(No Model.) 2 Sheets—Sheet 1.

M. N. CORMACK.

DELIVERY ATTACHMENT FOR PRINTING PRESSES.

No. 592,697. Patented Oct. 26, 1897.

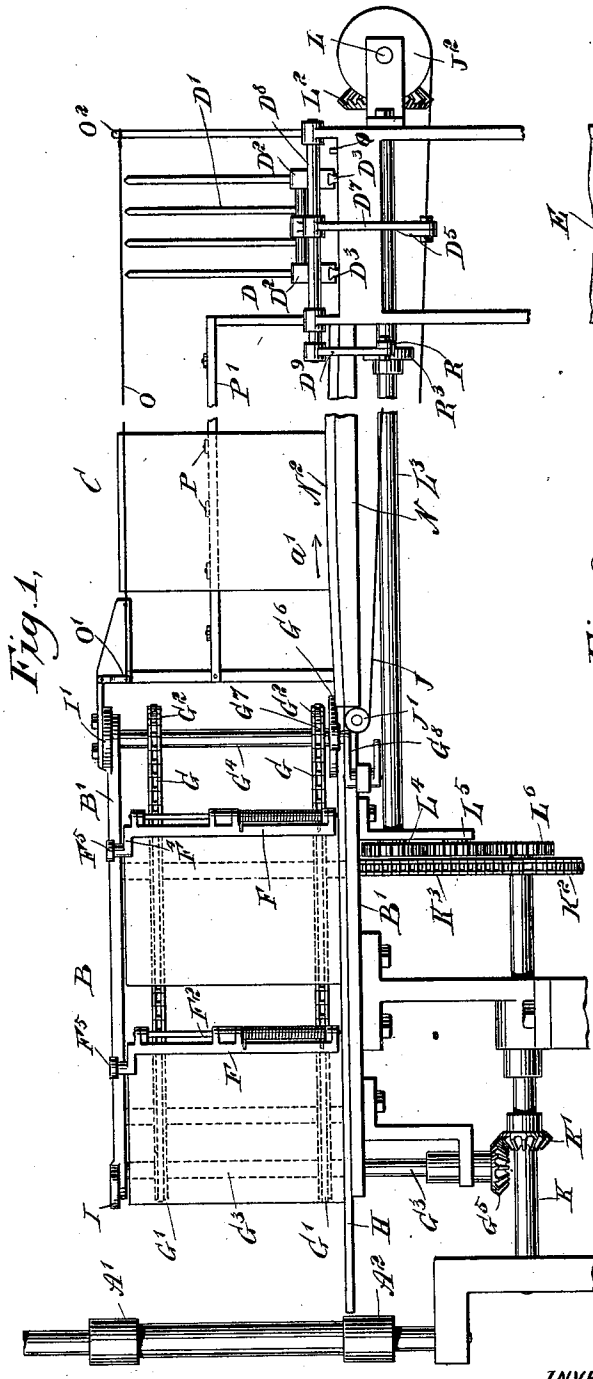

Fig. 1.

