

while the point remains fixed, as described. It becomes a laborious operation in the case of very large sizes, requiring, not merely a forward motion of the arm, but a strong push with the body against the handle.

They are next taken by the filer, who makes the points. Each barbed wire is taken up separately, fixed in small pliers held by the left hand, then placed upon the end of a slip of box wood, and filed to the degree of sharpness required. This is a matter of great nicety and delicacy. Common hooks are pointed with one file, but the finer sorts require two or three, flat and half round. Large sea hooks have the ends flattened, and the burr cut off on each side with a sharp chisel into a roughly-shaped point, previous to being filed. The points of "dubbed" hooks are not filed, but ground upon a revolving stone, and this process is called "dubbing."

When the points are made, the "benders" proceed to operate upon them. A woman holds in her left hand a piece of wood, at the upper end of which is inserted a curve, or "bend" of steel, projecting slightly. Taking a wire in her right hand, she catches the beard upon one end of the steel curve, and pulls the wire round into the proper "hook" shape. For the large sizes, the "bends" are fixed, not held in the hand.

Nothing now is necessary to perfect the formation but "shanking," which is done in various ways. Hooks are flattened at the shank end by a workman, who holds the curved part in his left hand, rests the end upon the edge of a steel anvil, and strikes it one sharp blow with a hammer. Some are tapered at the end with a file, while others are simply curled round, or "bowed," to provide a fastening for the line.

With steel hooks, hardening is the next process; but iron ones require converting, or "pieing," before they will harden. The pie hole is a recess with a large, open chimney, and in this recess is placed an iron pot, filled with alternate layers of hooks and bone dust. At a little distance from the pot bricks are built up all round and the space filled with coal, which, when lighted, creates an intense heat, and to its action the hooks are exposed for about ten or twelve hours, allowed afterward to cool, and are then fit for hardening. To effect this, they are exposed to a great heat upon pans in a fire hole, and while red hot, poured into a caldron of oil. Small hooks are afterward tempered in a kind of frying pan, partly filled with drift sand, and placed over a fire. The larger ones are tempered in a closed oven, at a low heat.

When these operations are completed, they are taken to the scouring mill. It is occupied by a number of revolving barrels, driven by steam power, and containing water and soft soap, into which the hooks are put, and allowed to remain for two or three days. At the end of that time, the friction having worn them all bright, they are taken out, and drier in another revolving barrel, containing saw dust. Blueing, japanning, or tinning follows—of which the two latter are performed in the ordinary way, and the blueing is done by exposing them to a certain degree of heat in drift sand over a fire, in the same way as small hooks are tempered. Counting, papering, labeling, and packing complete the series, and the goods are then ready for the market.

Readers of the foregoing description can hardly fail to notice the extreme simplicity of most or all of the processes; and it seems strange that in such an age as ours there should be little improvement in the mode of production, as compared with the fire-side practice of amateurs two hundred years ago. In the "Secrets of Angling" the author describes the making of hooks (as practiced by himself) in the following terms:—"Soften your needles in a hot fire in a chafin. The instruments—First, an hold fast. Second, an hammer to flat the place for the beard. Third, a file to make the beard, and sharpen the point. Fourth, a bender, viz. a pin bended, put in the end of a stick, a handfull long. When they are made, lap them in the end of a wier, and heat them again, and temper them in oyle or butter."

THE Commissioner of Agriculture has received from Honduras, Central America, a swarm of stingless bees. These bees are easily swarmed, and are excellent honey makers.

[From the British Journal of Photography.]

On the Artistic Coloring of Photographic Portraits.

So difficult is the task of training a good colorist, that even the accomplished artist feels his inability in endeavoring to impart the information necessary to those he is wont to train in the knowledge whereby he is enabled to produce almost inimitable results. With the best intention he fails, feeling he cannot impart that which nature almost intuitively bestows, and he discovers that there is something more required than pigments, palette, and brush in the making of an artist.

