A NEW STEEL-PLATE PRINTING AND EMBOSSING MACHINE.

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In a recent issue of the SCIENTIFIC AMERICAN there was described and illustrated a new engraving machine that, under the guidance of a mere boy, would cut letters on a steel plate three times as rapidly as the most expert hand engraver. This was a very great step looking toward the production of cheap engraved stationery, but it was soon found that in order to keep up with the output of these machines, new methods must be devised in printing and embossing from the dies.

In the old method of printing from the die, after the letters have been cut into the steel block, the hand stamper makes a counter and fastens it to the die with glue; then the ink is rubbed on the die with a brush. The surplus ink on the face of the die is then carefully wiped off; for if the slightest trace of ink remains, the sheet is wasted. The sheet is next adjusted and the screw of the press turned until the die strikes the paper, and forces it up into the sunken letters. The paper is then removed and set aside to dry, when the operation is repeated. The new machine is in reality a printing press, but a wonderful one when it is taken into consideration that it inks, stamps, and delivers as many impressions in an hour as the most skilled hand stamper can turn out in a day. The mechanism for accomplishing this result is naturally more complicated than an ordinary press; but a study of the accompanying drawing and the photographs will serve to show the principles involved. As in all job presses, the machine comprises a platen on which the paper to be embossed is placed, but the bedplate that holds the die, instead of being fixed in its position, is movable, and the rocking movement of the die bedplate causes the ink-wiping mechanism to be brought into operation and the inking roller to be carried to and from its source of supply and to the die-plates. By a novel arrangement of the different parts the steel die-plate is maintained in such a position that it is in full view of the operator, except, of course, at the moment when the actual imprinting and embossing is taking place.

The frame of the machine is indicated at 1 in the drawing. The opposite sides, 2, of the bed 3 are connected by pivots with the frame through the links 4. The inner end of the bed is pivoted upon the shaft 5, the latter also serving as a bearing from the inner end of the frame 6, which carries the matrix support or impression sheet table. The inking mechanism comprises a reservoir 7, and arranged to revolve within it is the feed roller driven by a belt from a pulley on the shaft 8.

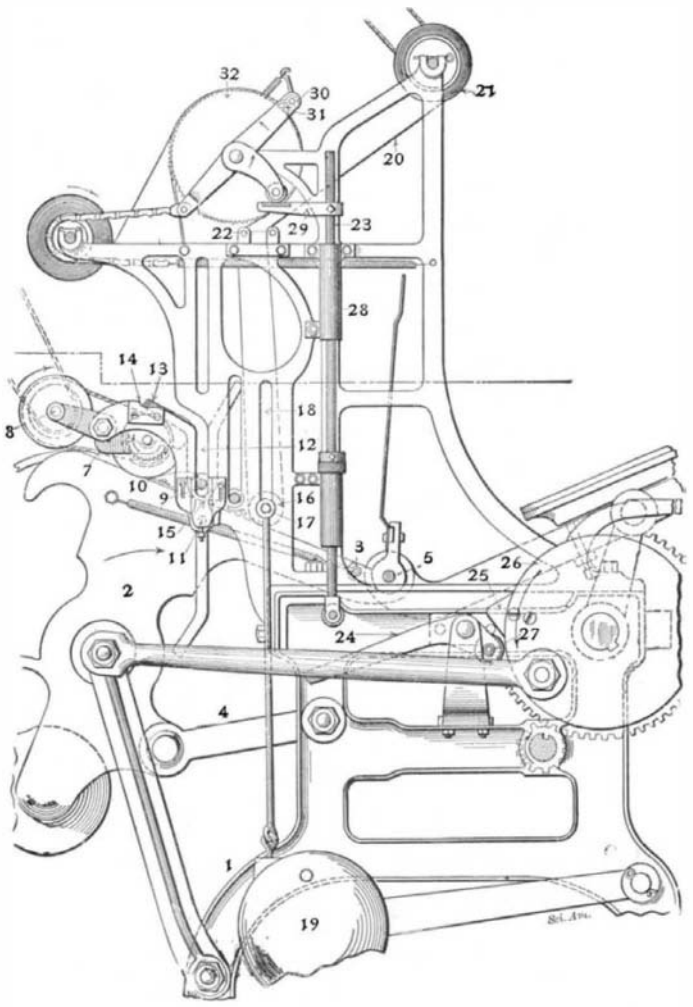
The die-inking roller includes a rod 9, having a central concentric pad portion 10, and is normally supported at its ends in the adjustable bearings 11, at the lower ends of the guide slots 12, in the opposite sides of the frame. It will be observed that the slots, while vertical at the lower ends, incline at an upward angle toward the rear part of the machine, the purpose of which is to bring the pair of curved figures, 13, straddling the rod 9, to a position so that the latter will be carried by their movement up the rearward inclines of the slot and will deposit the rod into the depressions 14, which serve as temporary bearings while the ink pad is receiving a fresh supply of ink from the feed roller (not shown in the cut). The inking roller 10 rotates upon the die-plate 15, and thoroughly and evenly inks its surface while passing beneath it.

