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THE MANUFACTURE OF WALL PAPERS.

The white paper comes into the factory from the paper-mill in large rolls. It varies in weight according to the particular use to be made of it; much heavier stock is required, for example, for "leather" paper than for the ordinary wall hangings. The first step in the process of printing is what is called "grounding." This is applying a tint over the whole surface of the paper by a machine made especially for the purpose, in which color is applied evenly over the surface by a series of brushes. Then the paper is caught up in loops and carried by an endless chain over steam pipes, thus becoming dry as it slowly makes its journey of about four hundred feet. It is then reeled up, and is ready for the printing. These grounding-machines can carry two widths of paper simultaneously, so that the process is a rapid one. "Mica papers" are grounded in the same way as those in plain colors.

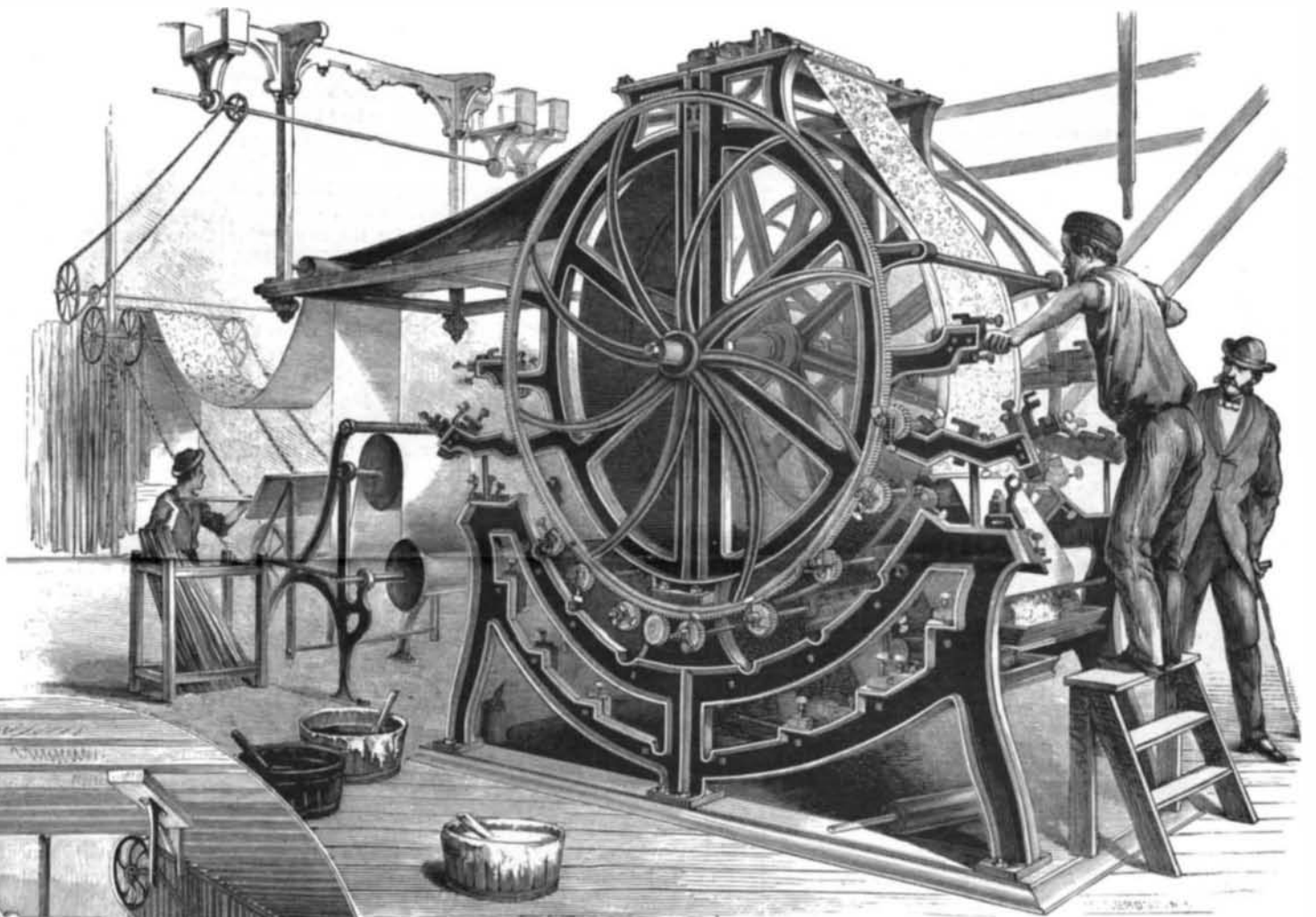
The next step is the printing. This is done on machines such as that represented in the engraving. This machine can print twelve colors at a time. Machines capable of printing in eight colors are quite common and largely used.