But when the colorist, solemnly imbued with the truth of the photograph, and watching the fine management of its monochrome, from its high lights to its deepest shadows, can translate the same with a keen desire to imitate its inimitably delicate gradations into color; then indeed does the photograph as rendered on the ground glass of the camera serve as the true guide to the miniature colorist, and the result is a beautiful conjunction of nature and art to produce a faithful resemblance of the human face. Of course the taste of the artist will dictate to him to soften some of the harder lines rendered in the proof by the peculiar color of the original, or the furrows which time indents on the forehead, and which, by the concentration of the lines, may really appear deeper in the photograph than in the original.

Without attempting to go deeply into the philosophy of color, analytically or synthetically, it may not be out of place to give, however slight, an idea of how to proceed in coloring a photograph.

It is indispensable that you wash the proof well with a sponge, or, better, and ever at your command, sweep your tongue across it in order to remove any traces of grease or starch. As far as my experience goes the later method is preferable. In rubbing down the colors on the palette give all attention to the manner in which it is softened with the gum and water added. If you rub with careless quickness the colors are rendered useless, owing to the numerous air bells that rise, which, when applied to the surface of the picture, give it a coarse, inartistic, and anything but a pleasing aspect.

To color a good, clean print, you must, in the first wash on the face, use as much gum as will bring it nearly, although not quite, to the same gloss as the albumen surface; this wash to be composed of—for a person of ordinary complexion—a combination of rose madder and Indian yellow, or Venetian red alone. With these colors judiciously applied you can produce any complexion from the highest glow of health to the most sallow; the shadows to be warm, and in every case glazed even more than the albumen surface. Sepia, neutral tint, burnt umber, chrome yellow, and ivory black, if properly used, will give the blooming, graceful curls of the gentle queen of hearts, or the seared locks of the tottering dame of seventy, that life-like brilliancy which is characteristic of health or decay.

Should the photograph be clear and well-defined, for draperies and carpets (the coloring of which should ever be subservient to the figure), use transparent, but if the picture be deficient from under-development, use *opaque*. Of transparent colors for such purposes use the following:—Crimson lake and burnt sienna, Prussian blue and Indian yellow. Chrome yellow and Prussian blue also make an excellent wash for draperies, although not purely transparent.

For backgrounds, which should ever be made to softly recede from the figure, the following colors may be used with much purpose:—Cobalt blue, and a little Chinese white, which gives a good effect and altogether a pleasing result, vignetting it to your own taste with sepia or other browns. By way of finish, or to relieve an otherwise poor production, it is sometimes necessary to make what is termed an introduction; that is, a side opening in the background, where a neat landscape may be lightly sketched and colored, comprised of water, land, and sky, or a bit of woodland. These sometimes give a freshness to an otherwise dull picture, or serve to exclude some of those hideous backgrounds so much displayed in *cartes* generally. But in putting in draperies, carpets, plain or pictorial backgrounds, let them ever be subdued, and in quiet harmony with the figure, the head of which should ever be the principal attraction for the eye.

With these rather incomplete remarks I hope you will feel satisfied, as I assure you my *forte* does not lie in writing papers, nor do I possess the capacity to express in words that which I can render in color. The specimens I now show will, in some measure, serve as an apology, and embody my ideas of what artistic coloring as applied to photographs ought to be.

SCOTT ALEXANDER.

NEW ENGLAND INDUSTRY.

The following summary of New England items we copy from our excellent exchange the *Commercial Bulletin* :—

George Dwight, Jr., & Co., of Springfield, Mass., are manufacturing some steam pumps of larger size than heretofore made in the State. Three of them are to be placed in fire districts in New York City, and will be of the following dimensions:—Steam cylinder, 20 inches; water cylinder, 10 inches; 36 inch stroke.

E. J. Piper & Co., of Springfield, are manufacturing patterns of new copper-ore crushing machinery, which is to be used in the Lake Superior mines.

J. H. Walker & Co., boot manufacturers, of Worcester, Mass., are erecting a large addition to their old shop. The new building will be of brick, four stories high, 72 feet long, and 35 wide; the total length of their establishment will be 147 feet. When the improvements now going on are completed, the producing facilities of the firm will be nearly doubled; they will employ from 300 to 500 hands, and turn out 500 cases of boots per week.

