



other Besides the advantage of having a clean bosom when one becomes soiled, the shirt having this improvement affords protection to the chest at the most exposed part.

Mr. David H. Thomas, of New York City, has patented an improvement in Cooking Ranges, which consists in a novel arrangement of the flues and ovens; also in a sectional swinging grate and a blower or grate cover for broiling.

Mr. Henry V. Aiken, of Fishkill Landing, N. Y., has patented an improved Pneumatic Gong Pull, which is so constructed that the gong hammer may be operated by means of compressed air. It may be used upon vessels, in houses, and in other places where signals are to be given.

Mr. Jerome F. Bussey, of Peck's Mills, Pa., has devised an improved Machine for Bending Chain Links, which may be adjusted so as to produce links of different sizes and thicknesses of iron by one and the same machine, without necessitating the use of several machines for each size of link.

#### A WRINKLE IN FILING.

Those who have used slender files have met with the difficulty that the file bends from the pressure with which it must be forced upon the work to make it cut. The result is that it files the edges of the work away, leaving the surface rounding, as shown in Fig. 1, in which A A represents the operation of filing out a narrow keyway, the file bending from the pressure, as shown, rendering it necessary to either make a drift to finish the keyway with or to work out the roundness with the end of the file only, which is a long and tedious job.

To remedy this defect and enable the filing to be done with full strokes and a maximum of pressure, the file may be grasped as shown in Fig. 2. The pressure of the forefinger and thumb, being exerted in the direction denoted by the respective arrows, bends the file to a sweep or curve, causing it to file flat clear across the work, while if any particular part only requires to be filed the file may be brought to bear against it and short strokes taken. It is obvious that in this case the handle end of the file must be elevated or depressed to bring the belly of the file to bear upon the required spot.

J. R.

#### Chrysoline on Cotton.

The author has been commissioned to examine the applications to cotton of a new coloring matter known as chrysoline, and which, since March, 1877, has been used in wool and silk dyeing. It is the soda salt of benzylated fluoresceine, and has been discovered and manufactured by M. Fred Reverdin.

As the inventor has himself in several publications described the chief properties of the new product, and the method of its preparation on the large scale, it will merely be necessary to describe here its characteristic reactions.

This color is soluble in all proportions in water and alcohol. In glycerine diluted with water it is less soluble, and in concentrated glycerine it dissolves only with the aid of heat. It is insoluble in oils. Essence of turpentine precipitates it from its aqueous solutions.

Its solutions by reflected light are of a splendid green color, but by transmitted light of an orange.

Alkalies promote its solution, while the acids and all the metallic salts, except the carbonates, give an orange precipitate, the shade of which varies according to the base of the salt.

Among these precipitates, the most remarkable are those given by chloride of tin and nitrate of lead. The latter is brightest if we precipitate a cold, weak solution, which has previously been rendered slightly alkaline.

Chrysoline contains two distinct coloring matters—the one gives a yellow precipitate with acids and metallic salts, the other a red or rose precipitate with salts of lead.

The latter color is not fast; the former is more stable. If the precipitate produced by muriate of tin is allowed to settle, the clear liquid above is of a light orange. If this is rendered ammoniacal, and mixed with a weak solution of nitrate of lead, it deposits a splendid rose-colored precipitate, apparently due to the presence of a certain quantity of eosine, which is produced in the manufacture along with the yellow color.

Cotton cannot be dyed in a direct manner with chrysoline, and receives only a slight rose coloration if previously mordanted with salts of iron or alumina.

With a lead mordant it takes a beautiful light rose, the shade of which is scarcely proportionate to the total quantity of chrysoline in the dye bath. It is the red coloring matter alone above mentioned which dyes. The whites are always stained.

If cotton is worked in a watery solution of chrysoline, 1 grain to the fluid ounce, and dried, it takes a very fine orange shade. This color, which is characteristic of chrysoline, is not fixed upon the cotton, and is very sensitive to

light. A few hours of exposure cause it to fade and even to disappear.

If this colored cotton is passed before drying into a bath of oil mordant, a part of the yellow color is fixed well enough to resist simple washing.

A weak solution of nitrate of lead likewise fixes the coloring matter with an orange shade, in which the influence of the red coloring matter may be traced.