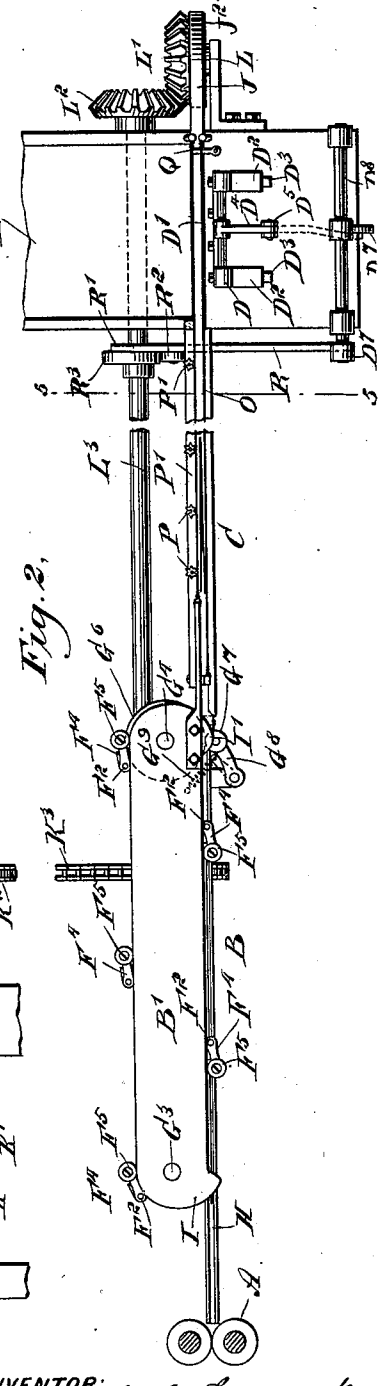

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

M. N. CORMACK.

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Fig. 6.

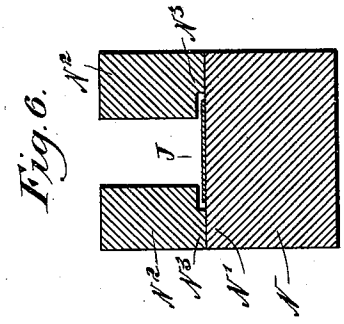


Fig. 5.

Fig. 3.

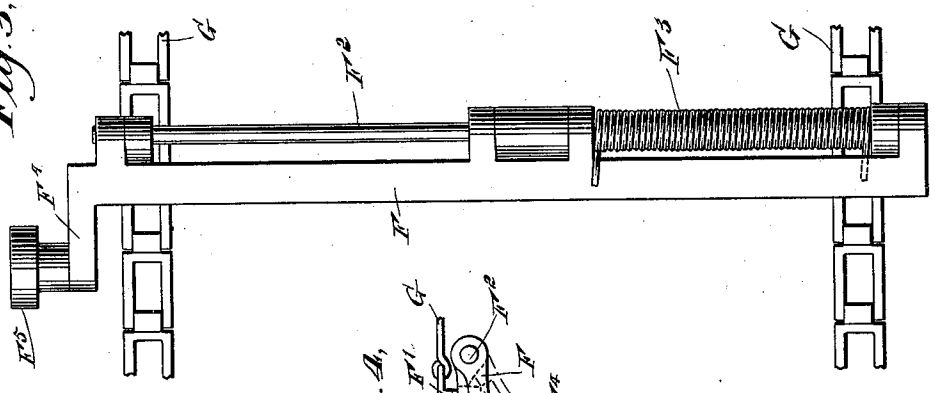
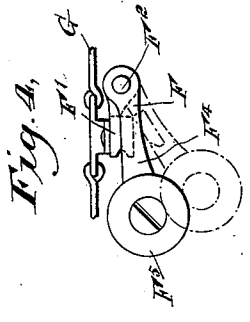


Fig. 4.



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DELIVERY ATTACHMENT FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 592,697, dated October 26, 1897.

Application filed December 28, 1896. Serial No. 617,283. (No model.)

To all whom it may concern:

Be it known that I, MARK N. CORMACK, of New York city, in the county and State of New York, have invented a new and Improved Delivery Attachment for Printing-Presses, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved delivery attachment for web-printing presses arranged to deliver a folded sheet free from smut or smear occasioned by the contact of the freshly-printed sheet with the folder and delivery surface to enable the printer in charge, to readily inspect the work to discover any imperfect folding, blotches, and the like, and to allow the ink to set before passing the sheets into the receiving-box.

The invention will be fully described hereinafter and its novel features pointed out in the appended claims.

Figure 1 is a side elevation of the improvement. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged side elevation of one of the gripping devices. Fig. 4 is a plan view of the same. Fig. 5 is an enlarged transverse section of the fly in the receiving-box, the section being taken on the line 5 5 of Fig. 2; and Fig. 6 is an enlarged transverse section of the carrier.

The last set of folding-rolls A of a rotary web-perfecting printing-press of any approved construction delivers the folded sheets to a feed mechanism B, adapted to compress the back of the folded sheets and to carry the same forward singly in an upright position and finally deliver the sheets to a carrier C, arranged to carry the sheets forward at a high rate of speed, so as to arrange the sheets farther apart and to permit the ink on the sheets to dry. The upright sheets as they arrive on the outer end of the carrier C are pushed out of the latter by a transversely-reciprocating pusher D into a receiving-box E.

