2 Sheets--Sheet 1.

G. & W. KIVLAN & G. WOOD.

Machine for Calendering Printed Sheets.

No. 161,242. Patented March 23, 1875.

FIG. 1.

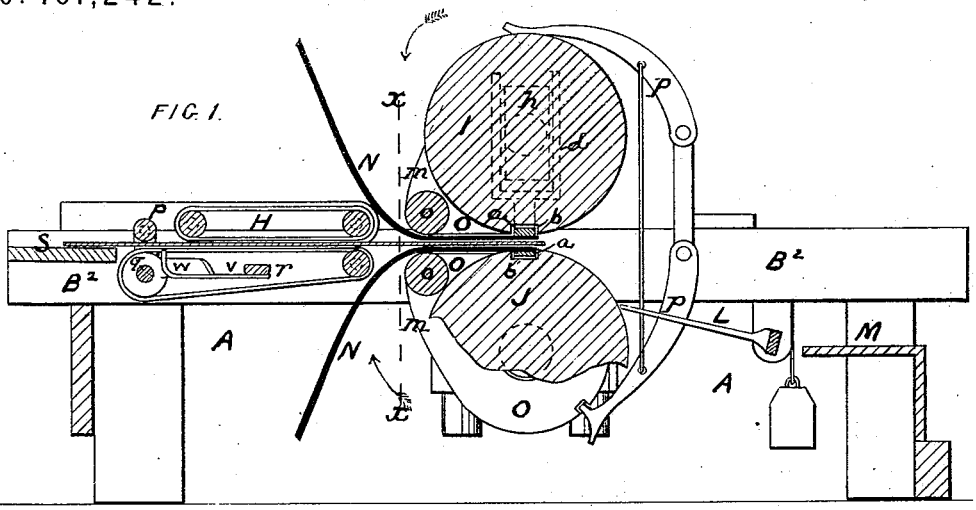
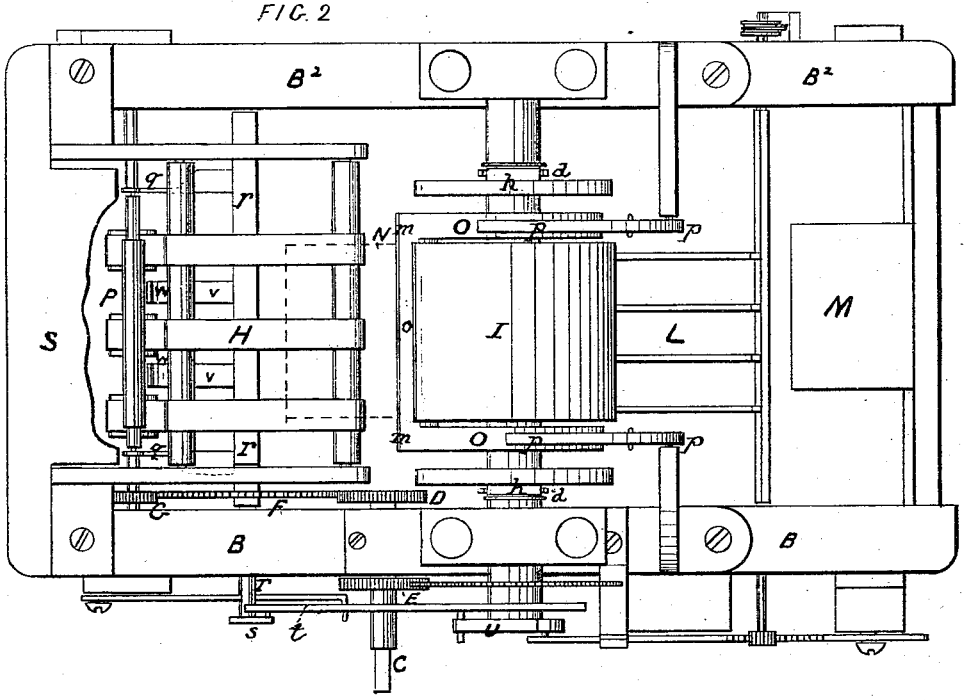


FIG. 2



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THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

2 Sheets--Sheet 2.

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FIG. 3.

