

(No Model.)

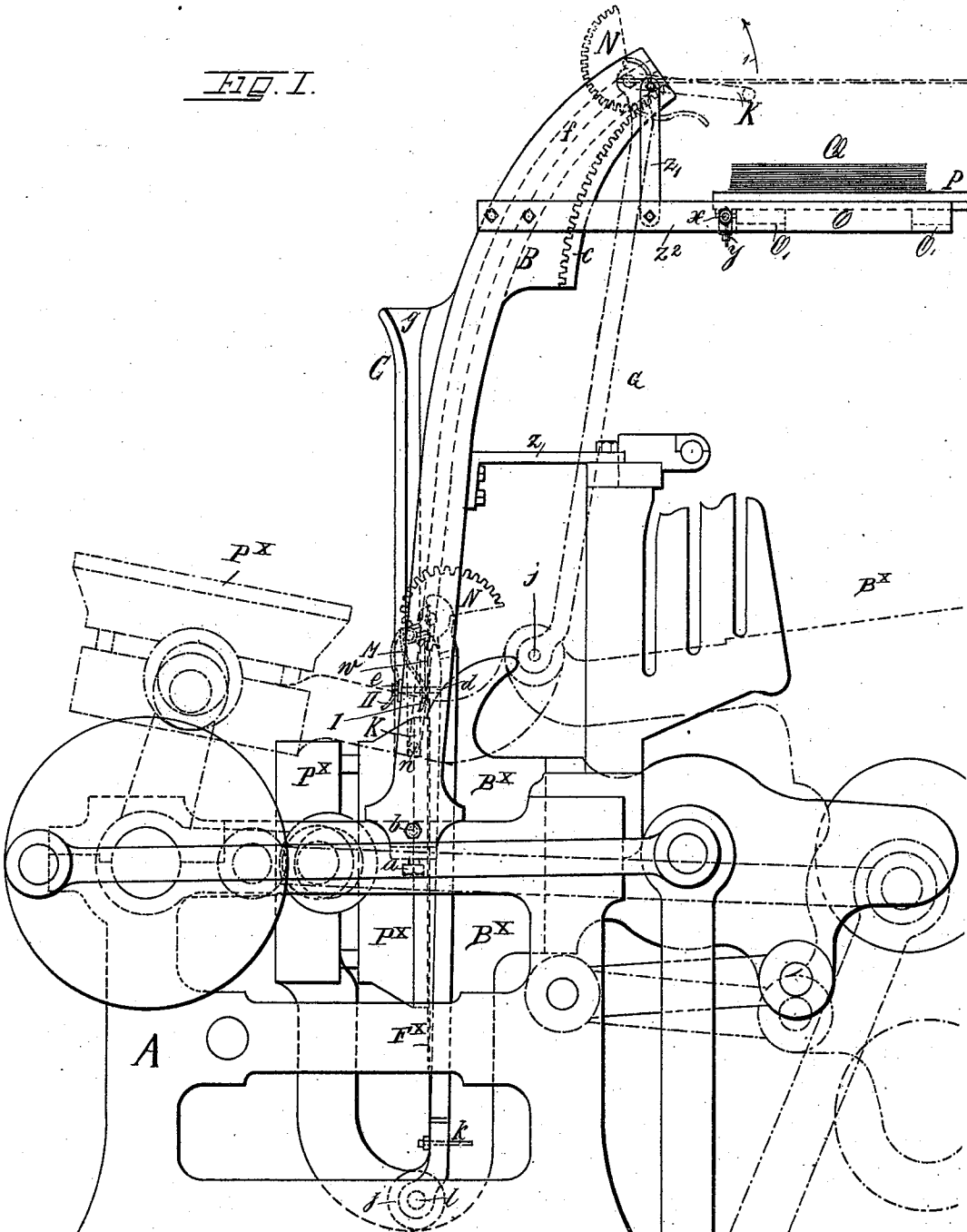
5 Sheets—Sheet 1.

