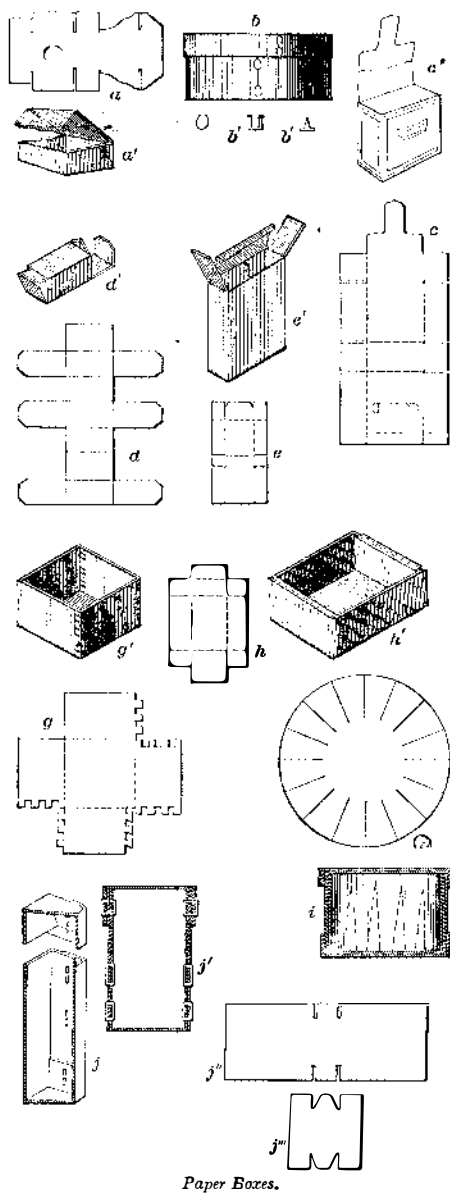


**PAPER BOX MAKING.**

It would hardly be imagined that paper boxes form the basis of an industry of sufficient magnitude to warrant the invention of costly and elaborate machinery; but if the reader will call to mind the thousands of uses to which these receptacles are now put, and further, that their employment is constantly increasing, it will be evident that a quicker means of production than hand labor has long since become necessary. If any one ever writes the history of paper boxes, he will find that, during the last three years, they have found a variety of new uses. Confectioners have almost abandoned the time-honored cornucopia for holding candies. Oyster saloons hang out the seductive sign: "Take home a fry in a box;" and even "stews" are now transported in cylindrical boxes of thick waterproof paper. Ice cream frozen hard and packed in paper boxes, is sold in the lobby of the opera and taken home from the confectioners, in place of candy, to the little ones. Retail dry goods dealers have lately adopted the box wherein to envelope small articles; and instead of becoming loaded with bundles of varying sizes, the "shopper" now carries her purchases in neat cases suspended by ribbons from the arm. The grocer ingeniously conceals a bottle in a case, which the purchaser takes with him unsuspected by the passers as to its contents. Besides, boxes, as Mr. Darwin puts it, have "differentiated." The old wall paper covered band box has become practically extinct, like the doo, and instead, we have a neat light case, square or conical in shape, and stiffened with wood or wire. Look at the ingenuity expended in making paper collar boxes look like something else.

Fig. 1.



Paper Boxes.

Some of them are in the shape of miniature Swiss chalets; others resemble dressing cases and have looking glasses and pincushions within. Hair pin boxes furnish a field for similar endeavors; and jewelers' boxes are often marvels of delicate paper and velvet lining.

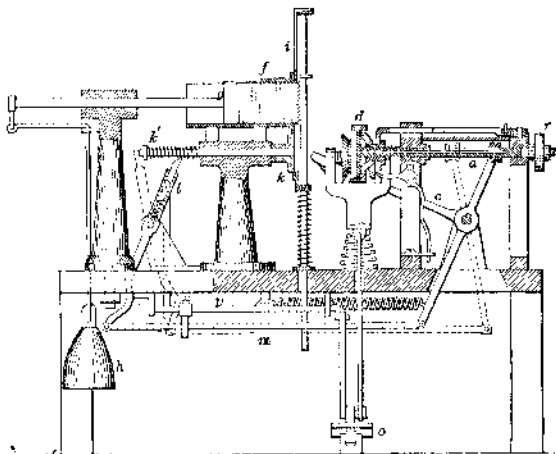
In Fig. 1, which we take from Knight's "American Mechanical Dictionary,"\* is shown how some of the different forms of boxes are made. In producing a pill box, paper from a coil is wrapped around a former, making a cylinder of a thickness depending upon that of the paper and the number of plies. The inside surface of the paper is coated with paste, and thus the joint is made. Such boxes are completed by pushing a disk of paper into the cylinder. The lid is but a shallow box, a trifle larger. Such boxes are also made by coiling a wide sheet of paper on a mandrel in the manner described, and then cutting it into lengths as desired. Lids are made in the same way. Colored boxes are made by an outer ply of colored paper. Such boxes are also made by machinery. In one mode of covering, the strip which is to cover the cylindrical portion has gored margins, which lap over upon the bottom of the box or the top of the lid, as the case may be, and match together.