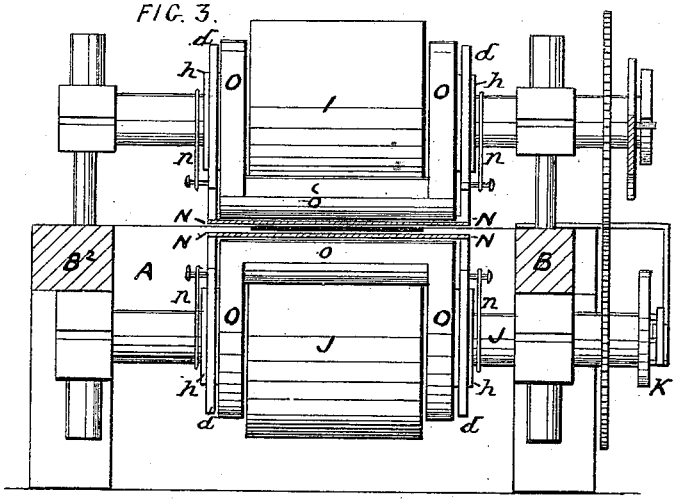


FIG. 4.

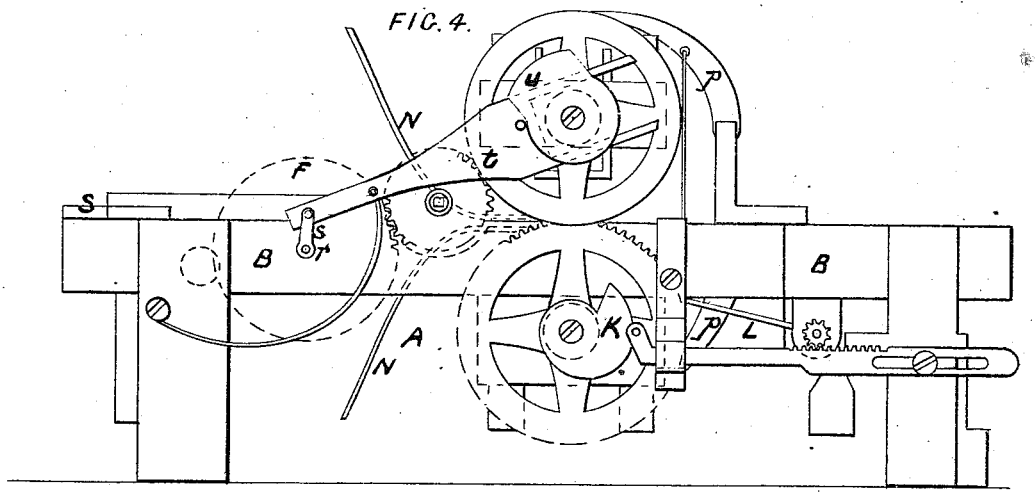
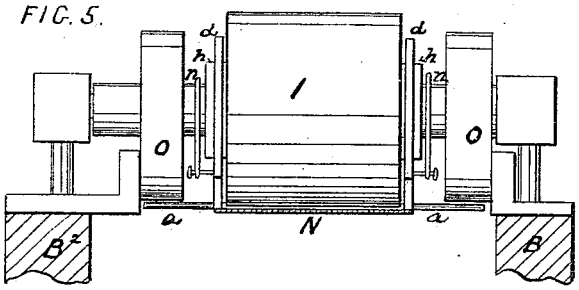


FIG. 5.



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UNITED STATES PATENT OFFICE.

GEORGE KIVLAN, OF BOSTON, WILLIAM KIVLAN, OF CAMBRIDGE, AND GEORGE WOOD, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR CALENDERING PRINTED SHEETS.

Specification forming part of Letters Patent No. **161,242**, dated March 23, 1875; application filed February 5, 1875.

To all whom it may concern:

Be it known that we, GEORGE KIVLAN, of Boston, in the county of Suffolk, WILLIAM KIVLAN, of Cambridge, in the county of Middlesex, and GEORGE WOOD, of Boston aforesaid, and all of the State of Massachusetts, have invented an Improved Machine for Pressing and otherwise Treating Printed Sheets, of which the following is a specification:

This invention relates to a machine more particularly designed for use in book-printing establishments to press, or dry-press, or recalender the printed paper sheets, or to accomplish all of the said results. This is now done by placing a series of the printed paper sheets, with intermediate separating-sheets of plain card-board, in a press, and there allowing them to remain for the proper length of time.