K. ALMÉN.
PRINTING PRESS.

No. 486,365.

Patented Nov. 15, 1892.

FIG. 1.



Witnesses:
H. G. Dieterich
C. H. Sommers,

Inventor:
Karl Almén,
By Lewis M. M.
Atty.

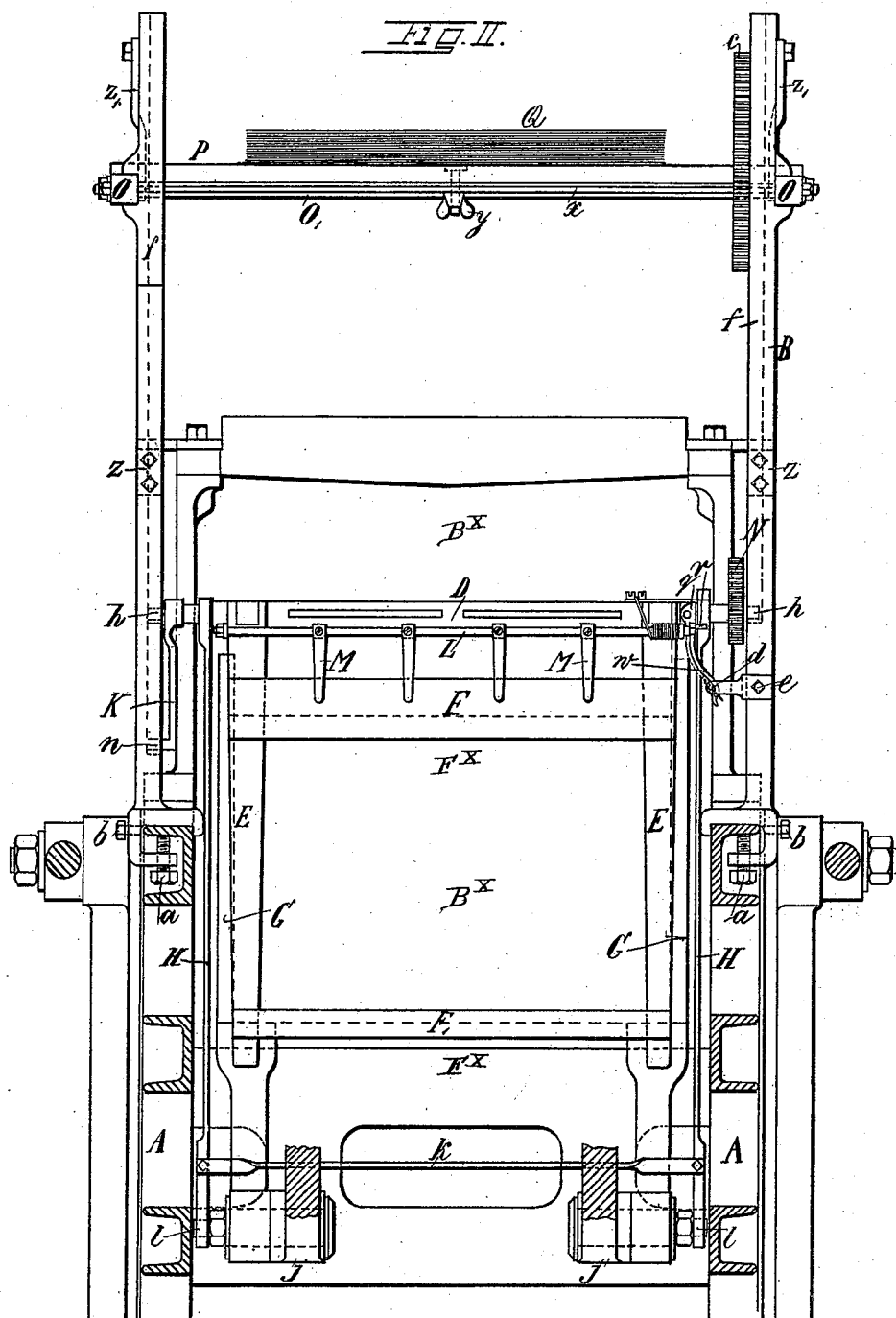
(No Model.)