The machine shop of Whitin Brothers, at Whitinsville, Mass., will employ over 1200 hands and will produce all kinds of cotton machinery except mules. The old shop is 306 feet long and 120 wide, and the new one will be 346 by 68, and four stories high. An ell is also building, 120 by 64 feet and four stories high—which will be used as a cotton mill—all the machinery manufactured in the shops being tested here.

The capital stock—\$100,000—of the American Button Company has been taken up, a large portion being subscribed for by Amherst, Mass., people. The work of manufacture will probably be commenced in this city.

The works of William H. Blanchard & Co., at Worcester, Mass., are now in complete operation in the manufacture of narrow fabrics, and are producing from 20,000 to 30,000 yards per day, of skirt tape, carpet binding, and corset binding. Their goods are of a very superior quality, and their success fully demonstrates the fact that narrow goods can be made at home as well as abroad.

L. J. Knowles & Brother, of Warren, Mass., are erecting a brick block in Worcester, 175 feet by 45 and five stories high, for their own use in the manufacture of their patent fancy loom.

At the foundry of the Charlestown, Mass., Navy Yard, an immense lathe-bed has just been cast. It is 60 feet long, 6½ feet wide, and weighs 50,000 pounds. When it is finished it will weigh 80,000 pounds.

The Saugatuck Manufacturing Company, of Wakefield, R. I., are about to build a new mill on the east side of the river.

Pratt & Spencer occupy a portion of the old Slater mill, at Pawtucket, R. I., as a manufactory of tapes and webbing for covering hoop-skirts. Another part of the mill is used by the Slater Hair Cloth Company. This building was erected nearly a hundred years ago, but is still in a good state of preservation.

The Lewiston, Me., Steam Mill is 92 by 56 feet, and has a sawing capacity of about 30,000 feet of long lumber per day. The number of hands employed is 46. The company owning this mill has a capital stock of \$50,000.

A company has been formed at Hartford, Conn., with a capital of \$100,000, for the manufacture of mills, pans, and other implements for making sugar and sirup from sorghum.

A company has leased a ledge in Danbury, Conn., which is composed of stone, that is specially fitted for the manufacture of sand paper, and will go into the business on a large scale.

A PULL of 250 lbs. is the maximum effort which a good horse can exert for a mile.

Improved Bolt Cutter.

We publish herewith the engraving and inventor's description of a new machine for cutting screw threads on bolts and in nuts. He says:—

"The revolving head in which the dies are fixed is the novel part of the invention, and is thus described as distinctly as possible without the use of detailed engravings:—

"Upon a hollow mandrel or spindle is rigidly fixed a die holder, A, provided with three slots to receive the dies; and extending back from these slots, and at right angles to them, and to the face of the die holder, are other slots in which are fixed small levers which operate to lift and open the dies, as further described below. A portion of the outer end or head of each die is made square and at right angles to its face; the remaining portion of its head is formed into an inclined plane, extending toward and prolonged beyond the back side of the die, thus forming a projection or hook on the back of the die; and when the dies are in place these projections rest on the outer ends of the small levers above-mentioned.

"In the rear of the die holder above described is a flange so made as to slide on the spindle, but made to rotate with it by means of a spline, or feather; and firmly fastened to this flange by means of two bolts passing through slots (herein is a sliding ring or cylinder which encircles the die holder. This ring is provided with three internal ways or bearings, each of which being divided into six equal parts; every alternate part is made eccentric with the ring. The eccentric parts of the two inner (left hand) bearings are in similar position and relation to each other, and expand in the same direction with each other; but the eccentrics of the outer (right hand) bearing expand in a contrary direction. This arrangement of eccentrics is made to correspond to the reverse action of the levers, and the whole plan of the eccentrics is used to adjust the opening of the dies to the proper size, and thus to compensate for wear of dies.

