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OIL OF TURPENTINE AND RESIN.

This is an important industry in some of our Southern States, and the mode of gathering the materials and manufacturing them into a merchantable article is described below.

In the manufacture of oil of turpentine and resin, a convenient portion of pine land is taken, where the necessary homes are constructed, and early in January boxing the trees commences, which lasts until the last of March. All the pines over twelve inches diameter are boxed, namely, incisions are cut near the base of the tree, preferably in the south side, the boxes being about ten inches broad and made to hold from two to three pints, some trees of larger size having from three to five boxes, according to size of trunk. Oblique gutters are cut above the boxes, to convey the turpentine in as it exudes. They meet over the center of the box from each side, inclined downward. The boxes are divided into lots of 10,000 each, which is called a crop, and is placed under the supervision of a man.

The exudation commences immediately, and very soon the boxes are filled, when it is dipped by means of wooden shovels, emptied into pails, then into barrels placed in convenient places, each barrel containing 280 pounds. The boxes, when properly attended to, fill about seven times during the season, from March to October. As the exudation becomes slow new streaks are made, reaching through the bark and into the alburnum to the depth of about four concentric circles. The turpentine obtained during the first year is richer in oil, and produces the best qualities of resin; it is called "yellow dip" or "pure dip." That which congeals on the faces of the trees is scraped off in October; it contains very little oil, having lost the greater part by evaporation. During the winter the stock of oil and resin which accumulates is disposed of, and arrangements made for commencing with warm weather of the following season. The same farms are seldom worked longer than three or four years, as the trees become badly exhausted in that time, and there are new trees to work upon near at hand. The still is made of copper, varying in capacity from eight to thirty barrels, some being larger even than this. It is inclosed in a brick furnace, so that heat may circulate around it. It is supplied with a movable top, through which the "gum," or crude turpentine, is put. At the base there is a large stopcock or gateway, through which the residue is drawn after the distilling process is completed; it is also supplied with a small stopcock at top, through which the water enters. The movable top is connected with a large coil of pipe for condensing, which is immersed in a tank filled with cool water; the end of the pipe is brought through the side of the tank near the base, so as to empty its contents into a barrel for that purpose. The barrel or receiver is furnished with two openings, one near the bottom, the other near the top.

A convenient quantity of turpentine is placed in the still, being very dirty, containing leaves, sticks, etc. Heat is applied, and very soon the vapor begins to rise, and is condensed while passing through the coil; it is emptied into the receivers. At first a greater part of it is water; the water immediately falls to the bottom, because of its greater specific gravity and incompatibility; as the receiver is filled, the water is drawn out through the stopcock at the base, while the lighter volatile oil is drawn from that at top and transferred to barrels. As the distillation progresses, the quantity of water becomes small, when more is added through the top of still. This process is continued until the distillate is largely water (one part of oil to twelve of water), when the fire is removed; the movable top is also taken away, and it is allowed to stand for a few minutes until most of the water passes away; then much of the straw and sticks are removed by means of strainers on long handles; after this is done, the large stopcock is opened, and the liquid resin conveyed to strainers to remove all dirt, etc. The first strainer is, of course, wire, to remove large pieces of trash; then it is passed through cotton batting made for that purpose, lastly through a strainer made of wire gauze of No. 40 to No. 60, No. 60 being used for best qualities of resin; it is then allowed to stand in large vats until it is partly cooled, when it is removed to barrels, each containing 280 pounds. The resin from turpentine of the first year is classed "window glass," then "virgin," which are the finest qualities; the lower grades are made from "gum" of succeeding years, and often by improper distilling. The oil is put in barrels, and after being allowed to stand for a short while deposits a sediment, mostly of suspended organic matter; this is removed, the barrels sealed up, when it is ready for market. To further purify the oil, it should be distilled from caustic potassa. When the manufacture is conducted economically, says the *Independent Record*, to which we are indebted for this article, a profit is realized when twenty-five cents per gallon is received for the oil, and from two dollars to four dollars per barrel for resin, according to grade. Large quantities of these are exported yearly, and their manufacture is one of the most paying industries of those of our States so abundantly supplied with suitable trees to operate upon.

