Machinery and Tools as they are.---Saws and Saw Mills..

(Continued from page 171)

There are mainly two distinct plans adopted in the application of the Saw, when it is removed from the hands of the artizan or workman, and intrusted to the guidance of rods or pulleys. Upright or reciprocating saw machines are largely employed to perform that kind of sawing which was formerly done at the saw pit, the larger upright saws are used for cutting round or square timber into thick planks, the smaller for cutting deals into boards. The framing of the earlier of these machines was mostly formed of wood, a material which still prevails for this purpose in many districts, although the best are now made entirely of iron. But the circular saw is rapidly gaining ground as a competitor over the straight saw, and is manufactured of as large a size as 6 feet in diameter. Other forms of this tool are sometimes used, although their employment is not general; for instance, we find for many small articles, that several variations of the "trephine saw" are employed under the names of crown, annular, curvilinear, drum, &c. Still, whatever the nature of the work, it may be classed under one of three varieties, according as the saw cuts the lengthway of the grain, across it, or in a curvilinear direction. Reverting to the upright saw machines, the leading principles of their construction are but slightly varied, the intended purpose is to give an alternate vertical movement to the saws, whilst, at the same time, a slow progressive horizontal motion is imparted to the table which supports the timber to be sawn. For this purpose two standards or upright beams support the guide bars down which the saw frame slides, while the frame itself is made sufficiently large to accommodate several saws, sometimes as many as eleven being employed, so that twelve boards can be produced from one plank. The frame keeps the blades straight, gives them tension, and enables the force to be applied without the risk of injury. The distances between the blades are adjusted by interposing pieces of wood and pressing the whole together by side screws, after which the saws are separately tightened by steel wedges. To allow of this adjustment, the saws have buckles rivetted to them, and these generally pass through mortices in the top and bottom rails of the sliding frame. This latter has appropriate bearings at the four angles, to fit the slide bars, and the alternate motion is given to it by a crank shaft; the connecting rods are not attached directly to the saw frame, but to a cross-head which is jointed at its centre to the frame, so that even supposing the two cranks to be a little dissimilar in length or angular position, they nevertheless move the frame equally without straining or rocking it. The advantage of a long connecting rod entails the necessity of allowing great depth to the standards which sometimes measure eighteen feet in height, and in order to bring the machinery into more moderate compass, it is proposed to use a forked connecting rod. The friction caused by the rapid motion of the saw frame, is very considerable, so that the guides require to be well adjusted. The timber lies on a bed which is placed on a series of rollers, and is made to advance towards the saws by means of a rack and pinion, which are actuated by a ratchet movement, so that when the retaining pawls are turned back a retrograde motion can be given to the bed. It is possible to dispense with the long rack by grasping the timber between two grooved feeding rollers, the one fixed to the framing of the machine, the other pressed up by a loaded lever, and moved a small step at each time by a ratchet, as usual, but this plan does not prevail. The balk is held in its right position by dogs, and in some machines, both these and the timber can be moved in transverse directions to suit the varying widths of the lumber.

At the City of London Saw Mills the machine for cutting logs or balks of timber into thin veneer planks, is very accurate—in one instance,—a log of Honduras mahogany, 18 feet long and 3 feet 1 inch square, was cut into unbroken sheets at the rate of ten to an inch, and so beautifully smooth as to require scarcely any dressing.

Reciprocating saws are much used for curvilinear works, such as bevelled timber for ship-building, felloes of wheels, circular rails of chair backs, &c. For these it is usual to have a narrow saw moving vertically, whilst the bed is capable of motion in various directions. In some cases the work can be guided by a fixed circular fence or by radius bars; for bevelled works the table can be tilted to any angle, and for such adjustment it appears preferable to allow it to swing on a central joint. In other cases the saw frame is jointed and may be brought down by a swing frame in the arc of a circle, to penetrate to any assigned depth.

