4 Sheets—Sheet 1.

C. KAHLER.

Newspaper Folding-Machines.

No. 204,578. Patented June 4, 1878.

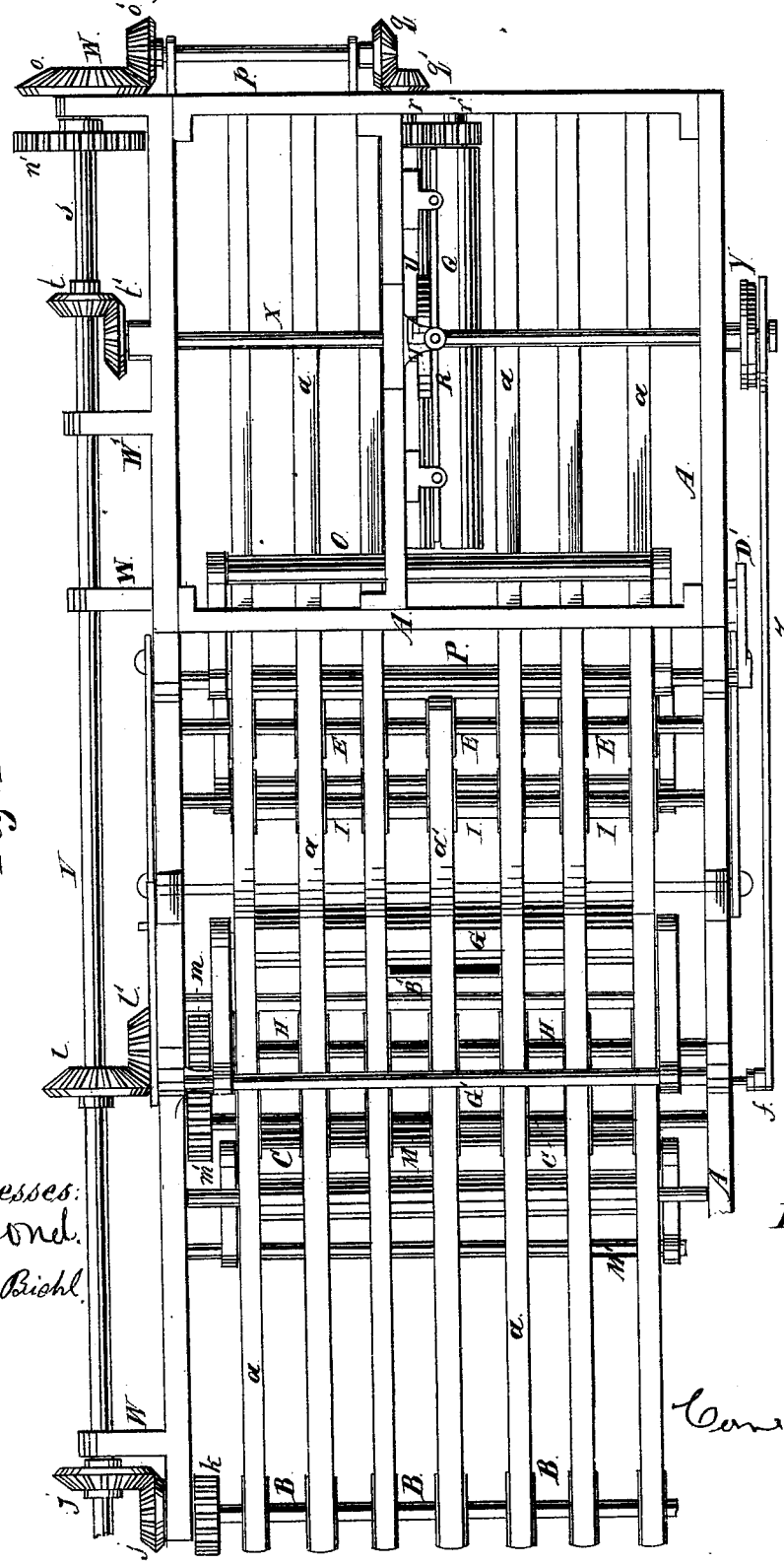

Fig. 1.