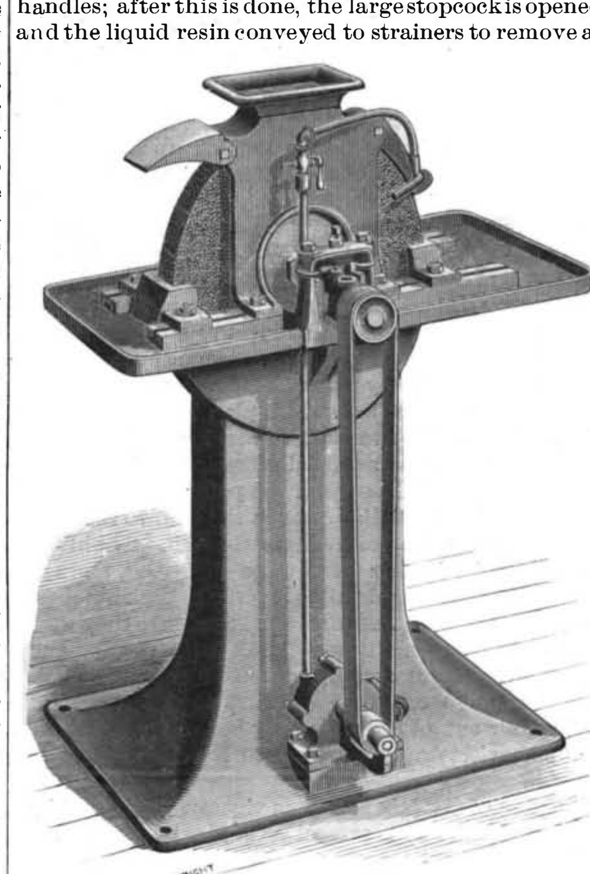


Fig. 1.—THE STILES MACHINIST'S TOOL GRINDER.

IMPROVED TOOL GRINDER AND PRESS.

By the use of corundum wheels running in water a cutting edge quite unattainable on the grindstone may be given to lathe, planer, and other tools, without affecting the temper of the steel. The frame of the tool grinder shown in the engraving is hollow, forming a reservoir for water, which is forced to the wheel by means of a self-acting pump bolted to one side of the base. Near the upper end of the tube is placed a faucet, by which the amount of water delivered to the wheel may be regulated. A flexible tube leads from the upper end of the pipe to the nozzle, which is divided and so arranged that the water may be delivered upon any desired point of the wheel or tool. The shaft is made of steel and runs in self-oiling boxes, and is accurately balanced together with the wheel, thus avoiding the necessity for a special foundation, and adapting it to use on an upper as well as lower floor. The fixture shown in Fig. 3 is made to receive a diamond tool, and is for truing up the wheel without removing it from the frame. The frame of the fixture is held in place by two bolts, the heads of which slide in grooves, as shown in Fig. 1. Journaled in two standards is a threaded shaft, eccentrically mounted upon which is a hub formed with the handle, C, at one end. The rear end of the cutting tool holder is journaled upon this hub, the set screw, A, serving to unite the two. The fixture, having been bolted to the grinder, the tool may be moved across the face of the wheel by turning the screw, and may be moved in or out by turning the eccentric hub.

For convenience in cleaning out the reservoir when necessary there is a hand hole—not shown in the cut—in the frame. These grinders are cheaper and will last longer than the ordinary grindstone, while the work they perform is of a better grade. The total weight of the tool is 700 pounds.

The press represented in Fig. 2 is a new design embodying many novel and admirable features. The pitman is wide, and fills the entire space between the bearings of the frame, thereby securing to itself a long bearing and adding strength and stiffness to the press. The device for ad-

(Continued on page 36.)

