

[Continued from first page.]

need be said to prove that it bids fair to effect as great a revolution in the printing of illustrated newspapers as the latest Walter and Hoe rotary machines have effected in the printing of daily newspapers.

We may here quote from Mr. Ingram's specification to the Commissioners of Patents the passages referring to the principal improvements which he has introduced:

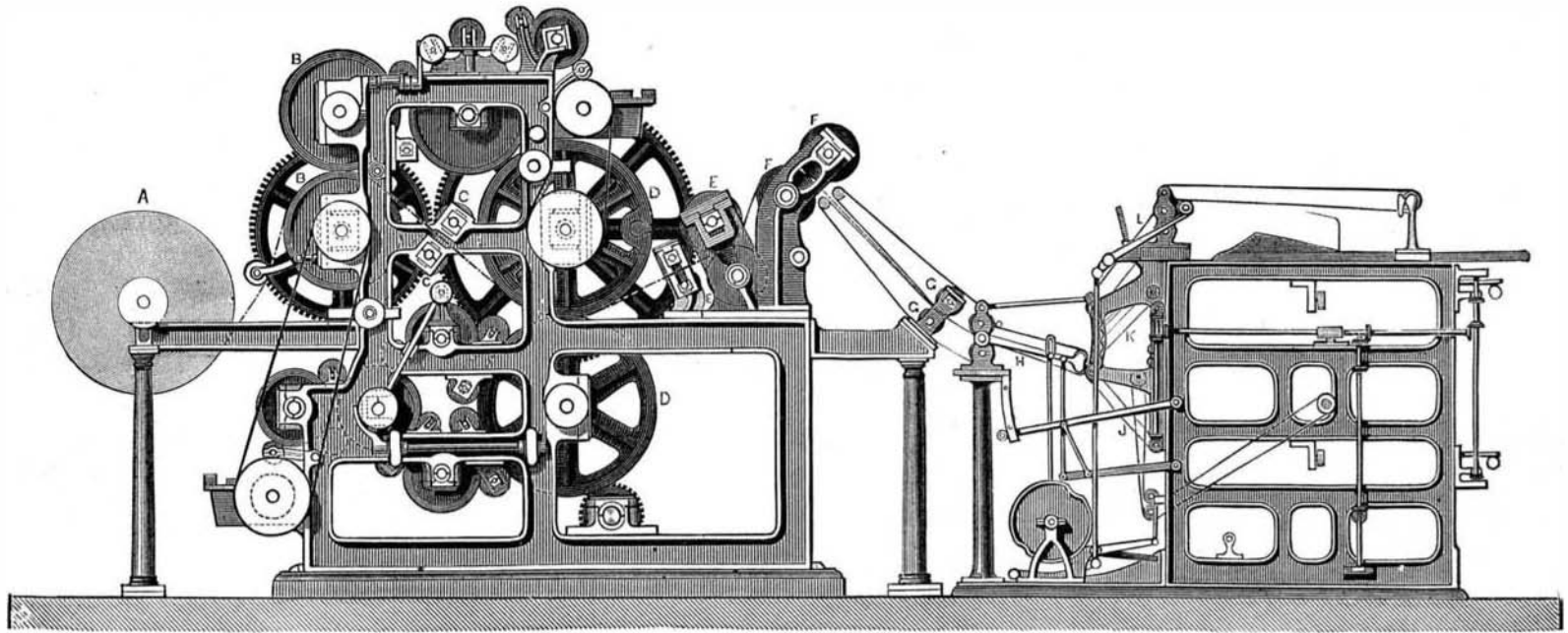
"It has been found in practice that 'cuts' or engravings require much more careful inking than the letter press, and that the ordinary inking arrangements, which are found to answer very well for printing letter press, will give but very imperfect work from engravings or cuts. It has also been wellnigh impossible to obtain satisfactory impressions from 'cuts' or engraved plates bent to the sharp curve required to correspond to printing cylinders of the ordinary size.

The large printing cylinders will therefore perform two thirds of a revolution while the smaller or type cylinder is making one complete revolution.

