

COMBINATION FOLDING AND WIRE-STITCHING MACHINE.

This machine marks another revolution in the method or process of handling, putting together, and making of a periodical. In a continuous and strictly automatic operation it takes the sheets from the platforms of as many as five feeders in one machine (representing as many separate sheets), folds, gathers, collates, covers, and wire-stitches them, delivering completed copies without intermediate handling.

The accompanying illustration represents the machine receiving from the automatic feeders three separate sheets, the two main sheets making up the body of the periodical, the third sheet being the cover. These machines took the place of sixteen folding machines of ordinary make, to each of which was attached an automatic feeding machine; also ten thread sewing machines, and did away with the help of sixty employes, who were formerly necessary to assemble by hand and stitch the immense edition of a popular periodical. Since that time, however, machines of a similar construction have been made which are designed to receive, bring together, and turn out a periodical made up of five separate sheets. Three such machines are now in course of construction for an illustrated weekly.

The main sheets are each first fed from the feeding machine to the folder, where they are partially folded, and then carried to the assembling gage in the machine, where they are met by the cover. At this point the several sheets are independently registered with each other, and are then carried into position for receiving the wire staples, after which they pass into position for receiving the last fold. If either sheet should be missing at the assembling gage, the incomplete copy will be switched out of its course into a receptacle provided for it. This automatic switch, at the same time, trips the wire stitchers, so they do not operate unless the copy is complete, thus preventing the possibility of any but complete copies reaching the packing box.

As a further idea of the completeness of these machines, it should be explained that should either of the feeding machines advance more than one sheet at a time, the automatic features of the folding machine are brought into play in practically the same way that they would be if the feeding machine had failed to advance a single sheet; in other words, if either of the feeding machines advances more than one sheet at a time, the sheet will be automatically switched out of its course, the stitchers automatically tripped, so that such copy will not be wire-stitched.

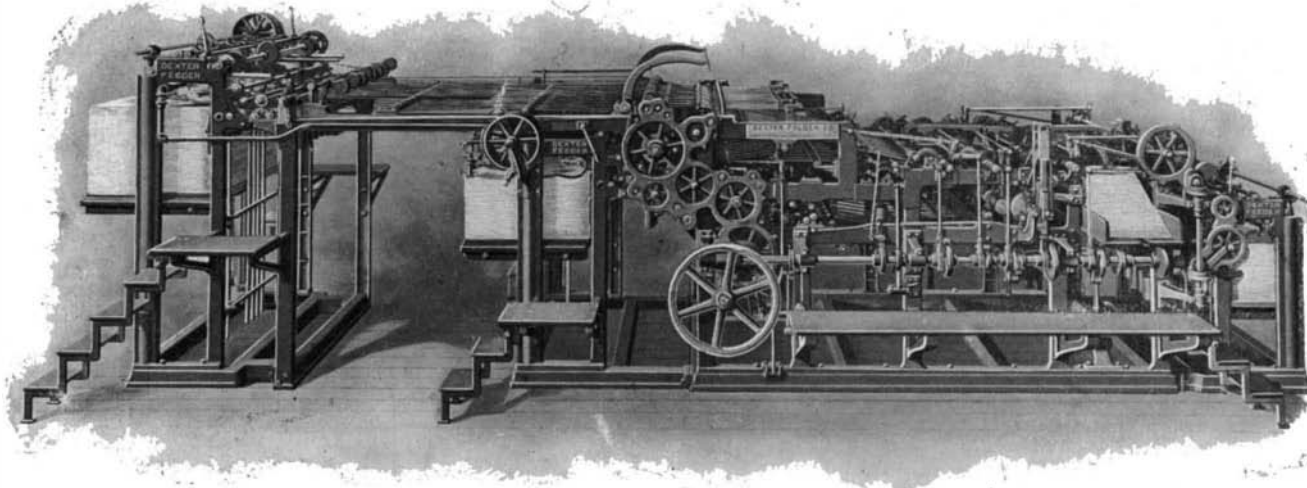
In dimensions, the very latest of these machines cover a floor space of 37 feet in length by about 12 feet in width, and weigh about 15 tons.