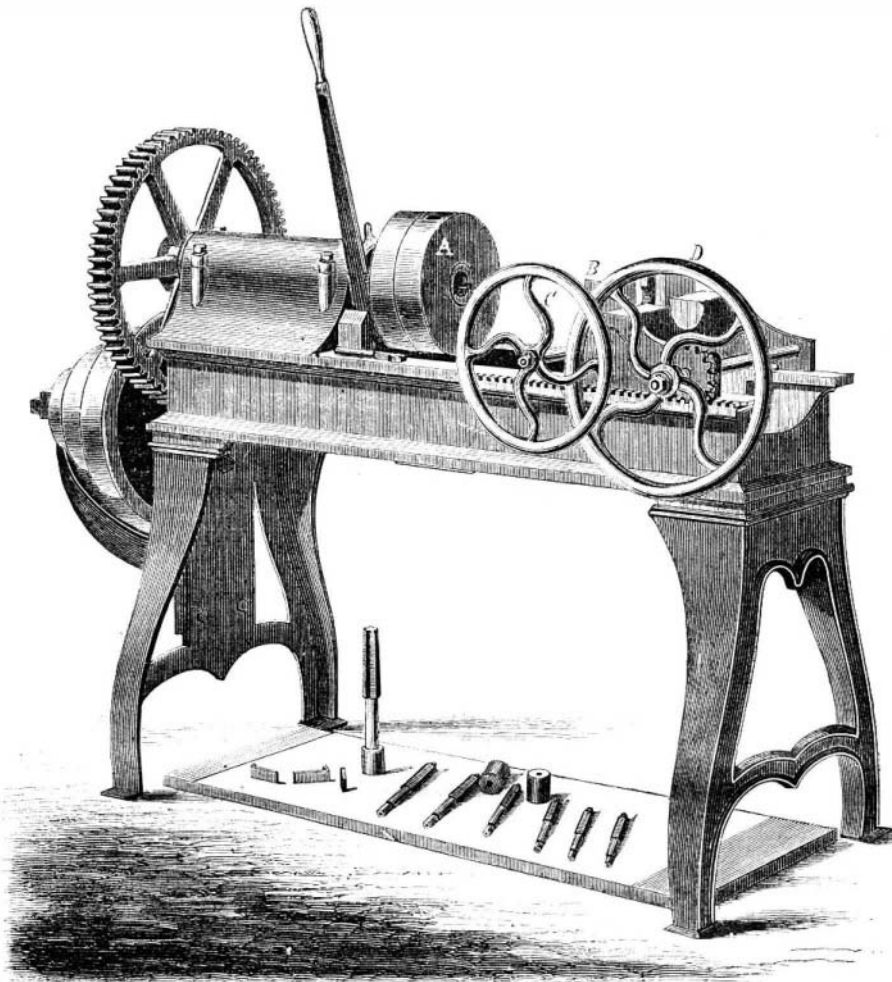
"A face plate or cap, which is secured to the face of the die holder, retains the dies in their respective slots. This face plate has a flange on its periphery, which shuts over a portion of the sliding ring to exclude chips, etc., from the working parts. Through this flange are openings corresponding to the die slots in the die holder, and through these openings (when the ring is carried to the left, as described below), the dies are passed into the die slots in the die holder, or withdrawn, as the case may be.

"The operation of the ring on the dies is this: when the back flange, to which the sliding ring is attached, is moved forward by means of the hand lever, the dies being supposed to be in place, the outer of the three bearings above mentioned comes in contact with the inclined plane of the dies, forcing them inward toward the common center till its face reaches the face plate, when the bearing rests firmly on the square end of the dies, and they are ready for the operation of cutting the thread on the bolt, and will receive the consequent pressure without yielding. The hand lever being carried back, the inner or middle bearing depresses the rear ends of the small levers—the outer bearing passing down the inclined plane of the dies simultaneously—and lifts the dies, thus opening them and allowing the withdrawal of the bolt on which the thread has been cut.

"A latch or stop at the rear of the back flange prevents the flange and attached sliding ring from passing so far back as to allow the ring to pass entirely off the projection on the back of the dies, so as to

liberate them; and so long as this stop is in place the dies cannot be removed. By simply throwing up the stop and moving the ring a trifle further back, by the hand lever, the dies are made free and can be almost instantly withdrawn and others substituted.

"To adjust the dies for cutting smaller so as to compensate for wear, the slot screws at the back of the head, connecting the flange and sliding ring, are loosened, and the ring is turned upon the interior head or die holder, as an axis, so as to cause the eccentrics to act on the head of the dies and depress



MERRIMAN'S BOLT CUTTER.

them. A reverse motion, of course, would enlarge the opening of the dies.