"My next improvement relates to the inking apparatus, which is used in conjunction with the large printing cylinder, and consists in the use of an increased number of inking rollers and distributing rollers, so that the engravings may be more perfectly inked than heretofore. The ink, as is usual, is transferred by a vibrating roller from the ductor or fountain roller to the first distributing cylinder, from which it is taken by two rollers, and is deposited on a second distributing cylinder, to which an endway motion is given by means of any suitable mechanism. The ink is thereby evenly distributed over the surface of this second cylinder, from which it is transferred by other rollers to two other distributing cylinders, in contact with which four

ing rollers, snatch or break the paper at the places where it has been perforated, and form it into separate sheets.

As it is found that machinery for folding newspapers works much better at a moderate speed, in this case it has been arranged in duplicate, so that each folder only works at half the speed of the printing machine. The vibrating arm, H, delivers the sheets alternately to K and J, which are carrying tapes leading to the two folding machines. If the sheets are wanted unfolded, the arm, H, is moved to its highest position and there fixed; it then delivers the sheets to the roller L, and, by means of a blast of air and a flyer, they are laid in a pile on a table provided for them. This change can be made without stopping the machine. Another machine, it is stated, is being constructed embodying further improvements which will make it possible to print two whole sheets and two half sheets of the *Illustrated London News* on the



INGRAM'S ROTARY MACHINE FOR PRINTING ILLUSTRATED NEWSPAPERS.

"In order to overcome these difficulties I considerably increase the diameter of the printing cylinder to which the 'cuts' or engraved plates are to be adapted, so that the curves to which these 'cuts' or engraved plates are bent may be gentler and of longer radius than the curved surface of the other printing cylinder. By this means I am also enabled to place on the same printing cylinder two, three, or more copies of the cuts or engravings, so that while the surface speed of the large and small printing cylinders is the same, the small cylinder, if it contains only one set of stereotype plates for the letter press, will rotate two, three, or more times for every revolution of the large cylinder. The impression cylinder, which acts in conjunction with the large printing cylinder, is also correspondingly increased in size, and rotates at the same surface speed. If desired, the type cylinder may be increased in size so as to be capable of receiving a duplicate set of stereotype plates for the letter press, while the large cylinder will have triplicate or other suitable number of sets of cuts for the engravings.

inking rollers rotate and take therefrom the ink, which they transfer to the printing surface. In this manner the cuts or engravings are plentifully and evenly supplied with ink, and good impressions are obtained therefrom."

We add particulars of the side elevation view, representing the action of the "Ingram" machine:

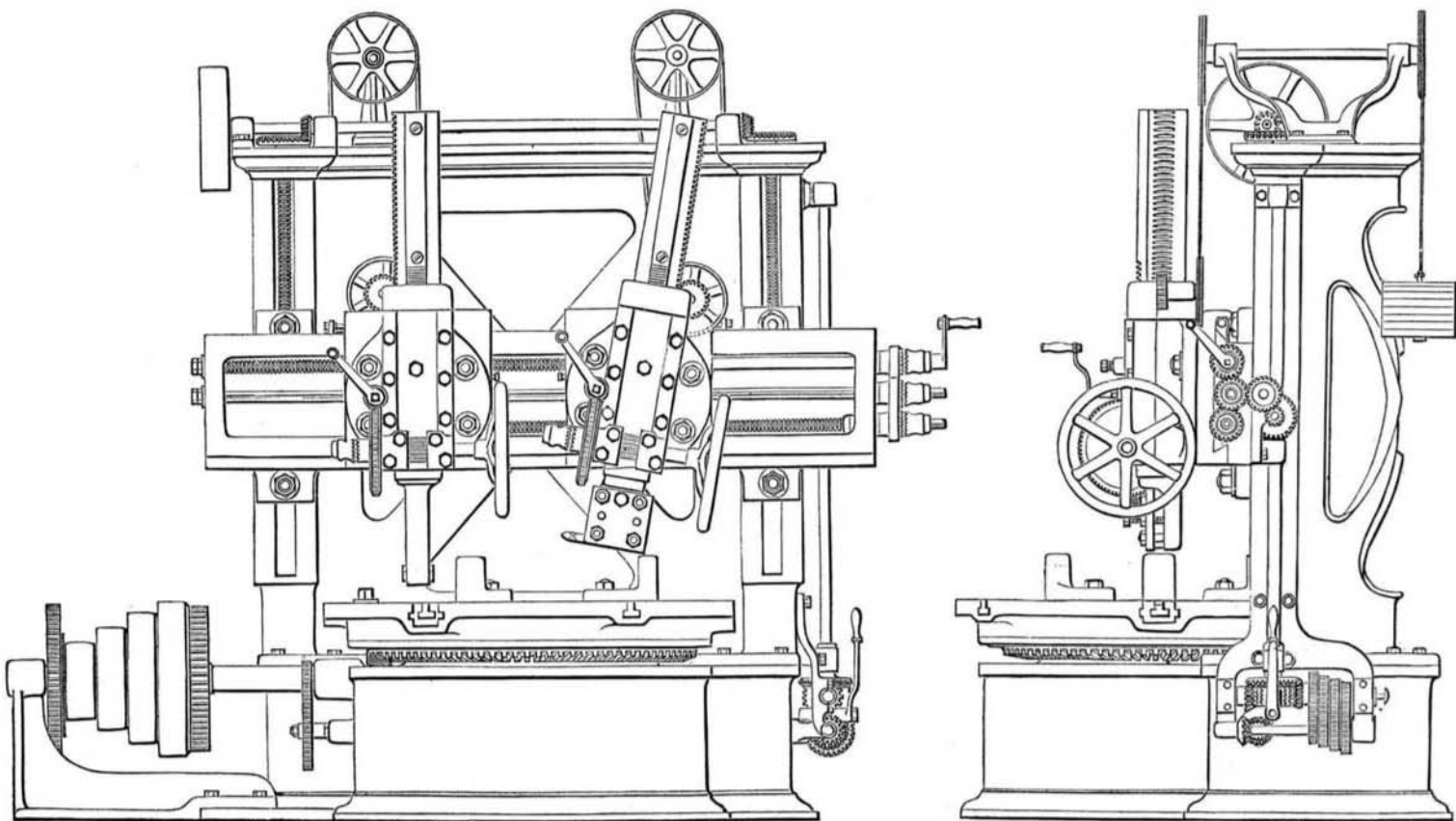
A is the roll of paper, containing a length of from two to three miles. B B, the type and impression cylinder for printing the inner form, or type side, of the paper. C C, calendering or smoothing rollers to remove the indentations produced by the impression of B B, so that a smooth surface is preserved to receive the outer form, or illustrated side of the paper, which is printed by D D. E E are cylinders, one provided with a saw-toothed knife, and the other with a corresponding indentation, to perforate the paper between each impression.

F F are rollers for holding the paper securely, to resist the effect of G G, which are called snatching rollers, and, being driven at a rather higher surface speed than the hold-

same machine. The size of the page of the *News* is about the same as that of the *SCIENTIFIC AMERICAN*.

IMPROVED BORING AND TURNING MACHINE.

We illustrate herewith a new combined boring and turning machine, constructed by Messrs. W. B. Bement & Son, of Philadelphia. The headstocks for the boring and turning tools are both mounted on the same carriage, which has a vertical traverse given to it, by means of the screw and bevel gearing driven off a pulley mounted on the horizontal shaft at the top of the frame. The headstocks can be traversed horizontally, or set at any desired angle, and the distance apart of the boring and turning tools can be regulated at will. The tools are fixed, the table on which the work is placed being caused to revolve by the gearing introduced, as shown. The weight of the boring and turning bars is balanced by counterweights passing over pulleys on the top of the frame, and the cutters are fed down to the work by a pinion gearing into the rack on the bar.



BEMENT'S BORING AND TURNING MACHINE.