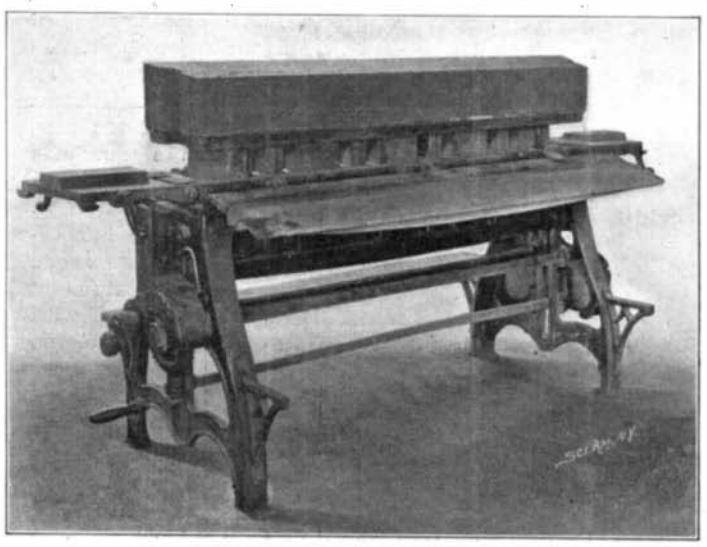
CONCRETE HOUSE BUILDING.

Not the least striking sight that greets the eye of the traveler in Mexico and the southwestern part of the United States is the singular architecture of the country through which he is journeying. Peculiar houses are met on every hand—low, rambling structures, many of them a century old and more, apparently hewn out of one solid mass. Soon enough the traveler discovers that the material of which these old and sturdy houses are built is not stone, but sun-dried bricks of clay, which have successfully resisted both the torrid heat of the dry season and the heavy showers of the rainy season. The lack of stone and wood compelled the inhabitants to construct their dwellings of a building material which was not only cheap, but also easily procured.

That the adobe house of the Southwest has not been introduced in the East is primarily due to the fact that kiln-dried brick, stone, and wood were too cheap, not because they were intrinsically better. Artificial stone has been employed to some extent; but the difficulty of its manufacture, coupled with its cost, has not raised it to the rank of a very formidable rival of brick and natural stone. Of late years, however, concrete has come gradually to the fore as a building material, which possesses all the merits of the most durable stone, and which, besides, has the merit of greater cheapness. In various parts of the country there may now be seen dwellings, factories, and workshops built of concrete, which for all the world look like masonry. By far the greater number of these structures have been erected after a simple and ingenious system invented by Mr. Harmon S. Palmer, of Washington, D. C. The result has been the introduction of a new type of dwelling very much cheaper than the ordinary brick structure and architecturally immeasurably superior. The adobe house of the Southwest has developed into a building constructed of a concrete, artificial stone, made in accordance with long-established principles of engineering.

Structures built on the Palmer plan are not simply piles of solid concrete, fashioned into walls and windows. The material is formed into blocks of any desired size, ornamented or unornamented, and hollowed within. Thus it happens that the concrete blocks have all the merits of the hollow brick. The house of which they are built is cool in summer and warm in winter, for the air-jacket formed by the walls of hollow blocks acts as a perfect insulator.