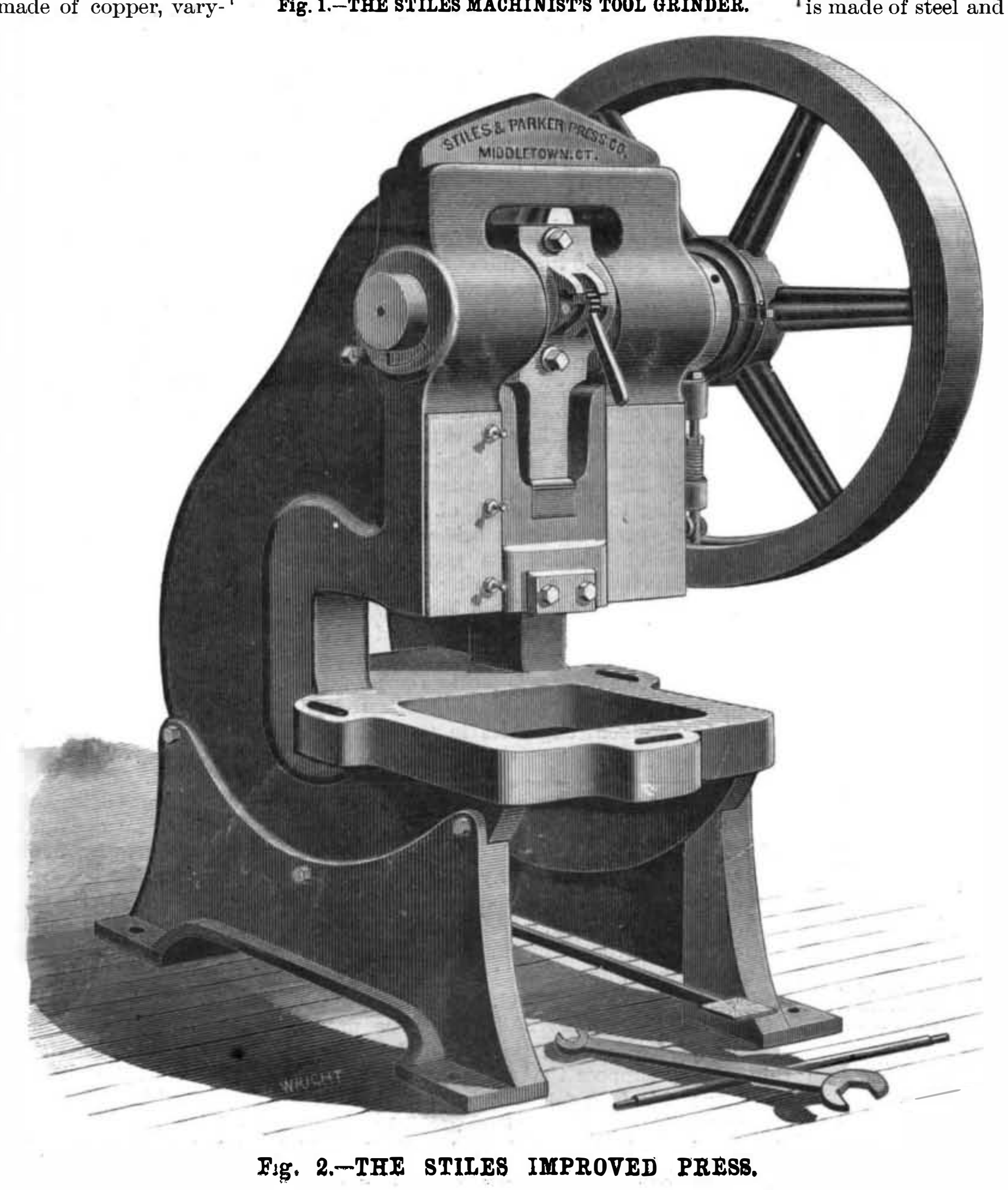


Fig. 2.—THE STILES IMPROVED PRESS.

IMPROVED TOOL GRINDER AND PRESS.

(*Continued from first page.*)

justing the pitman is another new feature; instead of holes being drilled in the eccentric to receive a bar for moving, as in the old style of these presses, gear teeth are cut one-half way round in the center of the disk, and a pinion formed on the end of a handle enters a recess made to receive it, so that by the movement of the handle up or down the punch can be brought to any desired position. This handle can be removed when not in use.

