsenic acid, 194° Tw. recovered, same sp. gr. as above.	300 "
Anilin for red	300 "
Liquid which has distilled over in former operations..	200 "

The firing up is so managed that the distillation begins in about seven hours, and that then 10 liters pass over every hour. After the lapse of twenty hours the heat is increased so that 20 liters may pass over hourly. When 400 liters have been distilled off, the melt will already have become thick, whereupon the fire is slackened. As soon as the contents of the pot become pasty they are scooped out, and the melt when cold is broken.

The distillate is mixed in a parting funnel with about 100 kilos salt, upon which the oil speedily separates. The salt solution is diazotized, precipitated with a solution of naphthol, and worked up into naphthol orange. More advantageously it is converted into saffranin.

The melt is ground up, wet to a fine, thin paste, in lots of 100 kilos, and passed through a filter press. The filtrate is evaporated in an iron steam pan for the recovery of the arsenic acid, while the press cake is again stirred up with lukewarm water and filtered once more. The filtrate from this serves for grinding up the next melt. The crude melt, after washing, is a yellowish-green powder, which is twice lixiviated in a suitable extraction kettle with boiling water. About a tenth part of the melt is treated in this kettle with 3,600 liters water and steam at a pressure of 1·5 to 2 atmospheres. After four hours the whole is passed through a filter press, and the residue again treated in a second kettle with 3,600 liters water in the same manner. This second decoction is run into the first kettle, which has in the mean time been charged again. The remainder, after this double extraction, forms one part of the poisonous, useless residues. The color decoction of one lot, after standing for half an hour and depositing certain impurities, is mixed hot with 200 kilos rock salt, whereupon, after heating, the muriate of the color separates out almost completely. In the liquid drawn off after standing for two days a little more color is thrown down by the occasional addition of a little milk of lime, and is worked up separately. The remaining lyes, containing much arsenic, are precipitated with lime, and this precipitate forms the second portion of the poisonous residue.

The precipitated crude magenta is purified by a systematic fractional precipitation. The crude magenta, forming one-fifth of the melt, is dissolved in a wooden cask in 1,000 liters water, boiling up by means of steam, and 40 liters of a 4 per cent solution of soda are gradually added. A greenish or golden resin separates out on the sides and on the surface. The liquid is then passed through a coarse filter into a wooden vat, and mixed with two liters muriatic acid to prevent the separation of chrysanilin and delay the crystallization of the magenta. Upon the liquid is laid a lid with wooden rods, which, as well as the sides and bottom, are in two days found covered with fine crystals. The mother-liquor is run off, the crystals are dried in the air and afterward in a drying room at 104° F. The yield is 20 kilos of crystals, while about 4 kilos magenta remain in the mother-liquor and 15 to 16 kilos resin are separated out. From the mother-liquor the color is precipitated by soda lye, and about 40 kilos of it are dissolved in muriatic acid. Here we proceed as in the purification of the crude magenta, about one-third of the coloring matter being separated out as a resin, and crystals of magenta being obtained on cooling. In this mother-liquor there remains very much chrysanilin. By precipitating with soda, and evaporating the colored mass with acetic acid, cinnamon brown is obtained.

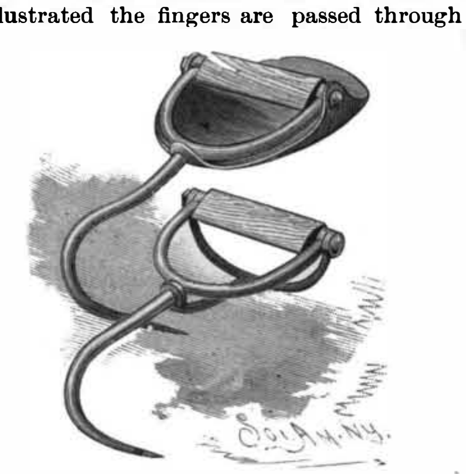
The resin which separated on purifying the crude magenta (resin No. 1) is dissolved in muriatic acid. On boiling the said liquor a resin separates out, consisting chiefly of mauvanilin, an almost worthless substance. By soda a portion of magenta is again separated, and on cooling the filtrate a little more is obtained. The lye, after the separation of this portion of magenta, is mixed with resin No. 1. Resin No. 2, obtained by purifying resin No. 1, is again dissolved in muriatic acid and boiled, when some more mauvanilin is deposited and is removed. From the hot solution salt precipitates cerise. After filtration the color is washed, neutralized with muriatic acid, and evaporated down in iron pans heated by steam, yielding thus the cerise of commerce. In the filtrate from the precipitate of cerise, the magenta remaining in solution is precipitated with soda, and the base mixed with resin No. 2, whereupon a further purification of the lye-products is undertaken, yielding grenadin and maroon.

