

this entire new tympan as often as required. Going over these points of the invention again, the entire tympan changes itself, so that you have a brand-new tympan in an instant. It does this between impressions, while the press is running at a high rate of speed, and it will do it as often as you wish.

The tympan mechanism consists of rolls of this manila paper located just inside of the openings in the cylinder. The paper comes out through these openings, passes across the quarter sections of the impression surface of the cylinder, and is drawn in through another opening in the cylinder onto other rolls. It winds itself automatically from one roll to another, across the impression surface of the cylinder, but instead of moving slowly it travels across the entire surface of the cylinder in one quick movement between impressions, giving an entirely new tympan surface.

The tympan mechanism can be set to shift in this way once every 10, 20, 30, and up to 150 impressions as the form may require, and thus it goes on automatically, requiring no attention as long as the press itself is kept in operation.

A roll of tympan paper lasts a day on fine work, or on common work for a longer period; it can then be used again and again—allowing time to dry. The shifting tympan or the tympan sheet acts in place of a blotter to take up from the freshly-printed surfaces or surface such portion of the ink as is not impressed in the paper surface and is not necessary to make an absolutely black impression. The web after being printed is carried by its margins to the folder, where it is cut into sheets, folded without the use of folding rollers, and delivered without any portion of the printed surface coming in contact with any part of the mechanism.

The Miehle press for general work shown is of the flat-bed, two-revolution style and known to printers by this description. The bed carrying the type reciprocates under the cylinder, printing on one revolution of the cylinder and returning to its original position on the second revolution of the press, which also gives time for the handling of the sheet by fly or other delivery, and gives time also for the re-inking of the form, the distribution of the ink, etc. This style of press also permits the tripping of the cylinder in case the feeder should fail to present a sheet at the right time, thus saving the printing on the cylinder and the offset that ensues.

The special feature of this press is the new bed movement. Probably no part of the cylinder press has been the subject of so much experiment as the mechanism for propelling the type bed back and forth under the cylinder. Of the numerous devices invented, comparatively few have developed merit sufficient to attain any permanent adoption.

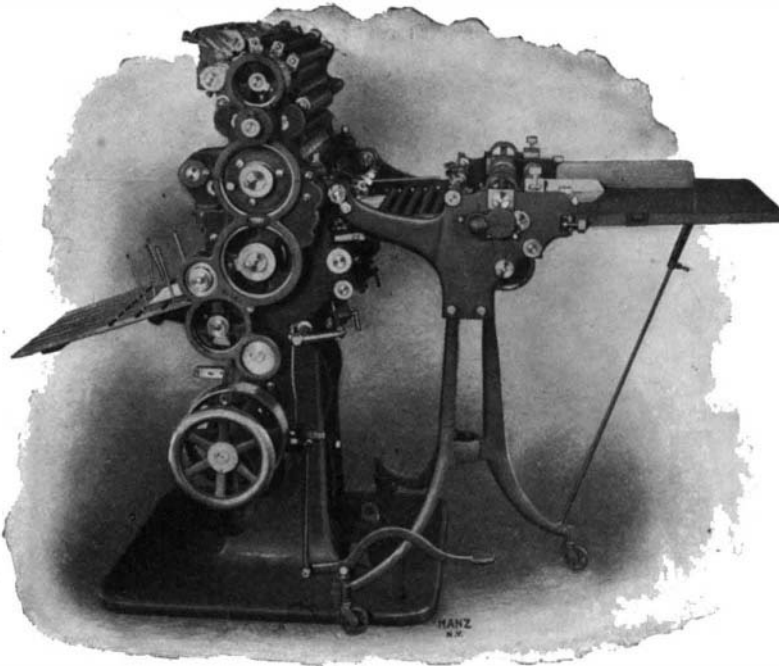
The movement of the bed under the cylinder is even throughout; the avoidance of any eccentric movement permits of an even quality of work throughout the line of impression, permits of its finest register work, like three-color or similar work requiring accuracy. The press prints at one time eight complete covers of a large magazine which are equal to thirty-two pages quarto book form, one impression carrying a sheet 48 x 68 inches, and it is at the Collier Press.

AUTOMATIC JOBBING PRESS.