Boxes are also made from a roll of paper, which is bent over into shape, cut off, the bottom folded in against a former, the contacting portions being pasted *in transitu*; also of paper or pasteboard cut from the roll, shaped, and secured by rivets or staples, and also from blanks of the required size

\*Published by Messrs. Ford & Loughton, New York city.

and shape, the machine taking them from the pile, shaping and fastening the parts together, as will be described further on. *a a'* are, respectively, a blank and a box made therefrom, the scale of the latter being enlarged somewhat. With the exception of two slight gores on the edges of the lid flap, no portion is wasted. Some portions of the box are double and others treble. Parts secured by paste or rivets.

Fig. 2.



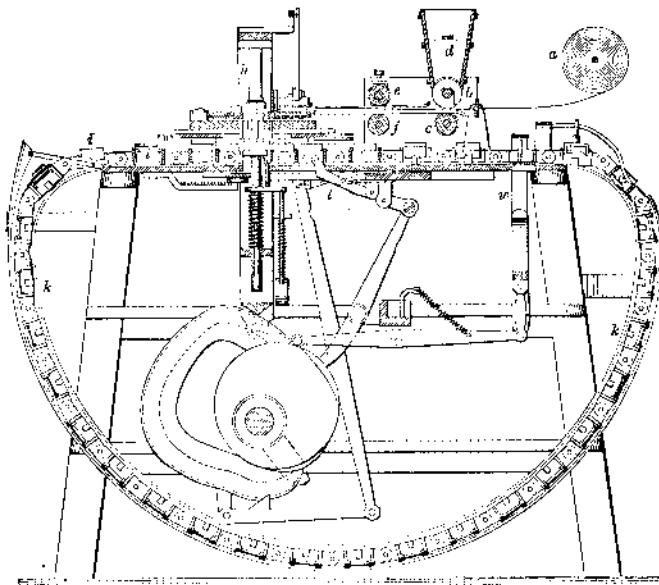
Hatfield's Paper-Box Machine.

*b b'* show a round box and the metallic fastenings which hold the lapped portions. *c c'* are the plan of the pattern and the folded box with a tuck and keeper. *d d'* illustrate another mode of shaping and folding. *e e'* is still another, with a lapping lid. *g g'*, a paper box with dovetailing angles. *h h'*, the plan of a blank and the box made from a similar larger blank. *i* is a box made from a circular blank, cut on the principle of *e*, but of larger size. *j j' j'' j'''*, Heyl's box, whose overlapping pasteboard flaps are secured by rivets.

Seamless paper boxes, lamp shades, hats, and other hollow articles of paper, are made upon formers which are dipped into the pulp; the latter collects on the reticulated surface by means of a partial exhaustion of the air from the interior of the former, the air being withdrawn through an elastic pipe communicating with a bellows or cylinder.

The water being drawn through the perforations, a film of

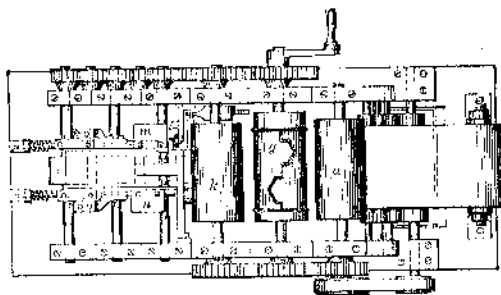
Fig. 3.



Gates's Paper-Box Machine.

pulp adheres to the surface of the former, which is then raised from the vat, and, the coating of paper pulp being removed and dried, forms a seamless article which requires no further manipulation for most ordinary purposes, but for ornamental uses may be covered wholly or in part with a second coating of colored pulp, and embossed or otherwise ornamented by stamps, swaging, or perforation.

Fig. 4.



Figs. 2, 3, and 4 are machines for making boxes from the roll or from blanks of paper.

**HATFIELD'S MACHINE.**

Fig. 2 is designed for attaching the bottoms to cylindrical paper box bodies previously formed by another machine. The shaft, *a*, is hollow, and through it works a spindle, ope-

rated by means of a hand-lever, *c*, and carrying a fixed head or disk.