Given good, hollow concrete blocks and the problem of erecting a house cheaply and quickly is easily enough solved. The true difficulty is to be found in the making of the blocks. No doubt concrete would have been used long ago had it been possible to employ a portable machine capable of forming blocks of all desired sizes. It is just such a machine that Mr. Palmer has invented; and it is due entirely to this invention that the concrete building has become possible. In its construction and operation, this machine is simple enough. Upon a substantial base frame is mounted a metal mold, one side and one end of which can be swung down. The mold is provided with a false bottom, which can be raised and lowered to any desired height, and which is provided with openings to receive blocks secured to the true bottom. The blocks serve the purpose of forming the hollows in the concrete product. The stationary side of the mold can be formed with any design or pattern. In making a concrete block, the false bottom is raised to such a height that the finished block will have the necessary depth, and the swinging side and end sections are clamped tightly into position. A hopper is placed over the mold. A mixture of sand and cement in the proportion of about 5 to 1 with water, which is about as damp as moist earth, is then shoveled into the hopper and tamped down into the mold. The concrete block thus formed can be easily removed by throwing down the swinging side and end of the mold, and lifting the block out of the machine by means of a special carrier. The block can then be transported to any desired place and left to dry. In order to form window-sills the mold is provided with shoulders at about the middle of each end section, so that the concrete block is formed with a groove. The tongues of correspondingly-formed blocks fit into these grooves, so that a very solid and rigid course of concrete blocks is produced. The fastening of the floor beams in place is effected in a manner no less ingenious. By cutting away a rectangular opening into the side of the block, the suitably formed end of the floor beam can be inserted, the wood and concrete being so firmly held together that there is no possibility of dislocation. The joints can be filled with cement if need be, to add to the security.

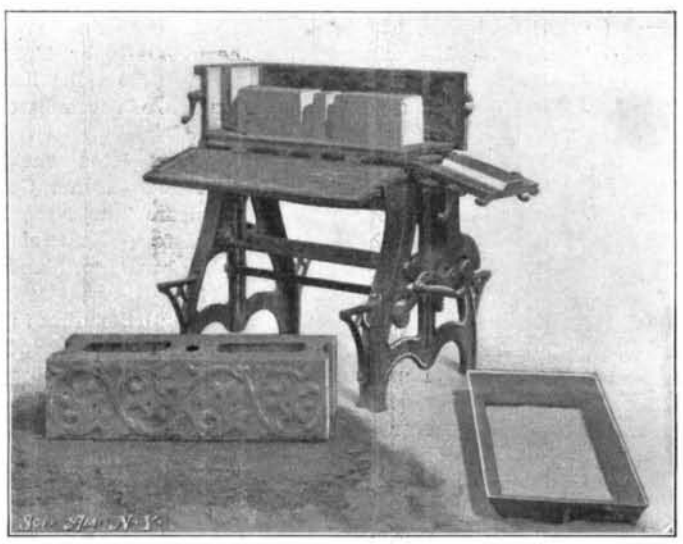


The Sides and Ends of the Machine Swung Down to Permit the Removal of the Finished Concrete Block.

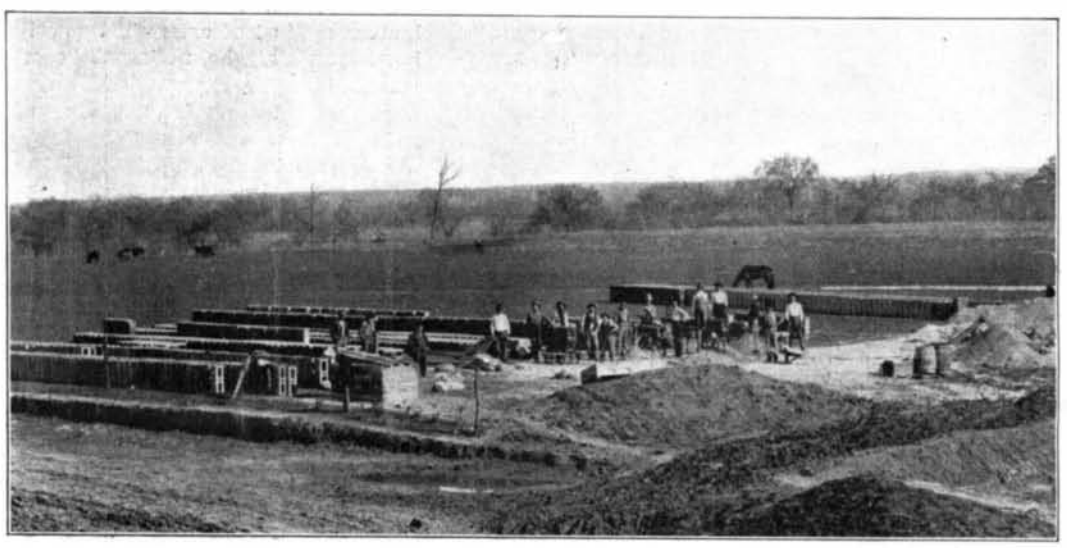
A house built of these hollowed concrete blocks in external appearance is as handsome as any structure built of the finest sandstone. Indeed, even a close inspection often fails to reveal the material of which the house is built. We doubt whether any of our readers would be able to tell of what material the half-completed dwelling pictured in one of our illustrations is built; and yet the entire building was erected with concrete blocks molded in the machines described.