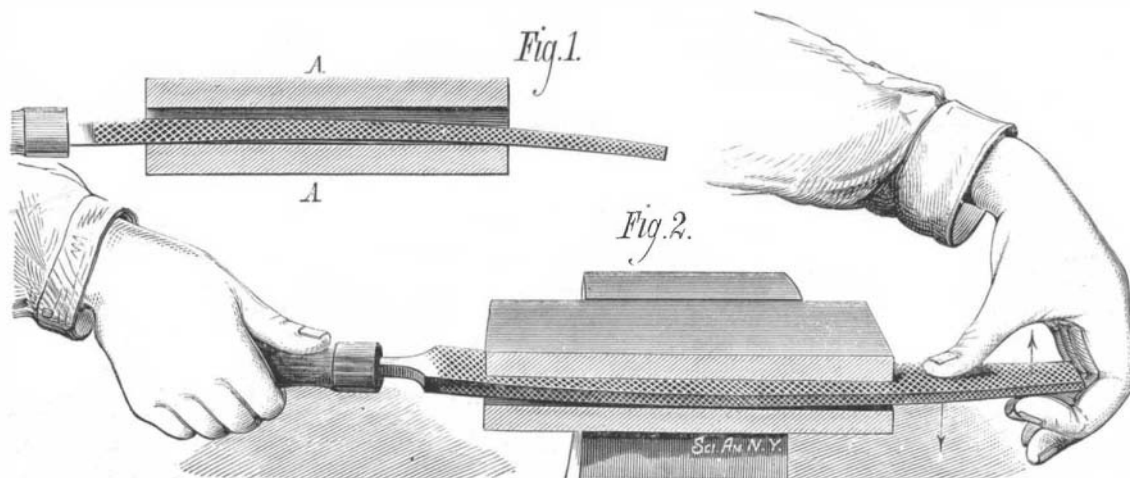
Cotton previously prepared with an oil mordant exhausts the color bath and dyes up a full orange. This color resists light better, but does not wash.

*Printing.*—After these preliminary trials I endeavored to apply chrysoline in printing.

A solution of 1 grain per fluid ounce of water, thickened with egg albumen, gives a fine yellow, which, after steaming, is sufficiently intense. Washing removes much of the yellow, and there remains merely a dull faded color.

A better result is obtained by printing with precipitates containing 62 grains of chrysoline in 31 ozs. of color. I exhibit two such precipitates applied with albumen; the one obtained with nitrate of lead, and the other with muriate of tin.

These precipitates were obtained as follows: 17½ fluid ozs. of solution containing 15 grains of chrysoline.



A WRINKLE IN FILING.

This is slowly precipitated in the cold, with ½ oz. of a solution of nitrate of lead, or of tin crystals, containing 3¼ ozs. per 1¼ pint. The precipitate is washed twice by decantation. 5½ fluid ozs. of this precipitate are thickened with 2½ ozs. of egg albumen. The lead color, though the more beautiful, must be given up, as it becomes discolored on steaming and exposure to the air. The tin color, on the other hand, is of a very fine orange, and is developed by steaming, and resists light better.

The two colors are much degraded and changed in tone by a slight soaping. They present then a flesh color, which is restored to a yellow by acids.

There is still a third method of application, that with arsenite of alumina. Upon calico prepared with acetate of alumina there is printed a solution of chrysoline, 62 grains to 35 fluid ozs., containing the necessary quantity of arsenite of soda, and thickened with white starch. The results are better as regards solidity, but at the expense of beauty. The orange is less intense, more of a yellow shade, and wanting in brightness. It resists washing and light.

*Dyeing.*—I submit some skeins dyed upon the same principles. The results are not much more satisfactory. The first skein was mordanted in acetate of alumina, at 5° B., steeped in a bath of chrysoline and arsenite of soda, wrung, dried, steamed, and washed. A tolerable orange, which resists light slightly.

The second skein, prepared in the same manner, was then dyed in a bath containing acetate of alumina and arsenious acid dissolved in glycerine. Wring, dry, steam, and wash. The tone is much more yellow.

Caution must be used in this process, as it is difficult to get the threads evenly dyed.

The third skein was saturated with a solution of chrysoline, dried, and passed into nitrate of lead. The result is a fine orange, but not solid.

The fourth skein shows the color fixed with muriate of tin, the tone being slightly less red than the foregoing. All the shades obtained with chrysoline are rendered yellow by acids, and are restored to their primitive shade by alkalies.

I have still to relate a fact which has been already remarked with other artificial coloring matters. A yellow dyed with bark is considerably heightened by taking it through a weak solution of chrysoline, 1 grain to the fluid ounce.

Chrysoline, therefore, cannot be considered applicable to cotton where nitroalizarine may be advantageously used in its stead. This latter color gives shades more solid, and almost as brilliant.