The folding-rolls A are formed at their upper and lower ends with enlargements A' A^2, adapted to engage the folded sheet at the top and bottom margins, so that the sheet passes freely with its printed portion through the rolls A without danger of bringing the printed surfaces in contact with each other to avoid smearing of the sheets by the fresh ink. Each folded sheet passes through the rolls A with the back foremost, and as only the enlarged portions A' and A^2 touch the back at the top and bottom it is evident that the middle portion of the back is not finished or fully compressed, but it is completed by the gripping-jaws F and F′ of the grippers disposed vertically and held on endless chains or bands G, passing over suitable sprocket-wheels G′ and G^2, secured on the shafts G^3 and G^4, respectively, mounted to turn in a suitable framework B′ of the feed mechanism.

The bottom of the frame B′ is provided with guideways H, between which pass the lower edges of the sheets as they are pushed forward by the folding-rolls A to the first set of jaws F and F′. The jaw F is made to turn on a pintle F^2, carried by the other jaw F′ on the chain G, and a spring F^3, pressing on the jaw F, serves to hold the latter in contact with the jaw F′, fixed on the chain G.

On the upper end of the jaw F′ is formed or secured a crank-arm F^4, carrying a friction-roller F^5, adapted to engage a cam I on the end of the frame B′ next to the folding-rolls A and a cam I′, arranged on the outer end of the said frame B′. Thus when a traveling motion is given to the chains G the gripping devices are carried along, and as a gripping device moves around the end of the frame B′ next to the roll A the friction-roller F^5 in passing over the cam I causes the jaw F to swing open to receive at this time the back of the folded sheet pushed forward by the rolls A. As soon as the roller F^5 passes the cam I the spring F^3 causes the jaw F to close, so as to press the back firmly between the jaws F and F′, thereby holding the sheet and compressing the back. As the grippers move forward the sheet is drawn along with the lower end between the guideways H. When the gripper comes to the outer end of the frame B′, then the friction-roller F^5 comes in contact with the cam I′, so as to open the jaw F to release the sheet, which at this time has passed with its lower edge upon an endless traveling band J, forming part of the carrier C. Motion is given to the shaft G^3 from the main driving-shaft K by means of beveled gear-wheels G^5 and K′, held on the said

shafts G^3 and K. The latter is provided with a sprocket-wheel K^2, connected by a sprocket-chain K^3 with a sprocket-wheel on the printing-press, so that the sheet-delivery attachment is actuated when the printing-press is set in motion. It is evident that other suitable means may be employed for rotating the shaft K from the printing-press.

The endless band J above referred to receives a traveling motion from the shaft K, and the said band for this purpose passes over pulleys J′ and J^2, of which the pulley J′ is located a suitable distance inward under the guideway H, as plainly indicated in Fig. 1, and the pulley J^2 is located a short distance beyond the fly D. The pulley J^2 is secured on a transversely-extending shaft L, journaled in suitable bearings attached to the frame of the fly D, and on this shaft is secured a beveled gear-wheel L′ in mesh with a beveled gear-wheel L^2, secured on the outer end of a longitudinally-extending shaft L^3, carrying at its inner end a gear-wheel L^4 in mesh with an intermediate gear-wheel L^5, meshing in a gear-wheel L^6, secured on the shaft K. Thus when the latter is rotated a rotary motion is transmitted by the gear-wheels L^6 L^5 L^4 to the shaft L^3, and the latter by the gear-wheels L^2 and L′ rotates the shaft L and the pulley J^2 to impart a traveling motion to the endless band J of the carrier C in the direction of the arrow *a*′.

The gearing described is so proportioned that the endless band J travels faster than the grippers of the feed mechanism B, and consequently the sheets are moved farther apart on the carrier C than on the feed mechanism B. As the carrier C may be of any desired length, it is evident that suitable time is given to the sheets while moving along the carrier, so that the ink has ample time to set and dry before the fly D pushes the sheet into the delivery or receiving box E.