It is one of the peculiarities of this system of construction that the machine which forms the essential element is so designed that blocks of any desired proportions can be molded. Thus, it becomes possible to use but a single machine for the molding of blocks to be used in many different parts of a building in course of erection. Indeed, it may safely be said that the success of this method of building depends upon the adaptability of the machine for making more than one size of blocks. It can be easily understood that little if anything would be gained if it were necessary to use a separate machine for each particular size of concrete block which might be needed.

Our illustrations sufficiently show the possibilities

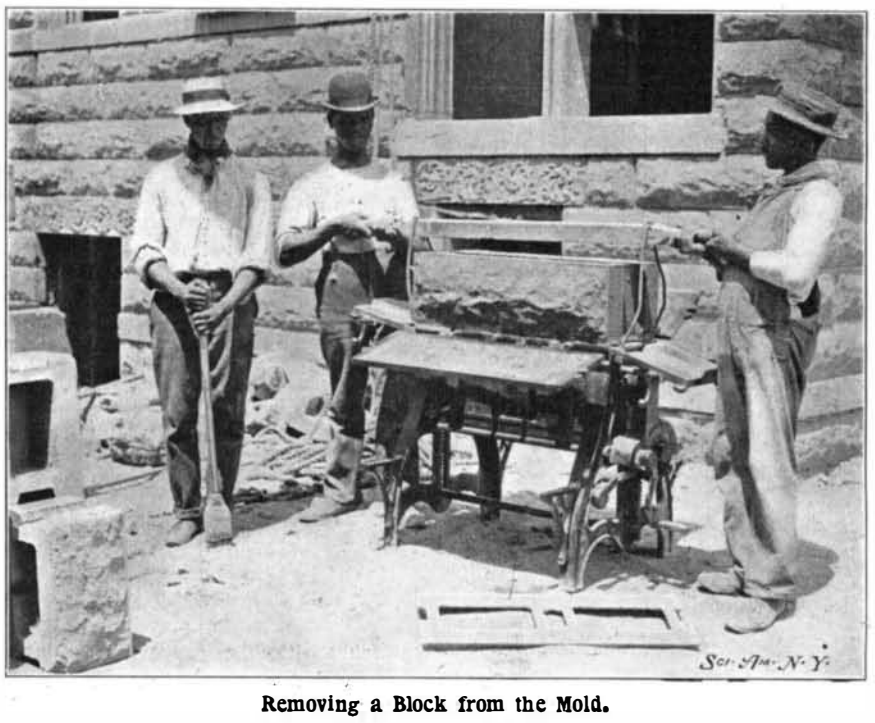


The Molding Machine and One of Its Products.



An Open-Air Concrete Block Plant.

A Partially Finished House of Concrete Blocks.



Removing a Block from the Mold.

CONCRETE HOUSE BUILDING.