On the end of the shaft, *a*, is an expanded head, *d*, formed in segments, which are pushed radially outward by links operated by a lever and arm.

*f* is a tube containing the bottoms of the boxes; these are pressed by the follower, *g*, kept in contact therewith by a cord and weight, *h*; *i* is a plunger cut-off by which the bottoms are pushed down one by one into contact with the follower, *k*. This is advanced by a lever, *l*, operated by the hand-lever *c* through the medium of the rod, *m*; *o* is a treadle connected by cranked arms and rods to the rock-shaft, *p*, of the lever, *l*, and to the arm of a lever having a divided head in which a roller is journaled.

The head, *d*, is rotated by the pulley, *r*, on its shaft, and the treadle depressed; this throws the roller out of contact with the expanding head, *d*, and also partially rotates the rock-shaft, *p*, throwing the latch, *l*, into position to engage the plunger-rod, *k*. A box-body is slipped over the expanded head, which is then expanded. The lever, *c*, is depressed, thrusting out the disk within the expanding head and bringing it into position to receive one of the bottoms which has been pushed down by the plunger cut-off, *i*. By an upward movement of the lever the box-bottom is pushed into contact with the disk, which, by the same movement, is withdrawn and brings the bottom into contact with the box-body on the expanding head; a slip of prepared paper, pasted on one side, is applied to the junction, the treadle is released, bringing the roller in contact with the side of the box, the rotary movement of which winds the strip around it, where it is fixed by the roller and vibrating fingers on an eccentric.

**GATES' MACHINE,**

shown in Fig. 3, is for making rectangular boxes. The paper web from the roll, *a*, passes between the rollers, *b c*, by the upper one of which paste from the trough, *d*, is applied to its edges. It is then carried forward by the feed-rollers, *e f*, and the necessary slits cut by a vertically reciprocating cutter, after which it is subjected to the action of a plunger, *h*, which shapes it by forcing it within one of a series of moulds, *i*, on an endless chain, *k*, advanced intermittently by a pawl, *l*, operated by an oscillating lever from the driving-shaft. The boxes are carried around by the endless chain until they successively arrive in a sufficiently dry condition at a point over an aperture, where they are forced out of the moulds by a vertically reciprocating plunger, *w*. Fig. 4 is

**JAEGER'S MACHINE.**

In this an address or label is imprinted and the box cut out and formed at one continuous operation. The paper passes first between the impression roller, *a*, and the type-roller, *b*, which is supplied with ink from the trough, *c*, by inking rollers, *d*.

Circular knives and creasers on the roller, *g*, cut it into the shape shown on the plan view during its passage between that and the roller, *i*. Paste is applied to its edge by the rollers, *k l*, in connection with a smaller roller not shown. Proceeding onward, two of the flaps are turned up and secured by pivoted wings, *m n*, the other two being similarly treated by other wings, leaving the end flaps to be folded in by hand.

**The Reproduction of Steel Engravings by Photography.**

The photo-engraving process has lately been brought to a wonderful degree of perfection. Not content with reproducing the coarser lines of wood-cuts and pen-drawings, the Photo-Engraving Company of this City have recently prepared

plates from fine steel line engravings. The result is certainly remarkable. Several impressions now before us, printed on heavy paper, present a depth of color, crispness and brilliancy of line, and absence of blur, which would enable them to be readily mistaken for impressions from the original steel plates by any but an expert eye.

This is not the first time that attempts have been made to reproduce fine artistic work in a similar way; but the preceding efforts have not as a rule been satisfactory, inasmuch as the qualities above-noted, which constitute the valuable characteristics of an engraving, have not been reached. The public may congratulate itself on work of this kind. We sadly need art education in this country; and the popularization of admirable artistic productions, by placing accurate copies within reach of straitened pockets, is well calculated to foster a healthy and valuable taste for art.

**A Safeguard Against Rats.**

Rats are accomplished rope-walkers, and are able to make their way even along very small cords. Consequently so long as they can mount upon the lines, nothing edible suspended therefrom is safe from their attacks. A correspondent of the *Boston Journal of Chemistry* uses wires, upon which circular pieces of tin are strung, and hangs his meat, grain, etc., between the tin pieces. The rats cannot pass the tin circles, because, as they attempt to climb over them after walking out on the wire, the pieces revolve.

**DYEING LIGHT ROSE.**—For 22 lbs. fabric, use 10½ ozs. oxalic acid, 5½ ozs. tin crystals, ¼ oz. cochineal. Boil, cool, enter and dye at a boil. Both dark and light rose shades are much better produced with eosine. For dyeing chamois on flannel, dye as for light rose, and add for 22 lbs. fabric, from ½ to 1 oz. flavin, according to shade.