J. HIRD.

Sheet-Delivery Apparatus for Printing-Presses.

No. 209,683. Patented Nov. 5, 1878.

Fig. 1.

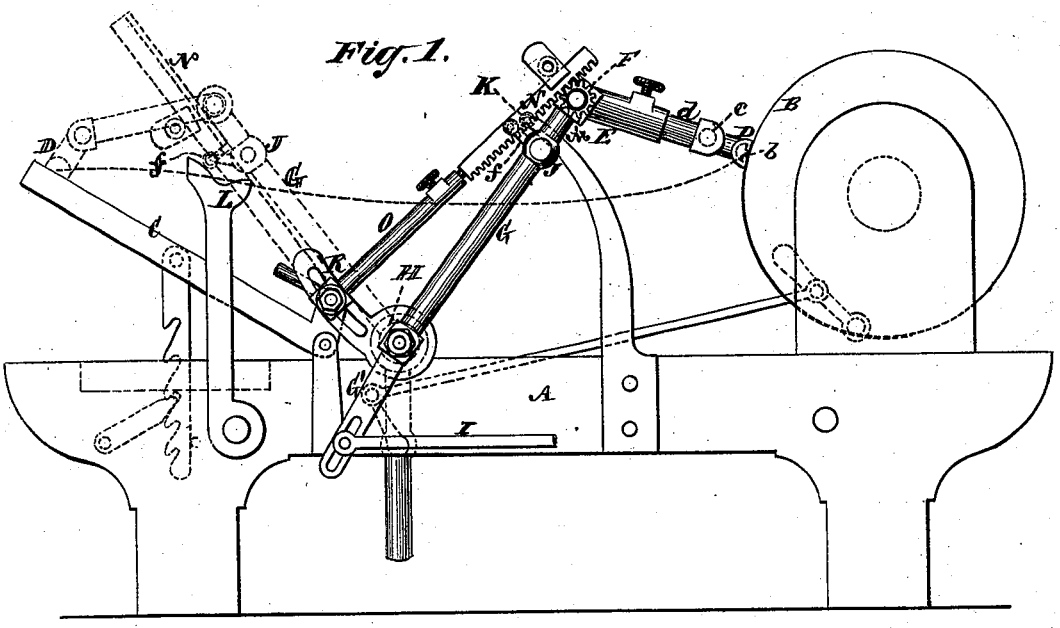


Fig. 2.