The devices employed to wipe the die-plate to clean its surface from the ink comprises a roller 16, made of soft or yielding material mounted so that it will revolve upon the rod 17, whose opposite ends are passed through vertical slots or ways 18, in the opposite sides of the frame. Pendant connections supporting a weight 19 are provided at the opposite ends of the rod 17, for the purpose of exerting a uniform pressure to hold the wiping roller against the surface of the die-plate as the paper passes under it. A strip of paper 20, from the roll 21, passes over the roller 22, and thence around the wiping roller 16, so that the wiping surface is changed intermittently. The lower end of the rod 23 is furnished with a friction roller, which is placed in a position to be struck an upward blow by the lever arm 24. The opposite end of the lever is fitted with a friction roller, and is located in the path of the cam swell 25 on the disk 26. As the disk rotates the cam swell strikes the lever 24, swinging it and thus raising the rod 23, and causing the arm 29 thereon to communicate, through a spur, a quick partial turn to the yoke rod 30, carrying the pawl 31. The latter being in engagement with the corrugated surface of the drum 32, and holding the paper fast to it, turns the drum abruptly a partial revolution against the tension of a spring, so that when the cam 25 performs its function, the paper is drawn sharply around the roller 16, and as this action is timed to occur when the roller is upon the die-plate, the surface of the latter is effectively cleaned.

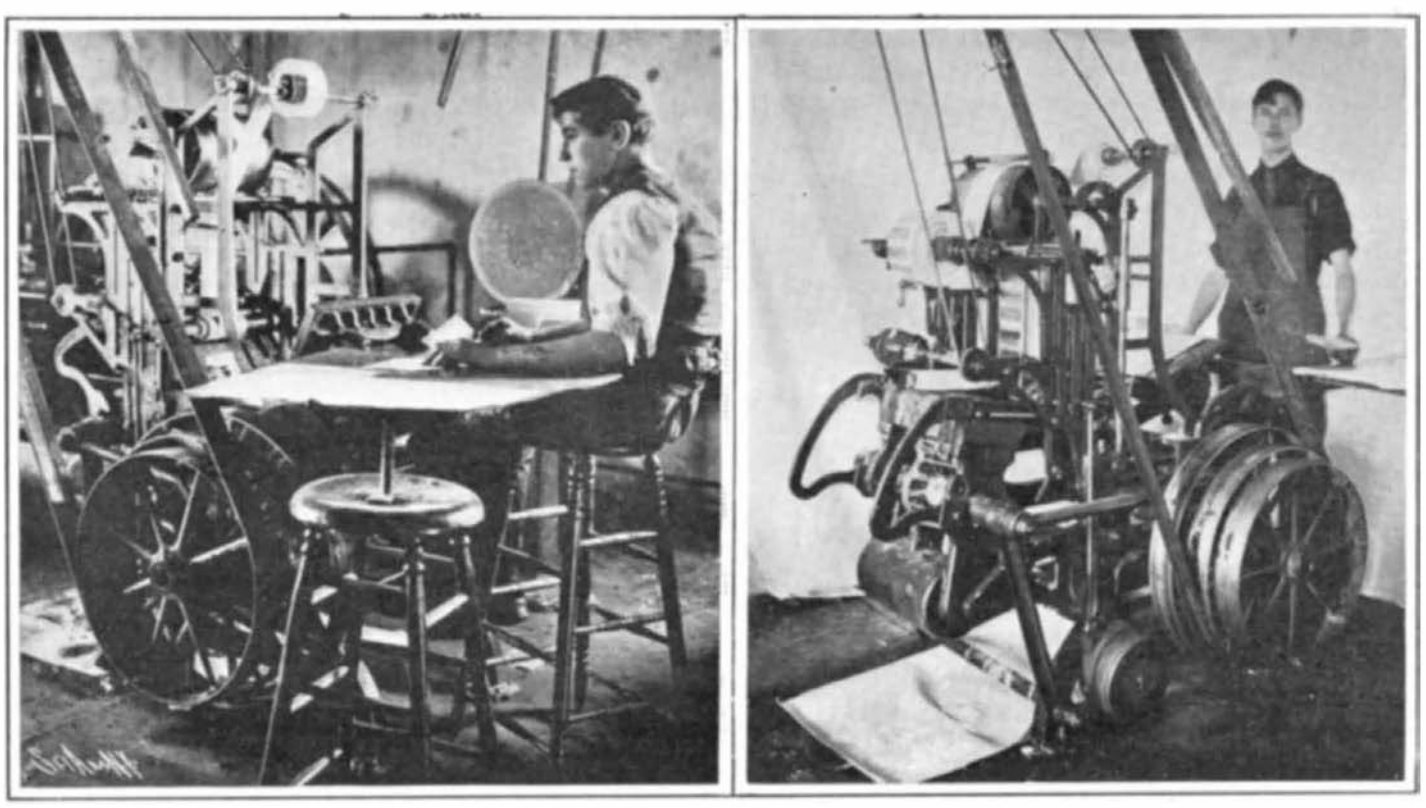
In operation, the paper to be printed and embossed is placed on the platen while the machine is in the open position illustrated. When the flywheel is revolved, a pinion 7 carried by the flywheel rotates a gear, which in turn transmits its movement to the disk, and through cranks and links moves the bed carrying the die and the platen from the open position to a closed position, when the impression is made.