The shaft is not held in place by boxes, the bearings being bored straight through the solid frame, into which is inserted a circular shoe, set up with screws to take up the wear and to produce friction sufficient to overcome the momentum, thus dispensing with any special device for accomplishing the latter purpose. This construction makes the frame much stronger than if cut out to receive a cap to hold the shaft in place, and also allows the shaft to be much larger, making a stronger and more durable press. The shoe is chambered for the reception of oil, thus keeping the shaft well lubricated. The press is provided with a patent stop motion, by which the shaft can be turned to bring the slide to the lowest point of the stroke for setting dies, while the wheel is in motion, and it is impossible to start the press by any accidental pressure upon the treadle. The lock is self-acting. A valuable feature of the machine is that the wheel can be turned backward to release a punch stuck in the die, or when fitting punches to the die.

Further particulars regarding these machines, which are now on exhibition at the New Orleans Exposition,

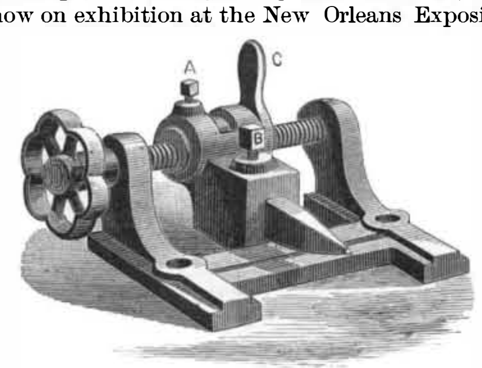


Fig. 3.

can be obtained by addressing the Stiles & Parker Press Co., of Middletown, Conn., or 59 Duane Street, New York city.

Electricity in Cotton Mills.

One of the most formidable foes we have to contend with in working cotton fiber is electricity, which is generated with fearful rapidity in dry frosty weather in all parts of a cotton mill, by the friction of machinery and belts. Suppose we look at the effect on a cotton breaker card on a dry November day, rather cool, with the wind ranging from north to northwest, when we find electricity very active and mischievous on cotton fiber. We may take a card in a very favorable place, by the side of a main belt, for the purpose of observing the effect on the condition of the fiber in the sliver, as compared to that of a card remotely situated from the main belt. If we select slivers of drawing from each, we shall find the fibers much better elongated in the sample from the card remote from the friction and consequent electricity of the main belt. Had we sufficient knowledge of electricity to measure it, we should find it in large quantities at the first point of much friction where the licker-in is combing the cotton from the feed rollers. It is quite evident, from the great variety of angles from a straight line in which we find the fibers in the slivers from the card near the main belt, that the card is charged sufficiently to attract the fibers from their straightened condition as they approach the doffer.

Standing in front of the card near the belt it is interesting to see the fleece between the doffer and the calender rollers raised up at intervals by the attractive power of electricity, and to notice the fibers drawn up out of line in their onward course to the rollers.

It is this silent force of electricity that is mischievous all the way through from the card to the small sliver between the rollers of the spinning frame. Frequently, when the air is dry and the electricity is active, heavily weighted drawing rollers are constantly catching up fibers from the slivers until they roll up and make bad work. Cotton fibers are very light, and when dry they are good conductors of electricity; when electrified or charged excessively, they are ready to fly to any point where there is the least friction. We may have some just conception of the fineness of cotton when we realize the fact, as found by actual count and careful weighing, that there are nearly 100,000,000 of low middling fibers to one pound avoirdupois, or more accurately stated 90,900,000.

By repeated trials in dry windy days I have removed the conducting wires from the counter and frame driving belts, and held slivers of roving 42 inches long, weighing about 3 grains, opposite a 2 inch belt, in which there was sufficient electricity to hold the sliver firmly in a horizontal position; by letting the rays of the sun in, near the belt, you can see streams of fibers flying in the air to load the belts with cotton.