On highly illustrated periodicals the use of this type of machine enables the publisher to use a grade of paper and do a class of printing that has heretofore been prohibited where it was attempted to do printing and folding at one operation. By this process the sheets are allowed to dry before going to the folding machine, and as the machine receives at one time all the sheets that go into the periodical, the work of getting out a completed book proceeds very rapidly and, at the same time, economically. This machine is made by the Dexter Folder Company, of New York.

The Louisiana Purchase Exposition covers two square miles—1,240 acres. It is larger than the Chicago, Omaha, Buffalo, and Paris expositions combined.

BOOK-COVERING MACHINE FOR APPLYING PAPER COVERS TO BOOKS, PAMPHLETS, AND MAGAZINES.

By looking at the cut of this machine it will be noticed that the books are placed in the receiving trough, and are fed automatically to the jaws, which are operated by a cam movement and springs. At a given point the jaw is opened automatically, and after receiving the book closes automatically, moving the book forward to the glue wheel, which applies the glue to the book. From this position the book is moved one step forward to the cover box, containing covers,

**FOLDER AND WIRE STITCHER.—FEEDS ITSELF AUTOMATICALLY.**

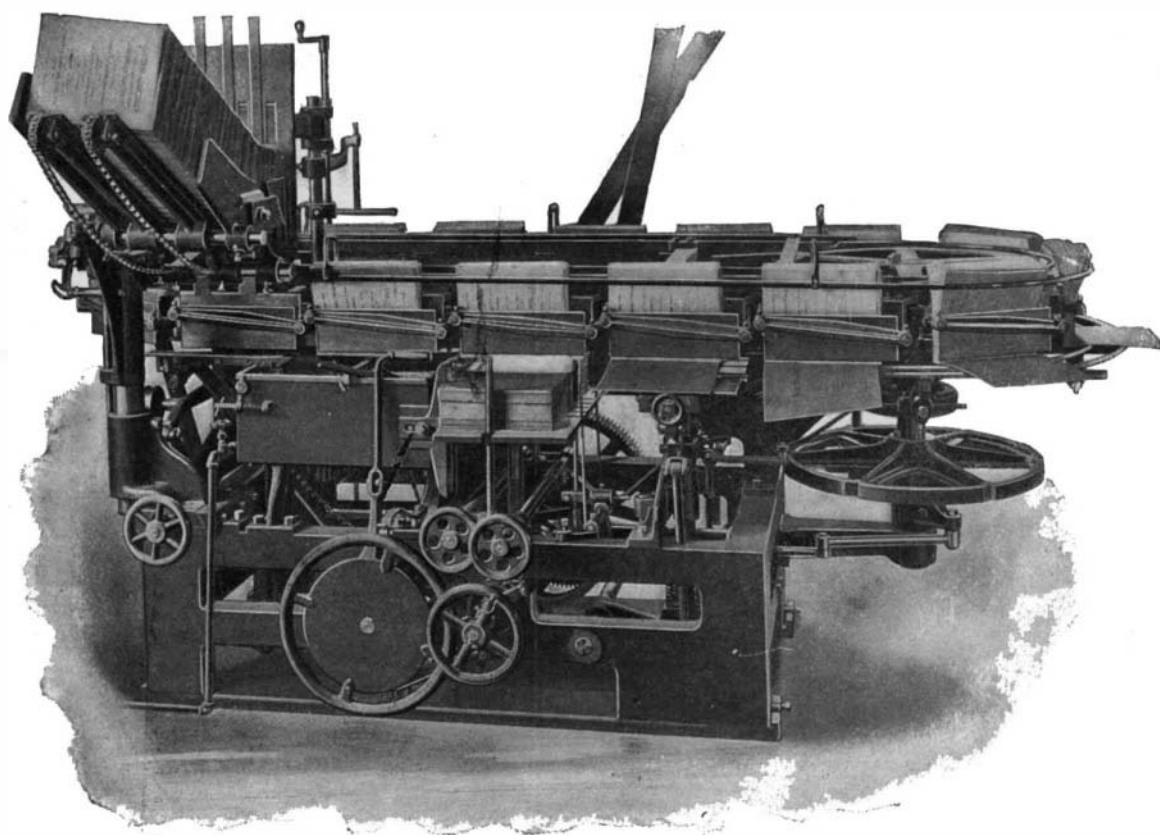
Thirty-seven feet long, weighs fifteen tons and does away with sixteen folding machines and sixty employes.