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Joseph Biehl.

Inventor:
Conrad. Kahler

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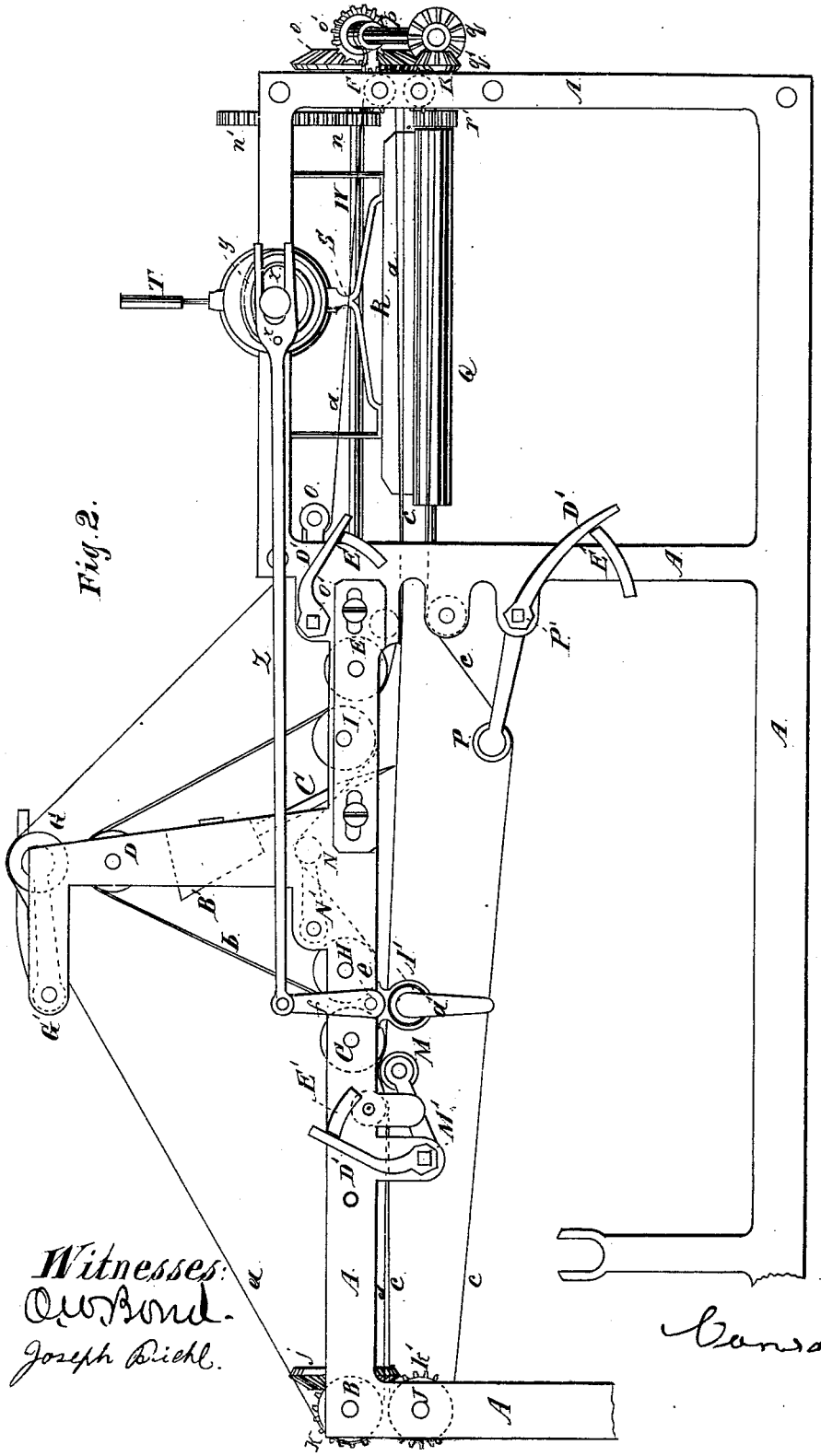
Fig. 2.