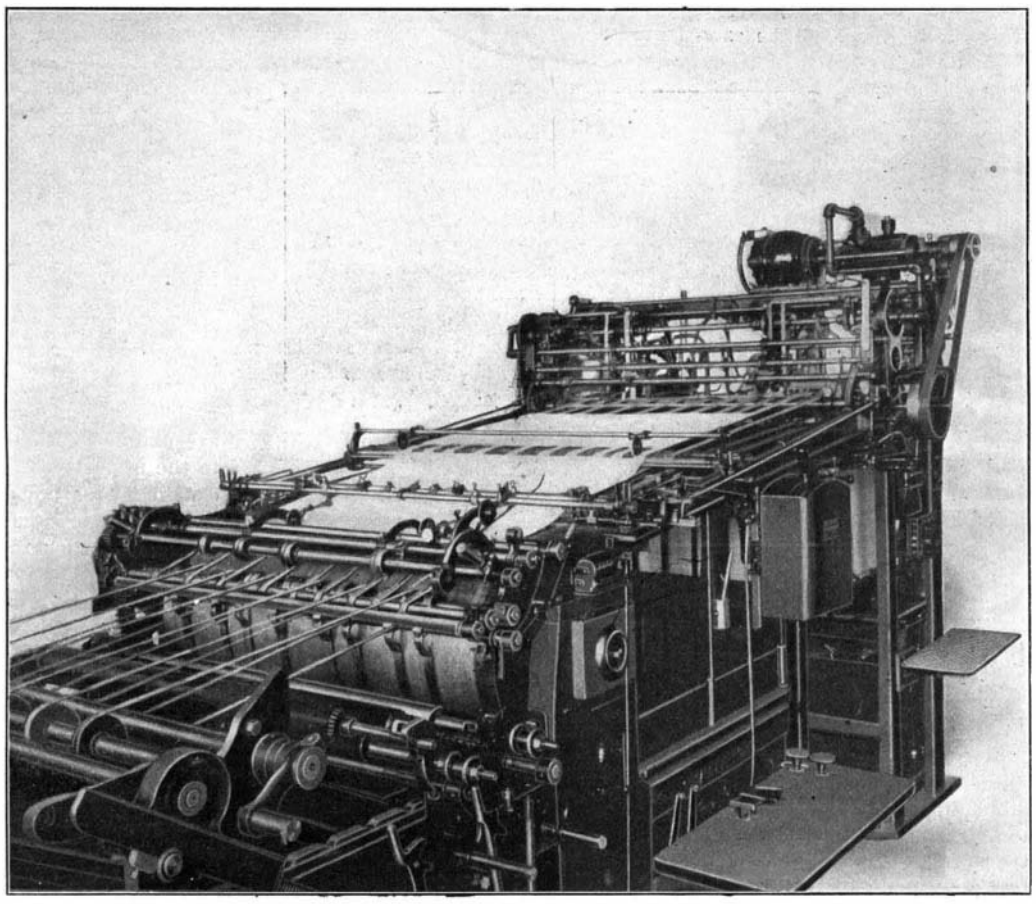
of molding blocks of different design. In the building illustrated, the blocks were made to simulate with remarkable accuracy the appearance of cut stone. It is possible, however, to produce blocks in which complicated patterns are cast with an effect that would seem attainable only by the deft hand of a skilled stone-carver.

AUTOMATIC PAPER-FEEDERS FOR PRINTING MACHINERY.