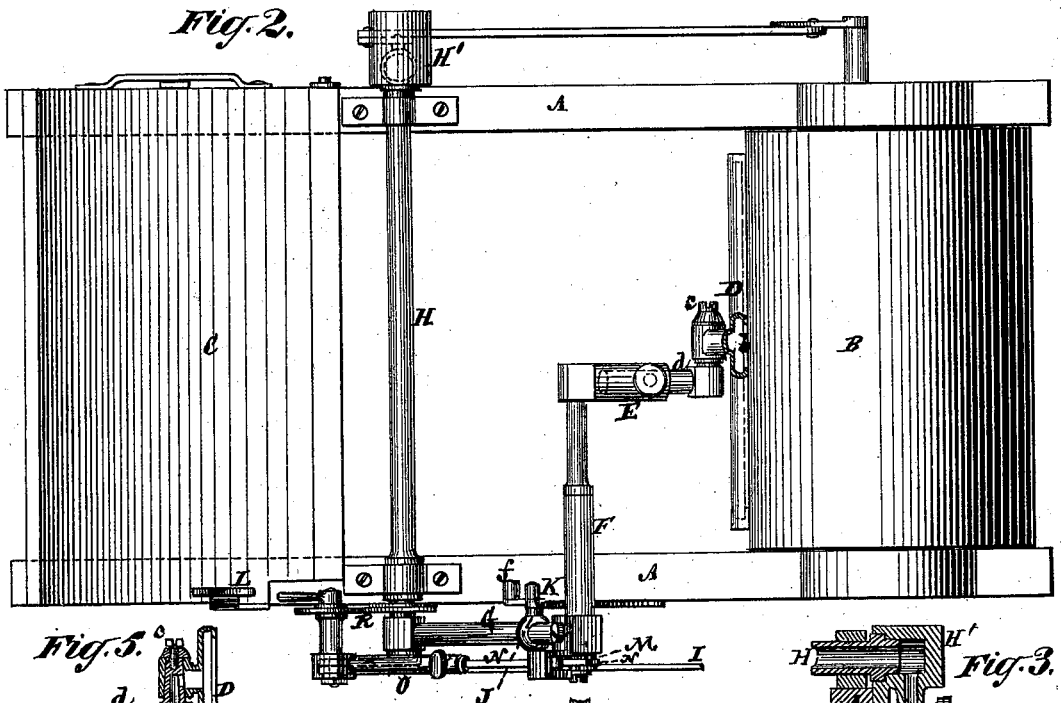


Fig. 5.

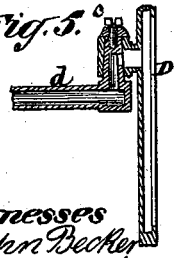


Fig. 4.

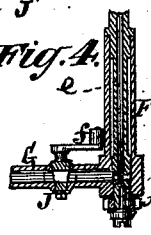
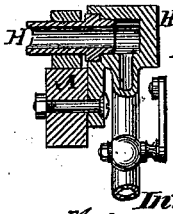


Fig. 3.



Witnesses

John Becker

Fred. Haynes

Inventor

James Hird

by his Attorneys

Brown & Allen

UNITED STATES PATENT OFFICE.

JAMES HIRD, OF BISHOPSTOWN, ENGLAND.

IMPROVEMENT IN SHEET-DELIVERY APPARATUS FOR PRINTING-PRESSES.

Specification forming part of Letters Patent No. **209,683**, dated November 5, 1878; application filed June 8, 1878; patented in England, March 31, 1877.

To all whom it may concern:

Be it known that I, JAMES HIRD, of Horfield Lodge, Berkeley Road, Bishopstown, in the county of Gloucester, England, have invented certain new and useful Improvements in Sheet-Delivery Apparatus for Printing-Presses, of which the following is a description, reference being had to the accompanying drawing, which forms part of this specification.

This invention relates to pneumatic delivery apparatus for delivering printed sheets of paper, one sheet at a time, from printing-presses, in which a vacuum or suction is produced to cause the sheet of paper, through the instrumentality of a vibrating conveying device, to be lifted and delivered from the press by atmospheric pressure on its one side as against a vacuum on the other side of the sheet.

The invention consists in a certain combination of devices, whereby the desired result is obtained in a perfect and advantageous manner.

Figure 1 represents a side elevation, and Fig. 2 a plan, of such parts of a cylinder printing-press, with my improved sheet-delivery apparatus applied, as will enable me to describe the invention. Figs. 3, 4, and 5 are mainly sectional views of certain details pertaining to the pneumatic sheet-delivery apparatus.

A is the main frame, which may be of any suitable construction. B is the cylinder of the press, from which the printed sheet is required to be taken and to be deposited on a receiving-board, C. D is the suction mouth-piece of the pneumatic apparatus, which takes the sheet from the cylinder B and conveys or transfers it to the receiving-board C. Said mouth-piece is here represented as operating from above, but it may be arranged to operate from below, the cylinder B. This mouth-piece consists of a hollow bar, having one or more openings, *b*, on its face, and constructed so that when in contact with the sheet on the cylinder B it extends to a greater or less extent throughout the length of said cylinder. Said mouth-piece is fitted by a swivel, *c*, to a telescopic tube, *d*, in a mouth-piece socket, E, which in its turn is fitted by a tube, *e*, capable of turning, and arranged at right angles, or thereabout, to the tube *d*, within a sleeve, F, that in the arrangement here represented projects in an outward direction toward the side of the machine. This sleeve F, formed on or rigidly connected to the upper end of a hollow lever and radial arm, G G′, capable of being rocked to and fro at or near the side of the machine about an axis the center of which is a hollow cross-shaft, H, with one end of which said hollow lever communicates. The opposite end of the shaft H connects with an exhaust box or device, H′, from which the air is exhausted by means of an air-pump or other suitable device.