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4 Sheets—Sheet 3.

C. KAHLER.

Newspaper Folding-Machines.

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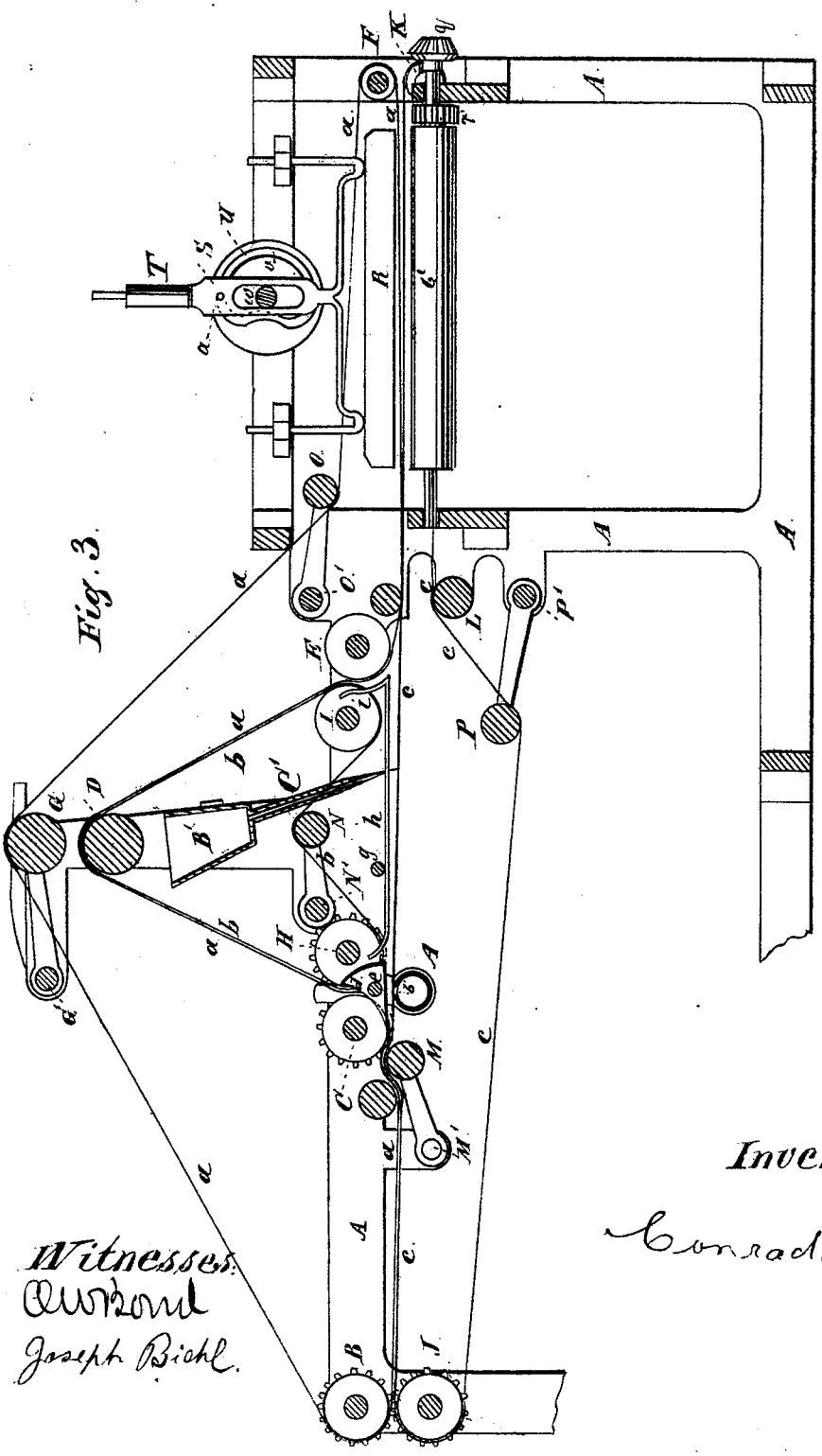

Fig. 3.