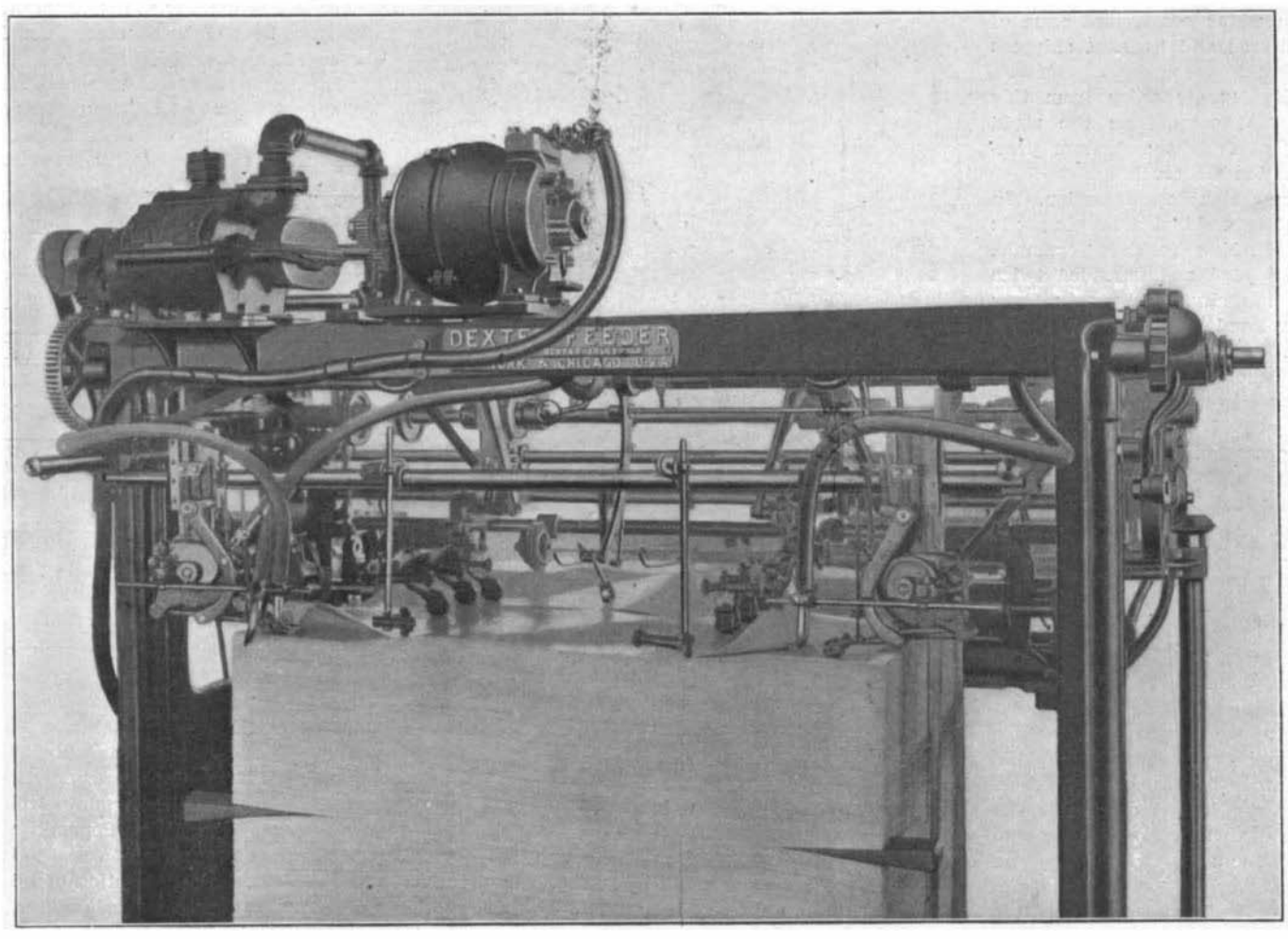
In the last few years the development of modern printing machinery has been phenomenal. Larger and faster presses, labor-saving devices for feeding, folding, cutting, covering, and case-making have reduced the cost of labor charges to a remarkable degree, and the quality of the product has steadily gained. Presses traveling at a high rate of speed were built, and this speed was increased until it finally got the better of the feeder and opened a field for the automatic supply of paper to the press, thus increasing output from 20 to 40 per cent, without mentioning other advantages, such as a saving in spoilage of paper and perfect registry. Printers, while strongly organized, do not look upon labor-saving devices as an incitation to strikes for with every march of improvement wages are increased. Still it must be admitted that the paper-feeder has minimized the liability of strikes among press-feeders. The continuous use of the press adds greatly to the increase in the output. The feeders can be loaded with paper at the regular hours and the capacity of the paper trucks is very large, 20,000 sheets not being unusual. The paper-feeder is not limited in application to the printing press. It is applied to folding machines and ruling machines. The paper-feeder must not alone supply paper to the grippers of the cylinder, but must automatically control the action of the press during the whole operation. Otherwise there will be little utility in the machine. In brief, the principle of the automatic paper-feeder is as follows: The paper is placed in a pile upon a movable elevator which rises automatically as required. When the operation is started, the corners of the paper are slightly raised, the buckling fingers buckle the paper, compressed air is blown toward the center of the sheet to separate it, and the sheet is then advanced through a caliper which measures the thickness of the sheet. The calipers insure absolute accuracy.