To test the magenta for the presence of chrysanilin, muriatic acid is added to the hot solution in water, and zinc powder is added in small portions until the red color disappears. If the magenta was free from chrysanilin, the solution will then be colorless. Otherwise, it is yellow.

Except for the manufacture of acid magenta, the magenta obtained according to the above process is used only in preparing common reddish rosanilin blues.

BALE AND BOX HOOK.

In the common form of box hooks the shank is fastened in the handle by being passed transversely through it and then riveted. A shank thus fastened is apt to become loosened and turn in the handle, while the fingers between which the shank is passed are liable to become chafed. With the hook herewith illustrated the fingers are passed through the



THE SAN JOSE BALE AND BOX HOOK.

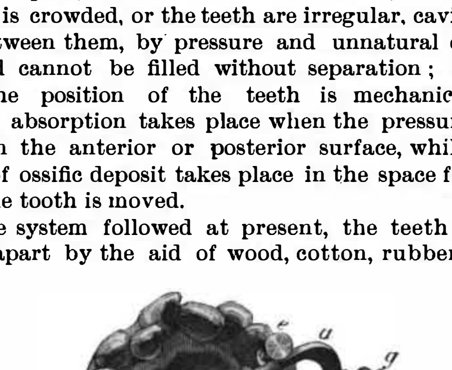
opening formed by the handle and the prongs of a fork formed on the upper end of the shank; the turning of the hook is prevented, and there is no wear between the fingers. To prevent the chafing of the outer sides of the fingers by their coming in contact with the box or bale, there is provided a leather guard, as shown in the upper view, or a metal frame, as shown in the lower view. The handle is slightly extended toward the front, thereby allowing a firmer grasp to be taken of it and a more easy and accurate guiding of the hook.

This invention has been patented by Mr. Philip J. Stockinger, of San Jose, Cal. These hooks can be seen at the San Jose Agricultural Works.

DEVICE FOR SEPARATING TEETH.

The separator of teeth invented by Dr. H. A. Parr, of New York city, is a continuous circular wedge, so constructed that teeth can be separated in a few minutes, with little pain, in most cases without any. When the arch is crowded, or the teeth are irregular, cavities form between them, by pressure and unnatural contact, and cannot be filled without separation; and when the position of the teeth is mechanically changed, absorption takes place when the pressure is either on the anterior or posterior surface, while a process of ossific deposit takes place in the space from which the tooth is moved.

In the system followed at present, the teeth are wedged apart by the aid of wood, cotton, rubber, or



PARR'S DEVICE FOR SEPARATING TEETH.

some such material, and often remain separated a number of days, causing pain to the patient and unnecessary labor to the operator. Frequently, the teeth have to be trained back to their former position. During the separation the ossific deposit formed has to be displaced, which in some cases it is difficult to do, and not unfrequently the teeth operated on remain separated for life. The herein described instrument was invented by Dr. Parr to do away with these difficulties.