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Newspaper Folding-Machines.

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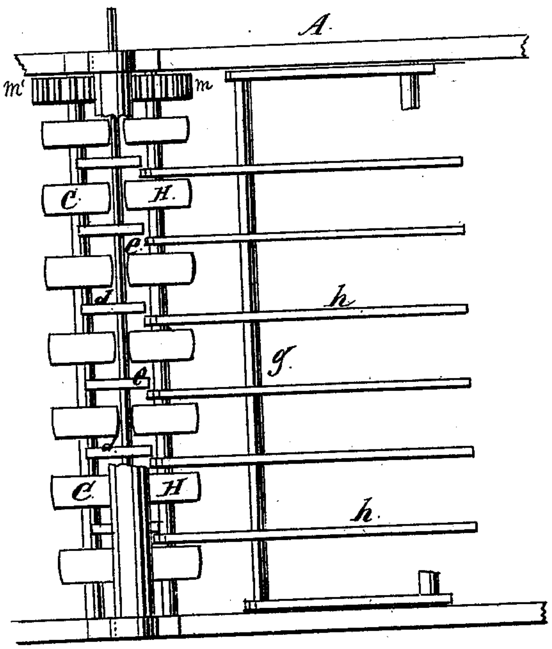


Fig. 4.

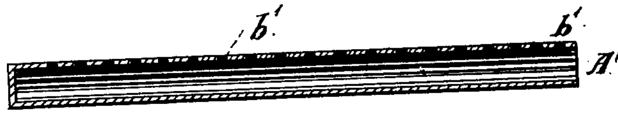
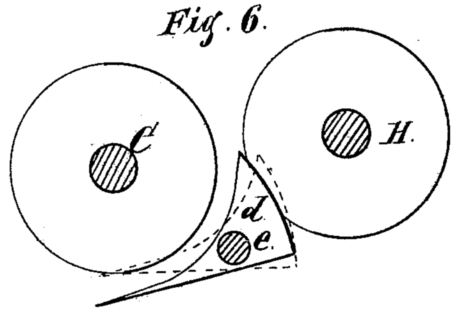


Fig. 5.

Fig. 6.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

CONRAD KAHLER, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN NEWSPAPER-FOLDING MACHINES.

Specification forming part of Letters Patent No. **204,578**, dated June 4, 1878; application filed February 25, 1878.

To all whom it may concern:

Be it known that I, CONRAD KAHLER, of the city of Chicago, Cook county, State of Illinois, have invented new and useful Improvements in Newspaper-Folding Machines, of which the following is a full description, reference being had to the accompanying drawing, in which—

Figure 1 is a top or plan view; Fig. 2, a side elevation, a portion of the frame-work being broken away; Fig. 3, a vertical longitudinal section; Fig. 4, a detail, showing the location of the switch and a portion of the tape-pulleys; Fig. 5, a detail of the blast-pipe; Fig. 6, a detail of the switch and pulleys, enlarged.

The object of this invention is to provide an attachment for web printing-presses, by which the paper, after passing the usual cutting-cylinders, may be separated into sheets or half-sheets, and these then placed one upon another before passing out of the tapes, without accelerating or checking the speed of any of the movements; and its nature consists in providing an upper and lower set of continuous tapes, having in the upper set an intermediate elevation, the several sets operated by suitable pulleys and rollers, and so arranged that the upper set of continuous tapes and intermediate short tapes will elevate alternate half-sheets and deliver them on top of the other half as they are carried forward by the lower set of continuous tapes in a direct line, and the two sheets or half-sheets thus brought together be carried between the upper and lower set of continuous tapes over the folding-rollers; in providing a paste-pot and a pasting-pen, so arranged as to operate continuously, allowing the paste to flow on either of the half-sheets or sheets carried by the upper or lower set of continuous tapes during the passage of such sheet; and in the several parts and combination of parts hereinafter set forth as new.