The pattern having been designed and the colors chosen, there must be a roller for each separate color, with the corresponding part of the pattern cut on it, and the rest left blank. The rollers consist of a body of wood with the pattern worked on them in brass and felt. The work on the rollers must be done with great accuracy, for the different parts of the pattern must be adjusted to a nicety.

gold dust on the proper parts, which have been printed in varnish instead of color; the gold adheres to the varnish, while the colors have become sufficiently dry not to hold it. In some of the papers the gold, or bronze, or other metal is applied by hand. The portion to be bronzed is printed in varnish, then it is liberally dusted over with the metal powder. When the superfluous powder is brushed off, the masses of gold, or silver, or bronze shine out, with the result of enhancing the beauty and effectiveness of the whole.

Following the paper along, we reach the end of the moving railway which carries it. Here the sticks which have supported it in its long festoons are thrown out, and the

Some papers are hand-printed. This is done in working off specimens, that effects may be determined and patterns fixed upon. It is done also in the production of special patterns made to order, or in cases where the quantity to be printed would not warrant the expense of preparing the rollers for the machine. It is done also in those cases where the pattern is, as it were, built up by layer after layer of "flock," resulting in very rich effects. Some of the "leather" papers have raised figures upon them. These papers, which are very thick and heavy, are stamped in a machine similar to other machines for the same general purpose. Some of the most gracefully elegant papers are embossed.



THE TWELVE-COLOR PRINTING MACHINE.

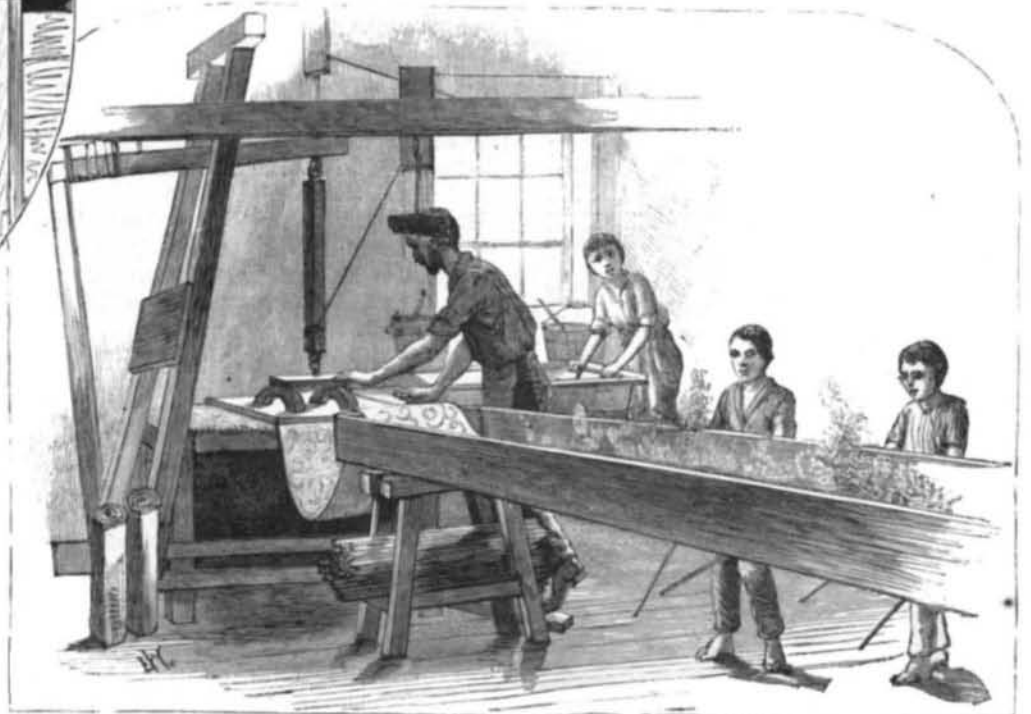
paper placed upon a movable rack, ready to be reeled into rolls for the market.

After the printing and gilding, they are run through a similar machine. [Continued on page 339.]



READY FOR REELING UP.

Everything being ready, the rollers and their troughs of color are adjusted, the reel of grounded paper begins to pass over the great cylinder. Here it gets a spot of crimson, the blushing center of a rose perhaps, while the next roller imprints the dark green of a leaf. And so it touches roller after roller until the whole pattern is produced in completeness and beauty. As it emerges from the machine it is caught on sticks that rest in notches on an endless chain, and so in graceful festoons is slowly carried over steam pipes, which rapidly dry it. If there is any gold in the pattern, at one point in its progress over the drying coils the paper passes through an auxiliary machine, which deposits



"FLOCKING."