Small reciprocating saw machines, fitted up as adjuncts to the lathe, are often found advantageous to mechanics using that tool and occasionally cutting curved work. In one instance the saw is stretched in a frame about 4 to 6 inches high, and from 10 to 14 inches wide, a small pulley beneath the lathe-bearers receives continuous motion from the foot wheel, the end of a cord is fixed to the pulley at a small distance from the centre, the other end is passed beneath another small pulley, and carried on to the frame, which is forced upward by a spiral spring, and then pulled down by the cord. In other small machines the saw is unprovided with the frame, by which it is generally stretched and guided, these functions being fulfilled by the motive part of the apparatus, one instrument of this sort has a spring attached to each end of the saw, and a small eccentric gives the motion by fixing a loop of wire, which embraces it, to the lower spring, so that when the eccentric revolves the spring is thrown into rapid vibration, and with care in the arrangement the saw can be made to traverse very nearly through the same point of the platform. These small saws are chiefly adapted for cabinet-makers and others who require to cut thin curvilinear pieces. When the straight saw is used in cross-cutting machines, it is customary to give the frame a horizontal reciprocating and also a vertical feeding motion, and almost to counterpoise the weight, so that a moderate pressure only bears on the saw teeth. The forms of the teeth differ considerably, according to the nature of the work, a tooth often used for cross-cutting is said to be of upright pitch from presenting equal angles on each side, but another kind more generally employed for small cross-cutting saws is inclined about 15° from the last, this is termed slight-pitch; in ordinary pitch the face is perpendicular and the back inclines at an angle of 30° from the edge of the saw; this shape is likewise used for cutting metal, for circular saws, when the work is fine, and often for cross-cut circular saws Sometimes in mill saws for soft woods the face of the teeth is set forward, or stretches beyond the perpendicular at an inclination of 15°, nearly the same tooth is likewise adapted for circular saws, and cutters for metal.

Some teeth are called gullet teeth, on account of the large hollow or gullet that is cut away in front of each tooth in continuation of the face, they are also known as briar teeth. The tooth is, in general, cut by one punch filling the entire space. This shape allows more room for the saw-dust, and is less disposed to retain it than the angular notch so that it is much employed, although the angles of the face and back are varied according to the species of wood, for mahogany, rosewood and other hard woods, and likewise for cross-cutting the angle of the face may be 90° and that of the back 30°, for soft woods and ripping with the grain the angle should be less.

(To be Continued.)

Serious Accident.

A serious accident occurred at Glen Cove, L. I., last week, by which one man was killed, and about thirty more severely wounded. A Magistrate's Court was in session in a small room, and a large number of persons were present as spectators, when the floor gave way, and precipitated one hundred and and fifty persons into the cellar below. A stove full of hot coal fell among the unfortunates, burning some of them severely.

The present naval force of Great Britain consists of five hundred and forty-five ships of war. Of this number one hundred and eighty are armed steamers.

Helichrome or Sun Coloring.

The following is M. Niepce's last address to the French Academy of Sciences, on the above-named subject, which we have translated from the "Lumiere":—

"In this new memoir I shall chiefly treat upon the optical phenomena that I have observed in trying to fix the colors in the camera. After having obtained, by contact, that is to say by applying the plane of a colored engraving on a sensitive plate, and covering it with a glass to expose it afterwards to the light, all that it was possible to obtain in the present state of things, I have sought to arrive at the same results in the camera. The attempt was difficult and I made up my mind to encounter great difficulties, which I have succeeded, to a certain extent, in surmounting.

I have discovered the possibility of copying every color—all that is required for this purpose being a suitable preparation of the plate. I began by copying, in the camera, colored engravings, and afterwards artificial and natural flowers, after this inanimate nature,—a figure which I clothed with garments of different colors, and always with gold and silver lace I obtained every color, and, what is most extraordinary and singular, the gold and silver were depicted with their metallic lustre, as were likewise glass, alabaster, and porcelain, with their peculiar brilliancy. I have produced pictures of precious stones and stained windows, and these attempts have brought under my notice a curious circumstance which I think it proper to mention here. A dark green glass placed before my objective, gave a yellow instead of a green picture, whilst a light green glass placed beside the dark green was copied exactly with its color. The great difficulty that has hitherto stopped me, has been that of obtaining several colors together; it is however possible, for I have often done it.

All light colors are produced much quicker and better than dark colors—that is to say, the nearer colors approach to white the more easily are they copied, and the nearer they approach to black the more difficult it is to copy them. This is to be expected, for their photogenic action is greater according as colors are more luminous. Bodies that reflect most white light are likewise those that are best copied, so that white light, far from being injurious to copying colors, renders it, on the contrary, more easy, as will be seen Having observed that light and brilliant colors are copied much better than dull colors, provided, however, that the former are not exposed to the direct rays of the sun, because, in that case, they would reflect the light like a looking-glass, and burn the picture in certain parts, I conceived the idea of operating in a room, the interior of which should be as much illuminated as possible; for that purpose I employed at first a room papered white. The results have been at least equal to those that the camera gave, as far as regarded the copying of colors, which it was important to prove. After this I covered the inside of a camera with tinned looking-glass, and again obtained the same results, such a camera is, however, contrary to all photogenic laws.