In the construction of the present improved machine we employ the ordinary endless feed-apron of printing-presses, by which to feed the printed sheets one after another, to be operated upon by our improved mechanism, to treat them as hereinbefore stated, and also the ordinary fly of printing-presses, for taking the said sheets, one after another, as they issue from our said improved mechanism, and laying them upon a table or shelf suitably located therefor, to be afterward removed from time to time by the attendant.

The main feature of this invention consists in the mechanism arranged between the endless feed-apron and the delivery-fly, whereby the printed sheets, one after another, as they pass to and through its action, will be treated as desired. This mechanism consists, in substance, of two continuously-revolving pressing-rolls and two flexible boards, which we call "trails," made of sheet card-board or sheet metal, or other suitable sheet material, that are applied to the said rolls, one to each, and otherwise arranged, so that under the revolution of the rolls they will, acting in conjunction, take a sheet from the endless feed-apron, and trail it in and between the rolls, finally delivering it to the delivery-fly, by which it is taken and discharged from the machine, all as hereinafter particularly described.

In the accompanying plates of drawings the improved machine embraced herein is illustrated.

In Sheet 1, Figure 1 is a plan view, and Fig. 2 a central longitudinal vertical section. In Sheet 2, Fig. 3 is a transverse vertical section on line *x x*, Fig. 1. Fig. 4 is a side elevation; and Fig. 5 is a view, showing a modification in construction.

In the drawings, A represents a frame-work, consisting of two parallel upright frames, B B^2, and otherwise of suitable construction for supporting the working and stationary parts of the present machine; C, the driving-shaft, arranged to turn in suitable bearings at the upper side of one side frame, B, of the frame-work A. This driving-shaft C is provided with two gear-wheels, D and E, the one D for continuously driving, through intermediate gear-wheels F and G, the endless traveling feed-apron H, such as ordinarily used in printing-presses to carry the sheet to be printed to the type or printing-cylinder, and the other, E, for rotating two similar rolls, I and J, one, I, of which is geared to the said gear-wheel E of the driving-shaft, and the other, J, geared to the roll I, so as to both run in unison therewith. These rolls I and J are arranged the one I directly above the other, J, and they are located between the parallel side frames B B^2 of the frame-work A, and they turn in suitable bearings of each side frame. In the location of the rolls I and J, above described, they are placed at the inner end of the feed-apron, which apron travels toward the said rolls I and J, and these rolls both revolve toward the endless apron, each in the direction indicated by the arrows in Fig. 1. The shaft of the lower roll J carries a cam, K, for operating the fly-frame L. This fly-frame L is the same as ordinarily used in printing-presses for taking the printed sheet from the printing-cylinders; and in this machine the arrangement of the parts for operating it are substantially the same as are required in printing-presses—that is, the fly-frame L is to take from the rolls I and J each sheet which passes through and between them, as hereinafter described, and is to lay it upon a table or shelf, M, suitably located to receive it, the same sub-