In order to insure a positive delivery of the sheet from the grippers onto the band J, I provide a pair of feed-rollers G^6 G^7 directly above the guideway H in the rear of the pulley J′. The feed-roller G^6 is secured near the lower end of the shaft G^4 and is somewhat larger than the sprocket-wheels G^2, so that an accelerated forward motion is given to the sheet by the said feed-rollers at the time the grippers open and leave the sheet. The roller G^7 is journaled on a horizontal arm G^8, pivoted on the frame B′ and pressed on by a spring G^9 to hold the feed-roller G^7 in peripheral contact with the other roller G^6, so that the sheet in passing between the rollers G^6 G^7 is fed straight forward from the guideway H upon the band J.

Under the top run of the band J extends a table N, arched lengthwise on its top N′ to form a rest for the band J and to cause the latter to assume the convex form of the top to prevent a possible slack or bridging of the band, which would be the case if the top surface were level. The band in bridging causes the sheets to hang back and they would not arrive in time at the end of the carrier for the fly to act on the sheet. Longitudinally-extending guide-rails N^2 are arranged over the table N and project or overlap the edges of the band J, as plainly shown in Fig. 6, so that the lower edge of the sheet is not liable to come in contact with the edges of the band and cause a disturbance of the band and sheet. The guide-rails N^2 are located a suitable distance above the top of the table N to form a correspondingly-shaped recess N^3 for the passage of the side edges of the band J. (See Fig. 6.)

In order to support the folded sheet in a vertical position while being moved forward on the band J, I provide a guideway O, preferably formed of two wires or rods stretched a suitable distance above the band J for the top marginal end of the sheet to pass between the wires. The latter are secured at their ends to suitable supports O′ O^2, as plainly indicated in the drawings.

In order to prevent the folded sheets from bulging transversely, I provide on one side of the sheets toothed wheels P, mounted to revolve on a rail P′, supported on the framework of the machine, the teeth of the wheels projecting beyond the rail to come in contact with the sides of the folded sheet, so that the wheels revolve as the sheet is dragged along without danger of spreading the ink on the sheets, as only the points of the teeth come in contact with the sheet.

On the outer end of the table for the fly D is arranged a transversely-extending stop Q over the band J, so that further forward movement of the sheet is prevented at the time the sheet arrives into alinement with the fly. When this takes place, the fly moves transversely to push the sheet off the band J and out of the wires forming the guideway O, the rail P′ terminating at the beginning of the fly, so as not to interfere with the fly pushing the sheet into the box E.

The fly D is provided with vertically-disposed arms D′, secured on a carriage D^2, fitted to slide transversely in bearings D^3, arranged on the fly-table, the carriage having its under side a suitable distance above the band J, (see Fig. 5,) so as not to interfere with the band when the carriage moves transversely for the fly to push the sheet off the band. The carriage D^2 is pivotally connected by a link D^4 with a lever D^5, fulcrumed on the fly-table and connected by a link D^6 with with an arm D^7, attached to a rock-shaft D^8, having an arm D^9 pivotally connected with a bar R, extending transversely, and fitted, with the free forked end R′, to slide loosely on the shaft L^3.

On the bar R is held a friction-roller R^2, adapted to be engaged by a cam R^3 on the shaft L^3, so that a sliding motion is given to the bar R to actuate the rock-shaft D^8, arm D^7, links D^6, D^5, and D^4 to impart a transverse motion to the fly-arms D′ of the carriage

D^2 to push the sheet off the band J and out of the guideways O. A suitable spring connected with the arm R insures a return movement of the fly D after the cam R^3 has left the friction-roller R^2. It will be seen that by the arrangement described the fly D is actuated from the shaft L^3, used for imparting motion to the band J, so that the fly and band act in unison.