The mouth-piece D is required to press upon the edge of the printed sheet when the latter has to be removed from the surface of the cylinder B; and connected with the radial arm G′, preferably by adjusting means to regulate the stroke, is a rod, I, driven by gear or devices connected with the press, for vibrating or rocking said arm G′ and the hollow lever G, to take the sheet from the cylinder B to the receiving-board C, and to return said transferring devices back to their normal position.

J is a cock or valve in the hollow lever G. This valve has a lever, *f*, that, accordingly as it is brought into contact with either of two stops, K L, by the vibration of the hollow lever G, admits or cuts off air from the sheet being taken up and deposited.

Means are also provided, as hereinafter described, for adjusting the apparatus to adapt it to different-sized sheets of paper or cardboard.

The tube *e* of the socket E is arranged to extend through the sleeve F, (see Fig. 4,) and has fitted on its outer end a pinion, M, which gears into a rack, N. This rack is adjustable in or out of or on a holder, O, which is adjustably fitted to an arc, R, on the receiving-board side of the shaft H.

Air having been exhausted from the shaft H, the mouth-piece D, being in contact with the cylinder B, or paper thereon, and the valve J, opened by its lever *f*, being brought in contact with the stop K, as shown by full lines in Fig. 1, there is a rush of air toward the opening *b* of the mouth-piece, which causes

the paper then hanging on the cylinder B to engage with said mouth-piece. The hollow lever G is then moved or rocked to bring the mouth-piece D up against the receiving-board, as shown by dotted lines in Fig. 1, and in or at the close of such movement the valve J is reversed or closed by its lever *f* striking the stop L, which causes the paper to fall onto the board, the force of the current or suction being such that, in order to keep the sheet onto or against the mouth-piece D, it is necessary to maintain the draft or suction, so that when the valve J is closed there is a diminished retaining-force, which is more or less assisted by unavoidable leakage at the mouth-piece, and the sheet consequently falls onto the receiving-board C. After this the motion of the hollow lever G, with its attachments, is again reversed, to bring the mouth-piece J up against the cylinder again. In this double movement of the lever G it will be observed that the tube *e* of the sleeve F is partly made to rotate alternately in reverse directions by reason of the gearing of the pinion M with the rack N, which latter is fitted to swing backward and forward with the lever G, and which rack N has its center of motion to one side of the lever G. Thus the mouth-piece D, traveling in common with the tube *d* and socket E, makes part of a revolution, or moves curvilinearly, as indicated by dotted line in Fig. 1, successively in reverse directions, to take the sheet from the cylinder and deposit it on the receiving-board, and subsequently to return to the cylinder, the swivel *c* serving to adjust the proper position of the mouth-piece. The arc R serves to regulate the position of the rack N; and the extension or contraction of the rack within or on its holder O, coupled with the adjustment of the tube *d* in the socket E, provides for adjusting the mouth-piece D to take sheets of paper of different sizes.

I claim—

The combination of the swiveling suction mouth-piece D, the telescopic tube *d*, the mouth-piece socket E, the sleeve F, the hollow vibrating arm or lever G, the hollow exhaust-shaft H, the pinion M, the rack N, the valve J, means for automatically opening and closing said valve, and the cylinder B and receiving-board C, of the press, essentially as specified.

JAMES HIRD.

Witnesses:
H. LEDINGHAM,
ARTHUR H. HUGHES.