It is an entirely automatic machine. The stock being dropped by handfuls into the hopper, the press delivers it admirably well printed, in such a convenient form for ready removal that one hand can operate the machine entirely unassisted on all speeds up to twelve thousand per hour. Indeed, there are many operators competent to handle the press at fourteen thousand per hour. The press is automatic to such an extent that if left alone it will stop itself when it has printed all the stock in the hopper. If for any cause a piece of stock fails to feed, the

press throws off its impression automatically, so that the tympan receives no ink to offset the next piece of stock that goes through. At the same time the press stops itself. To start it again is practically an instantaneous process. The Harris press is a small machine, occupying a floor space of 3½ x 5 feet. It ordinarily takes but one-half horse power to run it.

It is possible to make 250 changes of type forms a day, and still run off 50,000 impressions where it is not necessary to "make-ready." It feeds cut sheets of paper in all sizes of stock from 4 x 6 inches up to



THE HARRIS AUTOMATIC PRESS FOR PRINTING CIRCULARS, NOTICES, ETC.—FEEDS ITSELF FROM A HOPPER.

and including 15 x 18 inches. It prints in one or two colors at once a curved electrotype or stereotype form in all sizes from a single letter up to and including 14 x 17 inches, and one or two type forms in turtles, each holding a form up to 4½ x 8½ inches.

The normal running speed on a full form is 6,500 impressions per hour. The maximum speed is 10,000 an hour.

The feeder is accurate and reliable, involving no use of air, no electricity, and no buckling, crimping or doubling of the paper. The sheets are not pushed forward from the top of the pile, but are pulled out by the front edge from underneath the pile. It requires very little adjusting for various weights of paper or for changes in the size of stock. The separating mechanism is rotary. The stock being fed from the bottom, the pile is replenished without stopping or in any way delaying the machine.

The feeder is provided with a choke to prevent more than one sheet at a time reaching the form, and a trip, or automatic throw-off, which stops the press and sep-

arates the two cylinders to prevent the form from smutting the tympan whenever a sheet fails to feed from any cause whatever. This makes the press practically "fool-proof;" so that after a good, competent pressman has made a form ready and started the job, the cheapest intelligent labor in the shop can perform the work of loading up the stock pile, watching the color and removing printed sheets.

Ink and Rollers.

Ink and rollers are two of the most important articles connected with printing. Printing ink is a pigment of the required color mixed with an oil or varnish. It must distribute freely and easily, work sharp and clear, and not be affected to any great extent by atmospheric conditions. It must dry almost immediately on the paper, but not dry at all on the type or rollers. The basis for the best black ink is lampblack and the vehicle is usually linseed oil. Many pigments are used to produce printing inks of different colors. Printers' rollers are diverse in their composition, each maker having his own formula. The following is a typical formula:

Best glue	10½ pounds
Black molasses or honey.....	2½ gallons
India rubber, dissolved in oil of	
turpentine	1 pound
Venice turpentine	2 ounces
Glycerine	12 ounces
Vinegar	4 ounces

The above formula is given for the mysterious black composition, so durable and elastic. Purified and unvulcanized India rubber only is used.

In a printing establishment in New York city two motors are in use, a 15-horsepower gas engine and a 25-horsepower electric motor. The average load carried is only about 10 horse power. Comparison has been made two months, when the gas engine alone was used, and two other months, when the electric motor alone was in service. Gas is taken from the city illuminating mains and costs \$1.05 per 1,000 cubic feet. The engine was run a total of 697 hours, and the gas consumed cost \$106.68, or an average of 15.3 cents per hour, which is about 1½ cents per horse-power hour. Electric current is taken from the Edison mains, and the amount used during the 686 hours of operation of the motor amounted to \$250.30, or an average of 36.5 cents per hour, which is about 3½ cents per horse-power hour.