For the purpose of finding the injury to the quality of the yarn, I recently selected a place where the power of electricity had been subdued by good insulated copper wire conductors, and I then carefully tested yarn from 10 spindles on the end of a spinning frame nearest the driving belt. The total average results of several trials only are given, to avoid lengthy columns of figures. With 59 to 65 per cent of moisture in the air during the experiments with the electricity taken away by the conducting wires, while the wires were removed I found the following results: With the conducting wires in position to work over the counter belt overhead and by the side of the frame belt, the average number of yarn was 28·48, the average strength 56·65 pounds, equal to 4·45 per cent above extra quality.

Using the same roving, and all other things being equal except the removal of the electric conducting wires, I found the average number of yarn the same as above, 28·48. The average strength, 54 pounds, equal to 1·52 per cent above extra quality, thus showing a depreciation of nearly 3 per cent in quality by the action of the electricity.

During an experiment on a former occasion, when there was but 53 per cent of moisture in the air, and the electricity was much more powerful, I found more than 4 per cent difference in quality. By mounting a good magnifying glass over the rollers at the end of the spinning frame, near the belts, the fibers were seen distinctly. By throwing rays of sunlight between the rollers with a good hand mirror, not only were the fibers seen drawn out at right angles from the surface of the sliver as it passed from the bobbin to the rollers, but the fibers between the rollers were seen constantly swinging off at every conceivable angle, giving the thread of warp yarn a rough woolly surface, much like mule filling spun from a low grade of cotton, in which a short staple of cotton predominated.

These facts show most conclusively the importance of placing all drawing, roving, and warp spinning machinery in the most favorable positions, away from the influences of electricity. The conditions of electricity are constantly varying. About one year ago I made several trials of the strength of yarn, similar to those given above, and found but little difference in the strength of the yarn. Extremes of moisture and heat combined, such as we have in New England in the month of August, will affect the working of cotton just the reverse of an extremely dry air when there is much uncontrolled electricity, causing the fibers to expand, increasing the size of laps from the lapping machinery and the lap heads, and all the slivers of drawing and roving. With 65 per cent of moisture in the air, and the temperature at about 75°, and with a northeast wind, the spinning and weaving in most of the New England mills will generally be found running well, provided the quality of the cotton and all other things are properly adapted to the numbers of the yarn spun.

Good electric conducting insulated wires to convey the currents to the ground are essential to success in controlling the silent, subtle fluid, and in this way to destroy the bad effects of electricity on the quality of the work in cotton mills, without the serious objections to the use of cold vapor or hot steam in the rooms. Care should be exercised, in conveying the electricity to the ground, to have an unbroken connection of metal to the ground, so that the current shall not be severed. If the conducting wires are attached to sprinkler pipes, care should be taken to file off any rust or paint, so that the connection shall be made with clean polished surfaces of the wire and pipe together.—*Textile Record.*

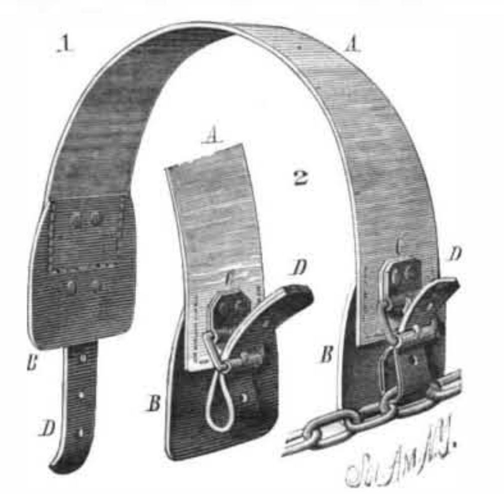
Carbon Disulphide Solution.