The device may be adjusted to the centrals, bicuspids, and molars, and is particularly adapted for irregular teeth.

b represents an angular bar, tapered to a point, and terminating at each end in the sockets, *d*, through which pass the two semicircular bars, *a a*, the inner ends of which are tapered to a point and meet at an acute angle directly opposite to the angle of the bar, *b*. *a* and *b* may be brought together by turning the nuts, *c c*, which can be done with the fingers or with a wrench. In case the teeth have not been sufficiently separated by turning the nuts, *c c*, additional pressure may be brought to bear by means of the wedge, *g*, which may be used on the buccal or lingual surface. The vertical screws, *e e*, are for adjusting the instrument upon the teeth so as to prevent undue pressure upon the gums.

Rectangular Proportion.

W. Barnes.—Oblong rectangles are the forms of manifold planes in buildings and house gear—doors, windows, room sides, room floors, tables, boxes, bookcases, books, and pictures; and therefore it is worth while to learn whether there is a more or less comely form of rectangles, or of their outer frames. Of the square, which is a shapefast figure, and which, with the circle and equilateral triangle, makes a harmonic triad, there is no need that I should now discourse; but to many other cases of rectangular forms I think harmonic proportion may yield good effect. I like the effect which it has afforded in the framings of pictures. In the framing of a picture we have often found a third harmonic term to its length and breadth, and have then taken the whole, or a half, or a quarter of that third quantity for the width of the frame. On the taking of a half, the sum of the widths of the two sides, or two ends, makes up the third term of the triad, and on the taking of the quarter the third is found in the sum of the widths of the four frame sides.

If we would frame harmonically a print or drawing with a margin within the frame, we may get the width of both its frame and margin from a third harmonic dimension to the length and breadth of it, and then divide this third dimension into two parts, which shall be the latter two terms of a harmonic triad, of which the first is the whole dimension; and a square picture may be framed in harmony by taking for the harmonic triad (1) the width of the picture and two breadths of the frame; (2) the width of the picture; and (3) the twofold width of the frame.

I think that door frames, shutter frames, and the mantelings or frames of fireplaces may be often fitted for the better to the spaces they bound by harmonic proportions of widths; and though the lettering pieces of bound books are often set on their backs without symmetry either of width or place with the height of the book, yet, if the back of a book were divided into six spaces, and the lettering piece should take up the third from the top, it would be in harmony with the book's height both in place and measure, since the six spaces of the whole back and the three below and the two above the lettering piece would make a harmonic triad. So, again, I have reason to think well of the elevation of a church of which the heights of the tower, of the nave, and of the chancel are a harmonic triad, while another is made by the ground widths of the nave, of the chancel, and of the tower. It might be worth while also to try whether a steeple would not be graceful if, at three harmonic spaces of height, it diminished by a harmonic triad of widths, or whether a spiral line or a stream or path made to wind through a lawn would not be of graceful bends if at three harmonic spaces it went off from its axis by the measures of a harmonic triad of ordinates.—*The Architect.*

Expansion Produced by Amalgamation.

It has been accidentally observed by the authors that the amalgamation of brass is accompanied by great expansive force. If the edge of a straight, thick brass bar be amalgamated, it will be found that in a short time the bar is curved, the amalgamated edge being always convex, and the opposite concave. The authors imagine that a similar action may be the primary cause of the phenomena presented by the Japanese "magic mirrors." Japanese mirrors are made of bronze, and have a pattern cast upon the back, and although to the eye no trace of it can be discovered upon the polished reflecting surface, yet, when light is reflected by certain of these mirrors on to a screen, the pattern is distinctly visible in the luminous patch formed. In a paper before the Royal Society, they have shown that this is due to the polished side opposite the thinner parts of the coating being more convex than the others, a conclusion verified by the fact that the pattern is reversed when formed by a convergent beam of light. Such a condition of things would evidently result from a uniform expansive stress taking place over the reflecting surface, the thinner—and, consequently, the weaker—parts becoming more convex or less concave than the others. The authors have hitherto attributed this inequality of curvature to a mechanical distortion to which the mirrors are intentionally submitted during manufacture, to produce the general convexity of the polished surface; but they now think it possible that the use of a mercury amalgam in the process of polishing may have an effect in the production of this inequality of curvature.—*Profs. W. E. Ayrton and John Perry.*