I cannot, nevertheless, certify in a positive manner, that there is really an advantage to use, in preference, an apparatus of these two kinds, either for the force of the effect or for the rapidity, because the means at my disposal have not, as yet, permitted me to make comparative trials sufficiently conclusive.

On account of the light colors being copied more easily, and above all more rapidly than the dark colors, it is of great importance that the shades of the object copied should have shades of a similar tone, if it is required to copy them all at the same time; unless this is the case, the light shades would be obliterated before the next were copied. Colors of different tones can, however, be fixed by taking care to select light dead colors and dark colors that are bright or glassy, which I have done successfuly. The most difficult color to obtain with all the others, is the dark green of foliage, because green rays have little photogenic action, and are almost as inactive as black; light green, however, is very well copied, particularly if it is shining, as in green paper glazed. To obtain dark greens, the plate must be scarcely warmed before exposure to the light; whilst, to obtain most other colors and particularly fine whites, it is necessary, as I have said elsewhere, that the sensitive coating be brought by heat to a cherry red tint. This red tint has great disadvantages—the dark parts and the shades remain almost red; some times, however, it happens that the dark parts are well expressed, particularly when it is done by contact. I have endeavored, by all the means at present in my power, to do away with this preparation by rise of temperature, but I have not yet succeeded. The following experiments have directed me on a road which will conduct me, I hope, to a complete solution of the problem of HELIOCHROME.

If, when taken out of the bath, the plate is only dried, without raising the temperature so as to change its color, and then exposed to the light with a colored engraving before it, there is actually obtained, after a very short time of exposure, a copy of the engraving with all the colors. But the colors, most commonly, are not visible, some only appear when the exposure to the light has been long enough, namely, the greens, reds, and sometimes the blues; the other colors, and frequently all the colors, although for certain produced, remain latent. The following is a proof of this: if a small ball of cotton, impregnated with ammonia, and that has already been used for cleaning a plate, is taken, and the plate gently rubbed with it, the picture will gradually appear with all its colors. For this purpose it is necessary to take off the surface coating of chloride of silver, to get at the lower coating below, namely, the one that adheres directly to the silver plate, and on which the picture is formed. It is clear from this that the only question is to find a substance that can develope the picture and that will, perhaps, at the same time fix the colors. The problem would then be completely solved. In the numerous experiments made for this purpose, I have observed, if the vapor of mercury is employed, the picture is very well developed, but it is of a uniform gray tint without any trace of color; its appearance differs from that of the Daguerreaan picture, although like the latter it is presented under two different aspects, that is to say, a positive picture, in one sense, and a negative in the other. If a weak solution of gallic acid, with a few drops of ammonia is used, the picture is similarly made to appear, especially when the plate is heated and afterwards dried without washing. The picture which then appears, resembles, in some degree that produced by mercury, and if to the gallic acid there are added a few drops of aceto-nitrate of silver, it becomes almost black. The time of exposure necessary to obtain the colors varies considerably, according to the manner of preparing the plate; I have already shortened it, for I have taken pictures in the snn with a German objective for a half plate, in less than a quarter of an hour, and with diffused light in less than an hour. The colors fade more quickly, according as the plate is more sensitive, and hitherto I have only succeeded in fixing the colors momentarily, the question of permanent fixing has yet to be resolved; it is connected, perhaps, as I have pointed out above, with the discovery of a substance that will transfer the picture from its latent to its visible state. Notwithstanding what remains to be done, I believe that I have already obtained extraordinary results, which have surprised every one to whom I have showed pictures of the figure copied by me, in which the gold and silver lace is depicted with its metallic brilliancy, and in which the contour of the figure and all the colors of the clothes are copied with much clearness. My best pictures already realize, in part, the enthusiastic expectations of my uncle, who said to one of his friends, the Marquis de Jouffry, that one day he would take his picture the same as seen in a looking-glass. This vast advancement has unfortunately, not yet been attained, but we may hope to arrive at it some day or other, and although the difficulties to be overcome are still numerous and great, I have placed, it appears to me, out of doubt the possibility of complete success."

The stock of hemp in St. Louis, is stated to be only one hundred and twenty five bales, and held at $115.