In the drawings, A represents the frame-work; B C, the receiving-pulleys for the upper set of continuous tapes; D, the roller for elevating the tapes; E F, the delivery-pulleys for the upper set of continuous tapes; G, the tightener; H I, the pulleys for the intermediate set of short tapes; J K, the pulleys for the lower set of continuous tapes; L, the roller or preventing the contact of the lower tapes with the frame; M N O P, the tape-tighteners; M′ N′ O′ P′, the tape-tightener shafts; Q, the folding-rollers; R, the folding blade or knife; S, the support for the blade; T, the socket in which the upper end of the frame S slides; U, the head or cam; V, the main driving-shaft; W, the driving-shaft supports; X, the driving-shaft for operating the folding-blade and the devices for adjusting the blast-pipe or the switch; Y, the head or cam on the end of the shaft X; Z, the rod; A′, the blast-pipe; B′, the paste-pot; C′, the pasting-pen; D′, the levers for operating the tape-tighteners; E′, the stops for supporting the ends of the levers D′; *a*, the upper set of continuous tapes; *b*, the short set of tapes; *c*, the lower set of continuous tapes; *d*, the switch-heads or switch; *e*, the switch-shaft; *f*, the switch-crank; *g*, the cross bar or rod for supporting the guide-rods; *h*, the guide-rods; *i*, the curved end of the guide-rods *h*, forming a means for directing the descent of the sheet from the elevating portion of the tapes; *j j′ k k′*, the gear-wheels for driving the pulleys B J; *l l′ m m′*, the gear-wheels for driving the pulleys C H; *n n′*, the wheels for revolving the shaft *s*; *o o′*, the wheels for operating the shaft *p*; *p*, the shaft for driving the folding-rollers Q; *q q′ r r′*, the gear-wheels for driving the folding-rollers; *s*, the shaft for communicating motion to the shaft X; *t t′*, the wheels for driving the shaft X; *u*, the friction-roller in the blade-support S; *v*, the cam-groove in the head U; *w*, the slot or opening in the support S, to permit of its vertical movement on the shaft X; *x*, the friction-roller in the rod Z; *y*, the cam-groove in the head Y; *z*, the slot or opening in the end of the rod Y, to permit its forward and back movement on the shaft X; *a′*, the crank for opening and closing the blast-pipe; *b′*, the openings in the blast-pipe.

The frame A may be of any construction suitable for the purpose of supporting the tape-operating devices and the folding mechanism. In some form of presses the inner portion of the frame, or that portion which receives the paper from the press, may be the frame of such press, the frame for the folding devices being made separate and attached thereto.

The pulleys B are mounted on a suitable

shaft having its bearings in the frame A, and directly under these pulleys B are located, on a suitable shaft, the pulleys J. These pulleys B J are located close to the cutting-cylinder, in such position as to receive the paper directly from such cylinder. The pulleys C, E, H, and I are mounted on suitable shafts having their bearings in the frame A, their location being in the central portion of the frame. As shown, the pulleys C E are in the same horizontal plane as the pulleys B, and the pulleys H I are located a little higher. The pulleys F are, as shown, of a less diameter than the pulleys B, and are mounted on a suitable shaft at the delivery end of the press. Beneath rollers F are located the pulleys K, of the same diameter as pulleys F. Two separate sets of pulleys K are used, mounted on two shafts, so as to leave an opening between the inner ends of the pulleys, to permit of the operation of the folding-rollers. A sufficient space for the tapes is to be left between the pulleys B J, C H, I E, and F K. The roller D has its bearings in suitable standards on the frame A, the roller being elevated some distance above the frame, so as to cause the elevating-tapes to carry the sheet the proper distance to lay it on the under sheet with their edges in line. Above this roller D, and in line therewith, is located the tightener G, supported by means of suitable arms from the shaft or rod G′, the bearings for the roller to revolve being in such arms at the end.