The operation is as follows: The folded sheet after leaving the rolls A passes with its back into the gripper having its jaws F F′ opened by the action of the cam I at the beginning of the feed mechanism B. The jaws F and F′ immediately close, so as to compress the back and to carry the sheet along, the latter passing with its lower edge in the guideway H. The gripper carries the sheet in the direction of the arrow *a′* and while the sheet is in an upright position until the forward end of the sheet passes between the feed-rollers G^6 G^7 at the time the friction-roller F^5 of this gripper passes over the cam I′ and the jaw F is opened thereby to release the sheet, which is now fed forward by the feed-rollers G^6 G^7 onto the band J and carried forwardly by the latter. The upper end of the sheet passes between the wires forming the guideway O, and the sides of the sheet are prevented from bulging outward by coming in contact with the wheels P. As the grippers follow one another they take hold of the successive sheets delivered by the rolls A and the grippers pass the sheets upon the band J successively, and as the band J travels faster than the grippers it is evident that the sheets fall farther apart. The outermost sheet finally comes in contact with the stop Q to prevent its further forward movement, and at this time the fly D is moved transversely to push the sheet from the band J and out of the guideway O and into the receiving-box E. The fly-arms previous to the passage of the next sheet pass back in front of the band. Now by the arrangement described it is evident that the sheets are carried a long distance from the roll A to the box E, so that the ink has plenty of time to set and dry, and the attendant in charge is at all times enabled to inspect the folded sheets as they pass along the delivery attachment to detect irregularities in the folding, printing, &c., of the sheets. It will further be seen that from the time the folded sheets enter the last fold-rolls A the sheet is controlled entirely during its travel to the box E by the marginal surfaces thereof, and consequently is not liable to be smutted or smeared while in transit.

By compressing the back of the folded sheets in its entire length while carried by the grippers to the band or belt J less paste is necessary for fastening the several parts of the back in position, owing to the heavy pressure of the gripping-jaws on the back. As the sheets are kept separate, the air has access to the entire surface of the sheet and insures a rapid drying of the ink.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the vertically-disposed folding-rolls, the sheet-support, and the vertically-disposed compressing mechanism arranged to engage the sheet at the fold and to feed it forward, substantially as described.

2. The combination of the vertically-disposed folding-rolls having end portions of increased diameter, the sheet-support below said rolls, and the grippers or compressing mechanism extending vertically the full length of the rollers to engage the sheet at the fold and feed it forward, substantially as described.

3. The combination of the vertically-disposed folder, the sheet-support, the vertically-disposed compressing mechanism arranged to engage the sheet at the fold and to feed it forward over said support, and the fly movable transversely of the direction in which the sheet is fed, substantially as described.

4. The combination of the vertically-disposed folder, the sheet-support, the vertically-disposed compressing mechanism arranged to engage the sheet at the fold and to feed it forward over said support, the traveling carrier adapted to receive the sheet when released from the compressing mechanism, and means for removing the sheet when it reaches the end of the carrier, substantially as described.

5. The combination of the vertically-disposed folder, the sheet-support, the vertically-disposed compressing mechanism arranged to engage the sheet at the fold and to feed it forward over said support, and the fly having vertically-disposed holders or fingers adapted to engage the sheet and to remove it, substantially as described.

6. The combination of the vertically-disposed folder, the sheet-support, the vertically-disposed compressing mechanism arranged to engage the sheet at the fold and to feed it forward over said support, the carrier arranged in the continuation of said support and connected to travel at a higher rate of speed than the compressing mechanism, and means for removing the sheet when it reaches the end of the carrier.

7. The combination of the vertically-disposed folder, the delivery mechanism or removing appliance, the longitudinally-arched support arranged between the folder and the delivery mechanism, and means for feeding the paper over said support, substantially as described.

8. A sheet-delivery attachment for printing-presses, provided with a sheet-feeding mechanism adapted to receive the sheets from the last folding-rolls of the printing-press, a carrier adapted to receive the sheets from the said feeding mechanism and move the sheets forward in an upright position, the said carrier traveling at a higher rate of speed than the feed mechanism, to bring and hold the

sheets farther apart, and a pusher adapted to engage the outermost sheet and push it transversely off the said carrier, substantially as shown and described.

9. A sheet-delivery attachment for printing-presses, provided with a sheet-feeding mechanism adapted to receive the sheets from the last folding-rolls of the printing-press, a carrier adapted to receive the sheets from the said feeding mechanism and move the sheets forward in an upright position, the said carrier traveling at a higher rate of speed than the feed mechanism, to bring and hold the sheets farther apart, and a pusher adapted to engage the outermost sheet and push it transversely off the said carrier, the said pusher operating in unison with the said carrier, substantially as shown and described.

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JEROME CUNNINGHAM.