We will now take up the operation of the machine in detail. The feeder is run either by the press itself, or preferably by an independent motor, electricity being usually employed. The feeders which we illustrate are of the independent electrically-driven type, and are made by the Dexter Folder Company, of New York city and Pearl River, N. Y. Power is required to work the buckling attachments, the sheet-advancing devices, the tripping mechanism, and to run the blower. The total power employed is slight, being only ¼ to ½ horse power. Compressed air is only used as an adjunct, its function being to loosen the top sheet, after the buckling fingers have raised the corners of the sheet, which causes it to move readily on a thin skin of air. There are two bucklers, one at each side of the feeder. These bucklers are adjustable to the pile. The driving power is applied through a telescopic knuckle-jointed shaft which readily accommodates itself to the various positions of the buckler. The buckling finger will move parallel with the edge of the pile, or it may be set diagonally, which best suits the paper being fed. A cam actuates a buckling finger or roll through the medium of a connecting rod. The action is very much the same as in turning the leaves of a book with the aid of a moistened thumb. A fixed finger to oppose the action of the roller helps to cause the sheet to be thoroughly separated, working in conjunction with the air blast. It will be noticed that there are three pieces of mechanism visible directly behind the buckling attachments. These are the two sheet-advancing carriages and the pile-elevating governor. The principle of feeding involved is very simple. All of the sheets, except one which is to be fed, are held back by a foot on the buckling attachment. The two sheet-advancing carriages which are on either side of the pile-elevating governor carry push fingers which travel in two distinct planes. On the forward stroke they are dropped into contact with the pile. They then advance the sheet forward on to the movable tapes, which carry it to the impression cylinder. On the backward stroke they are elevated above the pile, leaving a sheet free to be taken forward. It may well be asked what is to prevent the automatic feeding of two sheets owing to various causes, such as two sheets sticking together. This is prevented by an automatic sheet-calipering attachment which is located just beyond the sheet-advancing carriages. In brief, it consists of rollers which are very accurately adjusted; a single sheet passing between them would not cause friction enough to revolve the upper roller; but if more than one sheet enters between the rollers, the extra thickness will rotate the upper roller *B*, causing the pin *C* to tilt the pendulum *D* so that its upper end will be moved from another arm *E*, which actuates a clutch, stopping the machine. This automatic stop of the feeder takes place before the sheet is advanced on the pile more than 6 inches. The caliper does not stop the press; but it stops the feeder. The press does not stop until all the sheets are printed that have previously passed beyond the caliper. The sheets are quickly run down again from the feeder to the drop guides of the press by power before the press is started. This saves the spoiling of sheets, and it also prevents the possibility of blank sheets getting into a pile at the fiyboard. The small roller, which will be noticed as pressing on the sheet in the center, is the pile-elevating governor which automatically regulates the height of the pile of the sheets. Through the medium of a connecting rod it controls a locking finger. The pile will be fed up until the lifting of the wheel which goes up with the pile causes the locking finger to throw out of gear the elevating mechanism. This device is so sensitive that the height of the pile will not vary the thickness of one-sixteenth of an inch.

The sheet having been fed forward by the fingers of the sheet-advancing carriage and having been calipered, is allowed to pass on its way and is moved down to the press by means of tapes. But the feeder is not finished with the sheet until it has been actually taken by the impression cylinder. In all probability the sheet has been fed forward with such precision that the registry is most accurate. Now, no chances are taken, side registering grippers being provided, which give absolutely perfect registry, which is so necessary in color work. In brief, the side register gripper consists of clamps which, in case of any inaccuracy, seize the sheet and turn it to the proper position. The sheet is now advanced toward the cylinder, the whole operation, of course, being a continuous one, one sheet following immediately the other one. Directly over the impression cylinder is a device intended to control the tripping or skipping of the impression. In case a sheet catches in delivering from the impression cylinder, the press is in-



Paper Feeder Applied to a Cylinder Press.



Paper Feeder in Operation.

AUTOMATIO PAPER-FEEDER FOR PRINTING MACHINERY.