The upper set of continuous tapes *a* pass from the pulleys B under the pulleys C, up over the roller D, down under the pulleys E, to and under the pulleys F, thence back over the tightener G to the pulleys B.

The intermediate set of short tapes *b* pass from the pulleys H up over the roller D, down over the pulleys I, back to the pulleys H, so that they will have the same line of travel in elevating the sheets as the elevated under portion of the upper set of continuous tapes.

The lower set of continuous tapes *c* pass from the pulleys J through to the pulleys K, over said pulleys, and back over the roller L to the pulley J. The roller L only serves the purpose of preventing the tapes from coming in contact with the cross-bar which supports one end of the folding-rollers.

The several sets of tapes are tightened by means of suitable tighteners M N O P, supported on the shafts M′ N′ O′ P′ by means of arms secured at one end to the respective shafts, in the other ends of which arms the tighteners are properly journaled. The several tighteners are operated by means of suitable levers D′ attached to their respective shafts.

The tightener M is so arranged as to operate on both the upper and lower sets of continuous tapes, and its location is such with reference to the pulleys C that as the forward edge of the sheet comes between them the sheet will be broken at the point where it has been cut by the cutting-cylinders, thereby separating the sheet into half-sheets before the whole sheet has passed from the cutting-cylinders, and, by reason of the faster travel of the carrying-tapes than the cutting-cylinder, the half-sheet carried by such tapes will be carried ahead of the half-sheet from which it is broken a sufficient distance to enable the switch or blast-pipe to direct each sheet or half-sheet to its proper line of travel.

The folding-rollers Q are mounted on suitable shafts, having their bearings in cross-bars of the frame A, and are so located relative to each other as to leave a space between them for the passage of the folding-blade and sheets. The folding-blade R, as shown, is attached to arms secured to the lower end of the support or bar S, which arms move in suitable guideways located on a cross-bar of the frame A. The support or bar S is provided with a friction-roller, *u*, which operates in a cam-groove, *v*, in the head U, which head is permanently secured to the shaft X, so that as the shaft is revolved it will, through the head U, cam-groove *v*, and friction-roller *u*, give the folding-blade R a vertical reciprocating movement. The upper end of the support or bar S is held by, and moves up and down in, the socket T. The folding-rollers and vertically-moving folding-blade are located in the delivery end of the frame, and their arrangement is such that when the sheets are brought into position beneath the folding-blade such blade will fold the sheets at the proper place.

As shown, the several mechanisms are operated from the main driving-shaft V, which shaft has its bearings in the supports or brackets W on the side of the frame-work. This shaft V is provided with suitable gear-wheels for operating the several parts through other gear-wheels, the gear-wheels *j j′* and *k k′* driving the pulleys B J, the gear-wheels *l l′ m m′* driving the pulleys H C, the gear wheels *n n′* driving the shaft *s*, which shaft is located above the shaft V in suitable arms or brackets on the frame A, and, through the miter-wheels *t t′*, driving the shaft X, the miter-wheels *o o′* driving the shaft *p*, which shaft has its bearings in suitable arms or brackets on the end of the frame A, and, through the wheels *q q′ r r′*, driving the folding-rollers.

The rollers D L and pulleys E I F K are driven by their respective tapes; but, in order that the pulleys F and K may move in unison, they may be provided with suitable gear for this purpose. The head Y is permanently secured to the end of the shaft X, and is provided with a cam-groove, *y*, in which the friction-roller *x* on the rod Z operates, for the purpose of moving the rod back and forth.

A switch or a blast-pipe may be used for directing the edge of the sheet to its proper set of tapes. Both devices are shown in the drawings; but in practice only one is to be employed.

When the blast-pipe A′ is used it is located below the pulleys C H, in such position that a stream of air will pass through the openings *b′* in said pipe against the edge of the paper

and raise or direct it to the elevating-tapes *a b*. This pipe A′ is provided with a plate or shut-off, operated through the crank *a′*, which crank is attached to or connected to the end of the rod Z, so that as this rod is carried forward and back by the cam-groove *y* and friction-roller *x* it will operate the crank *a′* to automatically open and close the openings *b′* for the purpose of controlling the blast, so as to cause the sheets to be elevated or to pass in a straight line, as required.