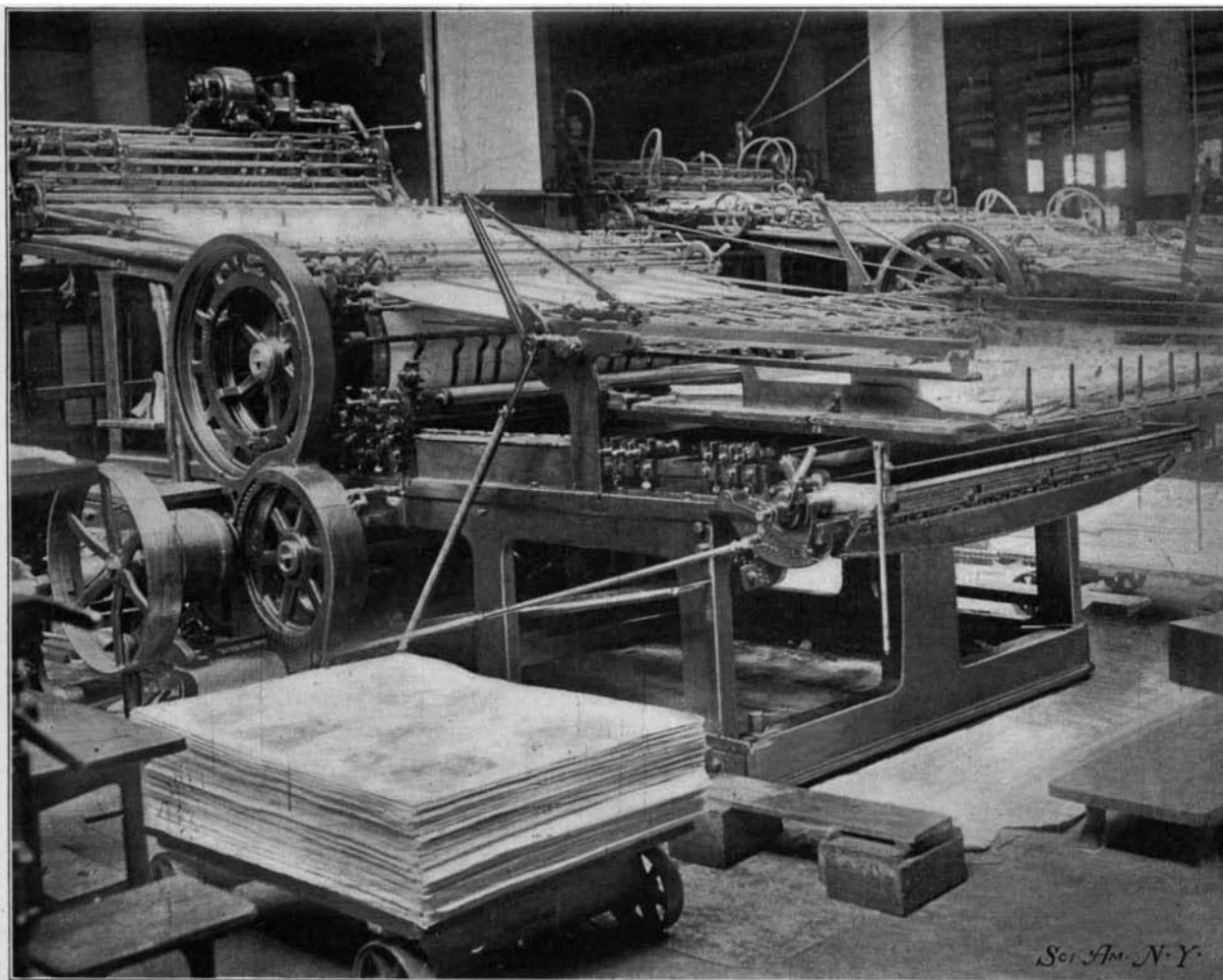
Lithographic Color Printing.

A widespread but unsuccessful attempt was made, about 1880, to substitute zinc for stone in lithographic work. After this failure, zinc was generally abandoned as a factor in the lithographic problem, but one firm has continued to make experiments along this line with considerable success.

In 1898 the great superiority of aluminium over lithographic stone was demonstrated. Aluminium is far lighter, requires less space for storage, is cheaper, is almost non-corrosive, can be used in sheets upon rotary presses, can be used for longer runs without reproduction of the design, and after some manipulation possesses all the desirable qualities of stone.

The methods of manipulation are two. By the first, the surface of a sheet of fine-rolled aluminium is ground off, producing a porous surface. The second method is the formation of an aluminium surface by electro-deposition.

The effect of the extraordinary activity in invention and improvement in the printing world since 1880, has been twofold. To the printer himself it has been injurious rather than helpful; to the public it has been of incalculable advantage and has been a potent factor in elevating the standards of good taste.



A TWO-REVOLUTION PRESS FOR WEEKLY OR MONTHLY MAGAZINE WORK.