THE MANUFACTURE OF FINE WALL PAPERS.

THE MANUFACTURE OF WALL PAPERS.

[Continued from first page.]

ple machine, the essential parts of which are two rollers, an upper one of steel, engraved with the pattern desired—ribs, wavy lines, or reticulations of any kind—and a lower one of hard manila paper. With many patterns this embossing adds very materially to the effect. The making of velvet or "flock" papers, as they are sometimes called, is an interesting process in the manufacture. The illustration shows the application of "flock" to portions of a pattern. These portions are hand-printed with varnish. Then the paper is laid in a tray which has an elastic bottom, and the "flock"—carefully ground and colored shoddy, imported for the purpose—is sifted over it. A boy then skillfully beats a rat-a-tat on the elastic bottom of the tray, which insures the even distribution of the "flock" over the varnished parts to which it is to adhere. "Plain flocks" are made by evenly coating the paper with varnish by drawing it through a machine constructed for the purpose, after which it is laid in a tray. The flock is sifted over it, and it is beaten by a series of long fingers moved by steam. These papers have the appearance and richness of fine cloth, and are much in demand for many purposes of decoration.

The designing department of such an establishment as the one we are visiting is, of course, a center of interest. Here artists are at work, getting their hints from foreign patterns, from tapestries, from stuffs of various kinds, from pottery, from objects of nature, from every possible source, for new designs. It cannot always be told in advance what pattern will strike the public eye and prove fashionable. Nor does it always follow that the most really artistic design will be the most popular. The only thing for the designer to do is to create a wide variety, and so suit all tastes. In this first-class establishment, however, though some of the patterns may not appeal to your taste or to mine, there will be nothing that is really inartistic. Both the designs and the combinations of color will conform to the canons of good taste.

Navigation of the Air.

Mr. F. W. Brearey, of the London Aeronautical Society, recently read a paper on aerial navigation, and explained, with the aid of models, the principles upon which attempts had hitherto been made and should in the future be made to effect artificial flight. The conclusion at which the Aeronautical Society had arrived was that flight was merely a mechanical action capable of imitation, that it was unassisted by air cells or other contrivances for effecting levity, that the balloon was incapable of being rendered useful to man as a means of locomotion except in the way of waftage. The tenants of the air, great as was the variety in their size and form, resembled one another in possessing three important capacities, the association and proper adjustment of which constituted the property and power of flight, namely, weight, surface, and force. The weight of a body was due to the action of gravity, and the problem was how so to retard or regulate the action of gravity as to cause its influence to be infinitesimally distributed. Having explained what he wished to show by projecting some peculiarly folded pieces of paper across the theater, he then let fall from a height a bat-shaped model, which soon, taking a curve, shot out in a nearly horizontal direction for a time. Had force, the third great principle of flight, been employed, it would have neutralized the action of gravity so long as it continued, and the flight of the models would have been prolonged. In endeavoring to estimate the proportion of plane surface to weight, so that the one might carry the other by the application of impulsive force, we were not without significant data. So varied were the forms of flight and so widely different the conditions—in some cases a heavy weight being supported by small planes or wings, and in others little weights by extensive surfaces—that, if ever the subject should be mastered, flight would probably be effected in more ways than one. Great weight and small surface, as the observations of M. De Lucy showed, must be accompanied by great velocity, as in the flight of the common sparrow, while with small weight and great surface, as in the butterfly tribe, a reduced velocity only was requisite. If, therefore, man could construct the necessary surface of strength sufficient to insure safety, he could certainly add, by the aid of engine power, sufficient velocity to obtain support from the atmosphere.

The Smoke Nuisance in Cincinnati.

The Cincinnati (Ohio) Board of Aldermen have passed an ordinance making the use of an alternative smoke-consumer compulsory upon the part of all manufacturers and others whose business requires the use of a chimney that has become a nuisance to the neighborhood. The matter of selecting a consumer is left entirely with the user, the only

requirement of the ordinance being that it shall be effective. Failure to comply with the provisions of the ordinance renders the one thus offending liable to a fine or imprisonment, or both.

It is expected that difficulties will be encountered in the enforcement of the ordinance, and there is a fear that many manufacturers will be driven into buying worthless devices, but there can be no doubt that the city will be ultimately benefited. It is also well established that there will be a gain to those employing effective devices, because of a more economical use of fuel.