In this movement the rollers have been raised in their respective slots by the bed carrying the die and the extensions, while the shaft which operates the beds, striking the projecting arms, has deflected the fingers and carried the roller with its inking pad on to the feed inking roller. In the first stage of this movement, however, the die plate has passed under the inking roller, and thence beneath the wiping roller, while the cam at this moment acts in the manner above described to suddenly turn the drum, and draw a quota of paper across the surface of the roller impinging on the die. This occurring while the die is passing beneath the wiping roller acts very effectively in cleaning the ink from the die surface, and the subsequent imprint and embossment is performed quickly and without disfiguring the sheet impressed.

THE OLD METHOD OF PRINTING AND EMBOSSING FROM STEEL DIES, IN USE FOR THE PAST CENTURY.



SIDE ELEVATION OF THE PRINTING AND EMBOSSING MACHINE.



THE NEW PRESS FOR PRINTING AND EMBOSSING STATIONERY FROM STEEL DIES. REAR VIEW OF THE MACHINE.

Employment of Atmospheric Nitrogen for the Preparation of Manures and Other Chemicals.

When barium carbide is heated in an atmosphere of nitrogen to about 1,000 degs., it is converted into a mixture of barium cyanide and barium cyanamide; calcium carbide, on the other hand, gives, under the same conditions, only calcium cyanamide. The latter substance, containing in the raw state 20 per cent of nitrogen, is considered to be as good as ammonium sulphate for agricultural purposes; in contact with moist earth and carbon dioxide it is converted by the help of certain bacteria into calcium carbonate and cyanamide, which then probably passes into urea, ammonia, and finally into nitric acid; in the absence of all bacteria these changes take place much more slowly. Calcium cyanamide may also be used as the starting point for the preparation of ammonia and its salts, of cyanamide, urea, dicyandiamide, dicyanamidine, and of guanidine; it also finds application in the preparation of indigo by the fusion of the alkali salts of cyanamide with phenylglycine and in the hardening of iron. Dicyandiamide added to explosives lowers their combustion temperatures. —Zeit. angew. Chem.

The largest casting ever made in the United States has recently been completed by the Bethlehem Steel Company; it is the frame for a 17½-foot gap hydraulic riveter for the Lehigh Valley Railroad shops at Sayre, Pa. It is designed for a maximum pressure of 150 tons per square inch. A special truck was required to transport the machine to its destination.