The solubility of carbon disulphide in water, and the uses of the solution, are attracting considerable attention just now. M. Peligot has made a communication upon the subject to the Academie des Sciences, by way of commentary upon the original memorandum of Ckiandi Bey. He recognized that pure carbon disulphide is soluble in water to the extent of 0·5 gramme per liter, if agitated in a flask completely filled with water. M. Pasteur has tested the solution in his laboratory, with a view to ascertaining its antiseptic properties, and the results have so far been most remarkable. It is declared to be possible that this solution will become the best antiseptic of the future, as it is already the cheapest. It costs only a few centimes per liter. M. Peligot finds that the solubility of carbon disulphide in water is much more than that already stated; and has succeeded in dissolving 3·5 cubic centimeters, or 4·52 grammes, in a liter of water at ordinary temperature—the density of the body being 1·293. This result was obtained by repeatedly shaking pure disulphide of carbon in a flask half full of distilled water; but it is the same with ordinary water.

The liquid thus prepared, even before the point of saturation has been attained, has a sugary smell, afterward burning. The odor, which remains for a long time when open to the air, resembles that of chloroform. Brought to the boiling point, it gives up the carbon disulphide; but this body is also driven off by sharp and prolonged ebullition. The water which condenses during this operation contains traces of sulphureted hydrogen, and discolors lead acetate. The solution before boiling does not affect the lead salt. The aqueous solution rapidly acquires a yellow color when placed in contact with potash, soda, or ammonia. If the solution is shaken with clear lime or baryta water, the liquor becomes yellow after some minutes, and throws down a white precipitate of carbonates of these bases, with simultaneous formation of sulphocarbonates. The barytes solution gives, by evaporation, carbonate and hyposulphite of baryta. The aqueous solution of carbon disulphide stops all fermentation, and is described as the insecticide *par excellence.* It is necessary to insist upon the purity of the substance, or the solution would have an insufferable odor.

BACK BAND.

The engraving shows a back band, patented by Mr. James B. McHugh, of Ambrosia, La., which not only secures greater comfort for the horse, but in which provision is made for changing the connection of the band from one part of the chains to another, and for lengthening or shortening the band and for putting it on without unfastening either end of the chains. The body, A, of the band is made of woven material, on



McHUGH'S BACK BAND.

each end of which is stitched a leather skirt, B, outside of which is a buckle holding strap, C. The fastening straps, D, are passed through any one of the links of the trace chains. It will be seen that this mode of attaching the band provides for putting it on without unfastening either end of the chains. In Fig. 1, one end of the strap is secured by rivets to the skirt, B; in Fig. 2 the strap is separate from the skirt, and is formed with perforations in each end; the method of attaching it to the buckle will be readily understood from the drawing.

Wild Flowers in Maine.

A forty mile stage ride through the more thinly settled portion of northwestern Maine, during the past summer, exhibited one botanical phenomenon of great interest and beauty.

As we were riding along the banks of the Canabassett River, a noisy little tributary of the Kennebec, our driver, hearing us speak of different flowers, said, "Just wait, and in a few miles I will show you the biggest flower garden that ever you saw."

Before long we came to a tract of some 4,000 acres, over which lumbering operations had been carried on some years ago, leaving a tangled mass of limbs and underbrush.

On June 8, of the present year, a fire broke out and swept over this entire tract, lasting for two weeks, and burning with such fury that it was almost impossible for the stage to travel along the road.

The driver said that the new vegetation began to start in three weeks after the fire, and as we drove along, August 14, our road passing through this tract for four miles, the whole region, as far as the eye could reach, over hill and valley, ridge and interval, was one mass of color from the "fireweed," *Epilobium angustifolium.* It looked, as one of the party said, as if the earth were covered four or five feet deep with a fall of pink snow. The sight was one never to be forgotten.

Now comes the query, "Where did the plants come from?" The region had been thoroughly burned over two months before, so that but little other vegetation had survived; the seeds are very light and feathery, and the driver had noticed none in the previous years. —*J. W. Chickering, Jr., Botanical Gazette.*

A Remedy for Frosty Windows.

A thin coat of pure glycerine applied to both sides of the glass will prevent any moisture forming thereon, and will stay until it collects so much dust that it cannot be seen through. Surveyors can use it to advantage on their instruments in foggy weather. In fact, it can be used anywhere to prevent moisture from forming on anything, and engineers will find it particularly useful in preventing the accumulation of steam as well as frost on their windows during the cold weather.