When a switch is used it is located close to the pulleys C, between the pulleys C and H. In the form shown, the heads or switch *d* are secured to a shaft, *e*, which has its bearings in the frame; and to one end of this shaft *e* is secured one end of the crank *f*, the other end of which is connected with the rod Z, so that as such rod is operated by the cam-groove and friction-roller it will move the crank *f* to automatically throw the switch to direct the half-sheets to the elevating-tapes or the direct-acting tapes, as required.

Below the pulleys H I is a series of guide-rods, *h*, permanently secured to the cross-rod *g*, attached to the main frame. These guide-rods *h* are so located and arranged relative to the lower set of continuous tapes *c* as to assist such tapes in carrying the sheet. The ends *i* of these rods *h* are curved up, and so arranged with relation to the tapes *a b* as to insure the passage of the sheet carried by such tapes below the roller E.

The paste-pot B′ is secured in any suitable manner below the roller D, and is located centrally. This pot, as shown, is provided with a pasting-pen, C′, which extends down so as to allow the paste to flow onto the center of the sheets carried by the tapes *c;* but such pen might be arranged to allow the paste to flow onto the center of the sheets carried by the tapes *a b*.

Rollers are shown near each of the pulleys C E. Such rollers may be used, if desired; but they are not absolutely essential.

In use, the paper passes from the cutting-cylinders directly to the pulleys B J between the tapes *a c*, and is carried by such tapes. When the edge of the sheet reaches the tightener M it will be broken by the action of such roller, as before described, at which time the blast-pipe or the switch will be in the proper position to direct the edge of the forward sheet, so that such sheet will be elevated by the tapes *a b*, and be carried by them up and over the roller D and down on the opposite side. This sheet will be carried ahead of the other half of the sheet by the faster travel of the tapes, as described; and as soon as the rear edge of the sheet being elevated has passed the pulleys C, the switch or blast-pipe will be changed, so as to allow the next half-sheet to pass in a direct line on the tapes *c* between such tapes and the guide-rods *h*, and each alternate sheet will thus be acted upon by the tapes *a b* and tapes *c*. During the passage of the sheets carried by the tapes *c* the pen C′ will deposit the required amount of paste for uniting the two half-sheets when brought together. These tapes *a b c* are so regulated that as the forward edge of sheet carried by the tapes *c* reaches the pulleys E, the forward edge of the sheet elevated by the tapes *a b* will also be at the same point; and as the sheets are carried along by the action of the tapes *a c* under the pulleys E, the half-sheet which has been elevated will be laid evenly on top of the one which has been carried in a direct line, and the two half-sheets thus brought together will be carried between the tapes *a c* to the folding-blade or knife R, which, as the sheets are brought thereunder, will descend by the action of the cam-groove V on the friction-roller *u* of the support S and force the two half-sheets between the folding-rollers Q, where the first fold will be given them, from which rollers they are to be directed between other rollers, (not shown,) and the required amount of folding given them.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a printing-press delivery and folding apparatus, the combination of the tapes *a c*, leading directly from the cutting-cylinders, with the interposed tapes *b*, folding-blade, and rollers Q, whereby the sheets are carried, overlaid, and extended over said folding-rollers before leaving the leading-tapes, substantially as specified.

2. The combination of the tapes *a c*, the pulleys C, and tightening-roller *m*, arranged to operate as a sheet-breaker, with a switch and intermediate tapes *b*, substantially as specified.

3. The combination of the tapes *a c* and intermediate tapes *b* with the paste-pot B′, arranged for continuous operation, and operating on the center of the sheets or half-sheets that pass in a direct line, substantially as specified.

4. The combination of the support S, having slot *w* and roller *u*, the cam U, with groove *v*, shaft X, and the socket T, for giving the blades a vertical movement, substantially as and for the purpose set forth.

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