The smoke nuisance in Cincinnati has long been of a grievous



THE MANUFACTURE OF WALL PAPERS.—WINDING IT INTO ROLLS.

ous character, and it has been growing steadily worse with the city's growth. The contrivances in use in cities where bituminous coal is used, both in this and foreign countries, have been carefully examined, and their respective merits reported upon. The Board of Exposition Commissioners has given the subject especial attention, and large premiums have been offered for two successive years for smoke-consumers whose efficiency could be established. None of those tested has been found to be all that was desired, but almost any of them would be a great improvement upon the furnaces now in use

Alderman Oliver mentioned, at a meeting of the board,



REELING UP WALL PAPER.

that while in London the past summer he observed that, though fifty times as much soft coal was being consumed as in Cincinnati, there was more smoke to be seen in one ward of Cincinnati than in the whole city of London. Here is a good subject for study by inventors.

RECENT INVENTIONS.

Mr. Robert Seeger, of St. Paul, Minn., has patented an improved vapor burner. The invention consists in a combination with the inlet or retort tube of a burner provided not

only with an ordinary jet hole, but with an auxiliary jet hole which admits of a flame impinging upon the inlet tube to heat the latter and vaporize the liquid passing through it. Shields are formed on the inlet tube, and the tip tube is provided with an overhanging disk to retain the heat derived from the auxiliary flame; also the tip tube, which is vertically adjustable, both controls the air inlet and has holes in its side which communicate with an interior chamber in the burner, whereby a return current of gas to the jet hole is formed.

An improvement in wire fences has been patented by Mr. Lorenzo Dow, of Denver, Col. The invention consists in combining sheet metal posts open longitudinally to give elasticity, and provided with tongues, with wire rails, of which one is wrapped around each post, where they wires are kept taut.

Mr. George T. Finagin, of Pioche, Nev., has patented an improved monkey wrench. The handle of the wrench, which carries the fixed jaw, is serrated on its front edge, and the sliding jaw also formed with serrations to correspond. Surrounding this movable jaw and the handle is a broad yoke, which is recessed on its side opposite said jaw, to receive within it the fulcrum and pivoted end of a lever. This lever is provided at its forward end with teeth which engage with cogs on a wedge within the yoke and bearing on the handle, so that when the lever is down, in which position it is maintained by a spring, the wedge locks the serrated jaw on the serrated handle, but when the lever is raised the wedge is released, and said jaw left free to move. This forms a very simple and strong construction, and provides for an extended grasp by the wrench.

Mr. Edward A. Smith, of St. Albans, Vt., has patented an improved smoking tube. The invention consists in a smoking tube, preferably of cigar shape, provided internally with a spool having end flanges and draught slots. This spool is placed in the tube to leave a chamber in the rear of it next to the mouth-piece, and a space in front for the charge of tobacco or cartridge containing the same. This smoking tube is clean, safe, and convenient. The smoke, passing through the spool and rear chamber in broad and thin streams, becomes cooled and deposits the oily matter it contains before reaching the mouth-piece, and the device generally seems to meet every requirement that the smoker can desire.

A very ingenious and useful check file, suitable for stores and other mercantile establishments, has been patented by Mr. Herschel V. Sanford, of Milledgeville, Ga. The object of this invention is to promote accuracy in receiving and filing cash checks and other memoranda. The check file has a supporting frame for attaching it to the cashier's desk. In using the device, the salesman passes his money and check to the cashier, and then forces down one of a series of levers bearing his distinguishing mark. This causes a file-covering lever to be removed from one particular file of a series of wire files, so that the cashier cannot err and put the check upon a wrong file. As soon as the cashier has filed the check, he touches a lever which causes the removed lever to again drop into place on or over the file it controls.

An improved tag, which combines facility of manufacture with reduced cost, has been patented by Mr. John Chantrell, of Bridgeport, Conn. The device consists in a combination, with the cord and tag body, of a metallic clip passed through a slot in said body and formed with end tongues which are bent down, upon either or both sides of the clip, to firmly connect the cord with the tag body, the whole forming a very secure as well as cheap tag.

An improved apparatus for facilitating sketching from nature, has been patented by Mr. Richard D. Gallagher, of Omaha, Neb. In this apparatus, a folding canopy, having a curtain to receive the head and upper part of the body of the artist, and provided with a mirror and lens in its top, is used in connection with an adjustable drawing board in the bottom of the canopy frame, the whole being arranged so that the picture of the country back of the artist will be visible upon a sheet on the board, and may be sketched thereon. The mirror is adjustable, and the adjustment of the board to bring it into proper focus with the lens is effected by employing a circular board capable of being turned, and having a screw-like fit in the bottom of the canopy frame. The top of said frame is supported by folding braces, and the entire frame is sustained by folding legs, to certain of which is attached a folding seat, the whole admitting of being packed into a small compass and very convenient of carriage.

An improved gong bell has been patented by Mr. Patrick McMahon, of New York city. The object of this invention is to obtain in gongs a heavy blow of the hammer with a comparative short movement of the operating lever, and also to provide a gong that can be used right or left hand without change of the mechanism.