stantially as the printed sheets one after another are taken by a fly-flame in a printing-press, and are laid upon a shelf or board suitably located therefor in the press. N N are the trailing-boards of the present machine. These trailing-boards are both made of a flexible sheet—as, for instance, sheet card-board or sheet metal—and they are connected the one to the roll I and the other to the roll J. This connection of the trailing-boards N with their respective rollers I and J is the same in each case, and it consists in fastening each flatwise to a bar, *a*, that is received in a corresponding-shaped groove, *b*, made along the length of the periphery and parallel to the axis of the roll, and is attached at each end to a similar fork-shaped frame, *d*, each of which frames is arranged to be guided and to slide over portions *h* of the shafts to the roll, that are squared correspondingly with the width between the two tines of the fork-shaped frame *d* playing over them. Beyond this attachment of the trailing-boards to the rolls I and J they are free and loose of the rolls I and J for their whole length. O O, disks, each having a corresponding-shaped cam-edge, *m*. These disks O O are located, in the present instance, one at each end of each roll, and the two disks of each roll are within the length of the trail-board-carrying bars *a*, which, by springs *n*, are held to a bearing on their edges *m*, and they have their cam-edge *m* toward the inner end of feed-apron H, as shown, and there they are joined together by a cross-bar, *o*, which may be round or of any other shape, and, if round, rolling or stationary. This position of the cam-disks O of each roll is maintained by the holding spring-pawls *p*, one for each disk. Each spring-pawl interlocks with a suitable notch of the cam-disk which it is to hold against turning, and the pawls for the two cams of each roll are disposed relatively to each other in their interlock with their respective cam-disk for the one pawl to be engaged with its cam, while the other pawl is released from its cam, and vice versa, as the trail-board-carrying bar *a* passes under the pawls in the revolution of the roll having such bar, and this alternate release and catch of the two pawls for the two cam-disks of each roll, together with their connection by the bar *o*, secures the cams in their fixed position described under the rotation of the rolls with their described trail-board connection. P, a roller located at outer or front end of endless feed-apron H, where it is arranged transversely to the feed-apron, and to nip against or bear upon the upper side of the lower apron of the endless feed-apron. This nipping-roller is supported at each end in a similar-shaped arm, *q*, both of which are fastened to a common shaft, *r*, suspended between and in suitable bearings of the two side frames B B^2 of the frame-work. This shaft *r* has a crank, *s*, fixed to it at one end, to which is pivoted one end of a pitman-rod, *t*, arranged to be actuated by the cam-edge *u* of the shaft to the upper pressing-roll I as such shaft revolves. The cam-edge *u* is shaped to cause, through the described connection between it and the shaft *r*, carrying nipping-roller P, the said roller P to be rocked against and away from the feed-apron on which it is located for a bearing or nipping. The shaft *r*, carrying nipping-roller P, as above described, is also provided with fixed arms *v v*, which arms project toward the outer end of the endless feed-apron, and are constructed at *w* for abutments to the sliding in of a printed sheet by the attendant at the table S when the roller is lifted from the apron. These abutments *w* rock with the shaft *r*, which rocks the nipping-roller P, and thus, when such roller is rocked, to nip the printed sheet to the feed-apron for being carried forward by it, they are removed from the course of, and offer no obstruction to, the forward travel of said sheet by the movement of the endless feed-apron H.

In the present improved machine the sheets which are to be operated upon are placed one after another, and at the proper time, by the attendant at the table S, against the abutments *w*, where, by the nipping-roller P, they are in due course of time nipped to the feed-apron, and by it carried forward to the pressing-rolls I J, to be operated upon by their trail-boards N. As the forward end of said sheet issues from the inner end of the feed-apron it is seized and nipped in and between the two trail-boards N, which, by the cam-edges *m* and revolution of the rolls, have been drawn out from the rolls sufficiently therefor. The combined revolution of the rolls, carrying with them, of course, the trail-boards, draws the paper sheet through and between the rolls, and as said sheet is so drawn the trail-boards dispose themselves against its sides or surfaces, substantially as shown in Fig. 1, pressing the sheet between them. The sheet, in issuing from the trail-boards, the opposite side of the rolls to that at which the trail-boards seized it, is taken by the delivery-fly and laid on a table or shelf, as ordinarily in printing-presses, and therefore needing no particular description herein.

The nipping-roller P, for nipping each sheet in turn to the endless feed-apron, is arranged to operate so that the feed-apron will always have a sheet ready for being taken by the trail-boards N as, in the revolution of the rolls I J, the trail-boards come into position at the inner end of the feed-apron therefor.

With a machine such as above described, obviously the trail-boards N preserve the flat and smooth condition of the sheet while passing through the rolls, and thus secure the desired pressing, or dry-pressing, (should the rolls be heated,) or calendering of the sheet.

By Fig. 5, Plate 2, a cam-edge for operating a trail-carrying bar, *a*, as herein described, is illustrated as fixed directly to the frames B B^2, which dispenses with the arrangement of holding spring-pawls *p*, herein described.

Having now described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination, with the revolving rolls I and J, of the flexible trails N, applied to the rolls, substantially as described, for the object specified.

2. The combination of the two rolls I J, each having a trail, N, with the disks O, having cams M, substantially as and for the purpose described.

3. The combination of the endless feed-apron H, delivery-fly L, and rolls I and J, having flexible trails N, all arranged together and operating substantially as described, for the purposes specified.

The above specification of our invention signed by us this 28th day of December, A. D. 1874.

GEO. KIVLAN.
W. KIVLAN.
GEORGE WOOD.

Witnesses:
EDWIN W. BROWN,
GEO. H. EARL.