and, while running, the cover box raises up and applies one cover to the back of the book. The cover box then proceeds with one movement forward to what is termed the cover breaker. This cover breaker lifts up the book, pressing the cover against the back of the book and at the same motion side lips are moved inwardly to form a joint or crease on the cover. The book then passes from step to step, as seen in the illustration, with the cover flying until it has reached the delivery point, where the jaws open automatically and allow the book to fall down on a table, and it is then pushed out of the way by a plunger, so that the next book may fall down without interruption. The machine will cover books or pamphlets from $\frac{1}{4}$ inch up to $1\frac{1}{2}$ inches thick and up to 12 inches long at the rate of 2,250 books per hour. By its use is saved, over the old way of covering by hand, in floor space nearly 50 per cent and in cost of operation and maintenance over 80 per cent. It is manufactured and sold

ing machines. The work to be sewed is placed upon a table at the left hand of the operator. It feeds the signatures one at a time to the radial arms as they successively present themselves. The arm then makes a quarter revolution, and rises underneath a row of semicircular needles. These arms are provided with punches or perforators, which make a series of holes. The needles pass into and out of the holes thus made, carrying the threads through the back of the sheet and up through the hole close to the series of loopers, which hold open the loops from the transverse stitches so that the needles can pass through them. The loopers then retire, leaving their loops round the needles, and then come forward, taking new loops from the needles. The needles then withdraw, leaving these new loops round the loopers, and retire to their original position ready for the next signature. The sewn signatures are pushed back on a long horizontal table in one continuous book, which is separated into individual books by the cutting of certain threads. Each sewing stitch is interlocked upon itself, and is independent of every other stitch. Therefore, a book is held together until every stitch has been cut or broken. A product of 20,000 to 25,000 signatures per day can be gotten off the machines, while the average product of a hand-sewer is from 2,000 to 2,500; in other words, the machine does the work of eight to ten girls, and is one of the greatest labor-saving devices ever introduced into the printing trade.

Before sewing, the edges may be marbled or gilded. The edges of the book are covered with a size, the gold leaf is applied and allowed to dry thoroughly. It is then polished with an agate burnisher. The book is now consolidated by crushing in a "smasher." It is then taken to the rounding and backing machine, which is a new labor-saving device, doing away with much hand labor, and producing a uniform product. The edges are cut, before the book is rounded, by the aid of cutters, the

construction of which is well known. The book is now ready for its case. Cases are made both by hand and machine. They consist of two mill-boards cut to size, covered with cloth, and the back lined with cloth. The Smyth case maker, shown in one of our engravings, employs only one operator and can make 500 cases per hour. The workman feeds a piece of cloth cut to the right size to the glue-applying roll. The machine automatically pushes two boards from the hoppers toward the center of the machine, and a strip of back lining paper is trimmed down to

**BOOK-COVERING MACHINE.—WILL COVER 2,250 BOOKS OR MAGAZINES PER HOUR.**

by Messrs. T. W. and C. B. Sheridan, of New York, Chicago and London.

The anti-diphtheria serum discovered by Prof. Roux, of the Pasteur Institute, is now being made up in the form of lozenges for use during convalescence. The profession had observed bacilli found in the mouths of patients several weeks after recovery were liable to convey the disease to others. The lozenges overcome this and also render preventive inoculation unnecessary.