"The bolts are held, for cutting the thread, in steel jaws D, operated by a right and left hand screw cut on the shaft of the hand wheel, C. The bolt carriage is moved forward and backward by a hand wheel, D, with rack and pinion.

"For tapping nuts a cylindrical tap holder is fitted to the central hole in the head (the dies being withdrawn), and a stud on the tap holder passes through and locks past a notch in the face plate into one of the die slots, thus holding the tap holder firmly in place. The tap holder is fitted with a square socket in its center, in which the shank of the tap fits.

"Three distinguishing advantages follow from the construction above described:—

1st. The screw is cut at a single operation and the dies are opened by the direct action of the hand lever to allow the bolt to be withdrawn. The movement of the lever to the right closes the dies ready for further use.

2d. The dies can be withdrawn in a few seconds and others inserted, without turning a nut or screw.

3d. The dies may be adjusted in a moment, with the most minute accuracy, to compensate for wear or any variation.

"The machine may be seen by calling on (or further particulars learned by addressing) S. C. Hills, No. 12 Platt street, New York; J. A. Merriman, general Western agent, 198 South Water street, Chicago, Ill., or the sole proprietors and manufacturers, H. B. Brown & Co., New Haven, Conn."

A CHILD in New Jefferson, Iowa, was fatally poisoned a few days ago by chewing pieces of an enamelled paper collar. The enamel contains arsenic.

Induction Coils.

At a recent meeting of the Royal Scottish Society of Arts, held in their hall, George street, Edinburgh, Sheriff Hallard presiding, Dr. Ferguson read a paper on a new method of constructing induction coils, an abstract of which will be interesting to our readers. One peculiarity of the method consists in coiling the secondary wire round the primary coil, in lengths proportionate to the power of the primary coil at the point where the wire is coiled, there being least at the ends and most in the middle. By this construction, the length of the spark given by the induction coil is not purchased, as it generally is, at the expense of its volume. Another peculiarity is that the wire is wound in two parts, separated by a diaphragm, and the poles stand at the same distance from the primary coil. Both poles are thus alike a power. In the usual arrangement one pole is weak and the other strong. A coil constructed on this method by Mr. Hart, of College street, was exhibited, which gave readily dense sparks of eight inches in length. The insulation of the coil has been so applied and protected as to secure the permanent power of the coil. The length of the wire on the secondary bobbin is nearly seven miles. Another paper on a new current interrupter for the induction coil, also by Dr. Ferguson, was read. In this contrivance a spiral of copper wire, free to oscillate in the middle, is fixed at its end to a rod of iron as a case. A wire soldered to the coil comes out at right angles from it, and being bent down at the end dips into a cup containing mercury. The battery connection is so arranged that when the dipping wire is in the cup the galvanic circuit is closed. On the closing of the circuit, the dipper is drawn out of the cup, and the circuit is thereby broken, and the coil, under the action

of its electricity, returns to its former position. The dipper is thus alternately lifted up and plunged into the cup, and a rapid series of interruptions is made. This interruption admits of a simple and perfect system of regulation, so that it can be made to move at any speed. It does away with the armature and spring of ordinary self-acting brakes, is quite continuous, and introduces almost no resistance into the primary circuit. The interruption was used with the coil, and several experiments illustrative of the merits of both were performed.—*Mechanics' Magazine.*

Cooper Union Night Schools.

The term of 1865-6 closed at this institution last month. Before the close each class was examined separately in the studies they had been pursuing during the term, and certificates were awarded according to the merit of the pupil. A certificate of the First Class being granted for superior ability and diligent attention; a certificate of the Second Class for ability and diligent attention, and a certificate of the Third Class for attention and good conduct.

The annual reception of the Art Department takes place on the 30th inst., and the Annual Commencement on Thursday evening the 31st inst., where all who feel a pride in the advancement of our young men are invited.

MR. JOHN BOURNE, the eminent English engineer, in speaking of shot for use against ironclad ships, says they might be so made that a shot of small diameter could be attached to a wooden piston, and fired from a large gun which would give the small projectile great power and velocity. Such shot were made and used during our late war, with what success we do not know.