Chrysoline will find its use for wool and silk, which it dyes readily without mordants, and on which it is much more solid.—*Société Indust. de Rouen.*—*Chemical Review.*

#### A Cheap Illuminated Clock.

Reiniger, of Stuttgart, proposes an ingenious substitute for illuminated tower clocks. It is the use of a magic lantern, so frequently employed for street advertising in this

city. A small lantern could be so arranged as to throw the picture of a common watch or chronometer upon a suitable white screen in places much frequented at night. The movements of the hands would be quite as distinct as those of a real clock with a transparent face and a strong light behind it. The project recommends itself to smaller cities, unable to bear the expense of a costly tower clock with illuminated face.

#### New Mechanical Inventions.

Mr. Edmund Golucke, of Crawfordville, Ga., has patented an improvement in stationary Horse Powers employed for driving cotton gin machinery; and it pertains particularly to the construction of the king post and master wheel and their appendages.

Mr. John W. Donnel, of Muscatine, Iowa, has patented an improved Millstone Driver, in which the driving points and the point of suspension are in the same plane and parallel with the face of the runner. By this construction the extra pressure on the skirt of the stone is avoided. The driving block is supported on the shoulder of the spindle a sufficient distance below the cockeye, so that it may vibrate and balance itself easily.

An improved Hoisting Jack has been patented by Mr. Richard O. Keffe, of Omaha, Neb. The object of this invention is to furnish an improved hoisting jack for raising railroad tracks, safes, and other heavy bodies that require to be taken hold of close to the ground or floor.

Mr. Ramon Vereas, of New York City, has patented an improved Calculating Machine. This ingenious machine is capable of rapidly performing addition, subtraction, multiplication, and division. The details of its construction cannot be properly described without engravings.

Mr. William Booth, of Newark, N. J., has patented an improved Machine for Rounding Off the Ends of

Fine Combs, such as are made of celluloid, hard rubber, and other material, the machine being adapted for cutting different sizes of combs, and accomplishing its work rapidly and accurately.

Mr. Arthur Sirois, of New York City, has devised an improved Coupling for the driving belts of heavy machinery, and also for the driving cords of lighter machinery, such as sewing machines, etc., the coupling admitting of the instant connecting or disconnecting of the belts or cords, while taking up a small space, so as not to interfere with the driving of the pulleys or wheels.

Mr. William H. Peterson, of Richmond, Ind., has patented an improved Double Acting Force Pump, that is of simple and compact form, and adapted to be placed at any depth in the well, so as to make it non-freezing.

An improvement in Machines for Cleaning and Polishing Coffee has been patented by Mr. Henry Bamberger, of Philadelphia, Pa. This invention has reference to an improved machine for cleaning coffee of its adhering impurities, dry hulls, etc., and imparting to it a smooth and uniform appearance.

Mr. Willie Kniffin, of Yorktown, N. Y., has patented an improved Lifting Jack for raising the axles of wagons to allow their wheels to be removed, and to raise other heavy weights. It is so constructed as to enable a weight to be raised by a slight exertion, and will hold the weight suspended for any length of time.

Mr. William H. Walsh, of Fort Worth, Texas, has devised an improved Gin Saw Sharpener, of simple construction, by which the teeth of the saws are cut square at the inside and pointed at the top, and by which the sharpening of all the saws of a cylinder is accomplished quickly and perfectly, avoiding the objectionable features of hand sharpening.

Sedgwick M. Wade, of Andover, Ohio, has patented a Strap Hinge, composed of two leaves, having flanges and rear tongues, the latter curved to form sockets for the pivot.

#### Effect of Gas on Cotton Goods.

At the last meeting of the Chemical Section of the Philosophical Society of Glasgow, Dr. William Wallace, gas examiner and public analyst for the city of Glasgow, read a short paper on the destruction of the color of cotton goods by the sulphur in the gas burned in the London warehouses. Sulphuric acid, he said, was found in considerable quantity in the goods after being some time exposed, while the same articles in the fresh condition were quite free from that acid. In some cases the cotton fiber itself was rendered so tender as to be perfectly useless. The same thing had been observed in the warehouses in several large towns in England, such as Leeds, Manchester, etc., where common coal, containing much sulphur, was used as the source of the gas supplied to the consumers, but only to a limited extent. The remedy which was recommended by Dr. Wallace was the thorough ventilation of the warehouses, so as to insure that the sulphurous and sulphuric acids generated by the burning of the