5 Sheets—Sheet 2.

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No. 486,365.

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Witnesses:

H. L. Dieterich
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Inventor:

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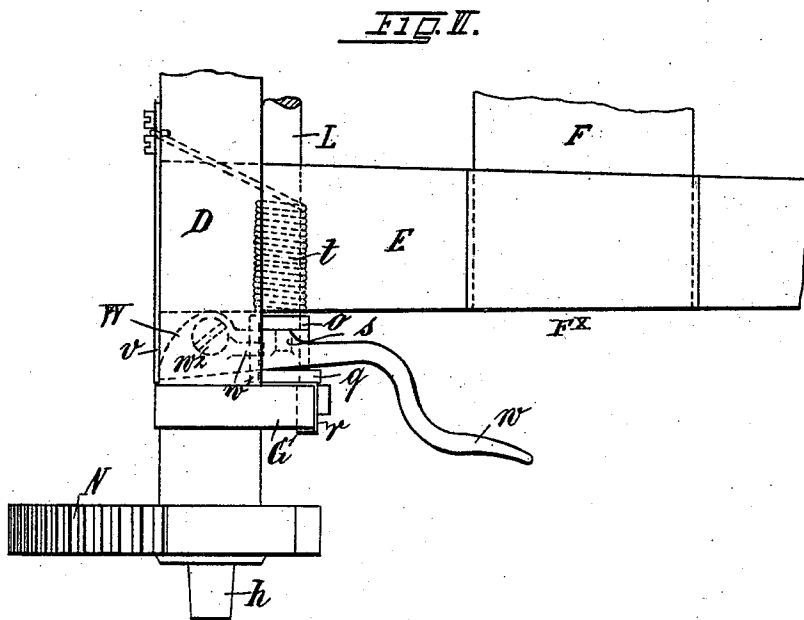
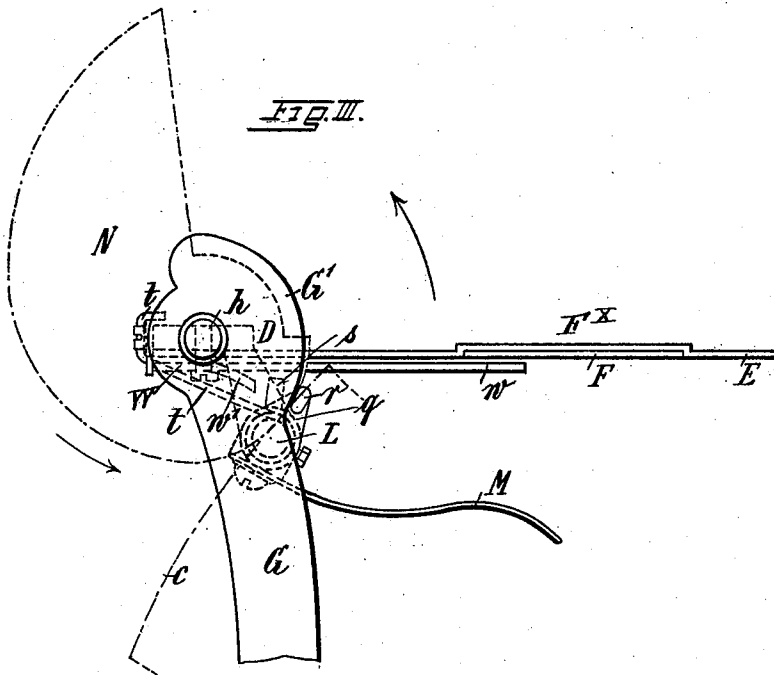
(No Model.)

5 Sheets—Sheet 3.

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PRINTING PRESS.

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Witnesses:

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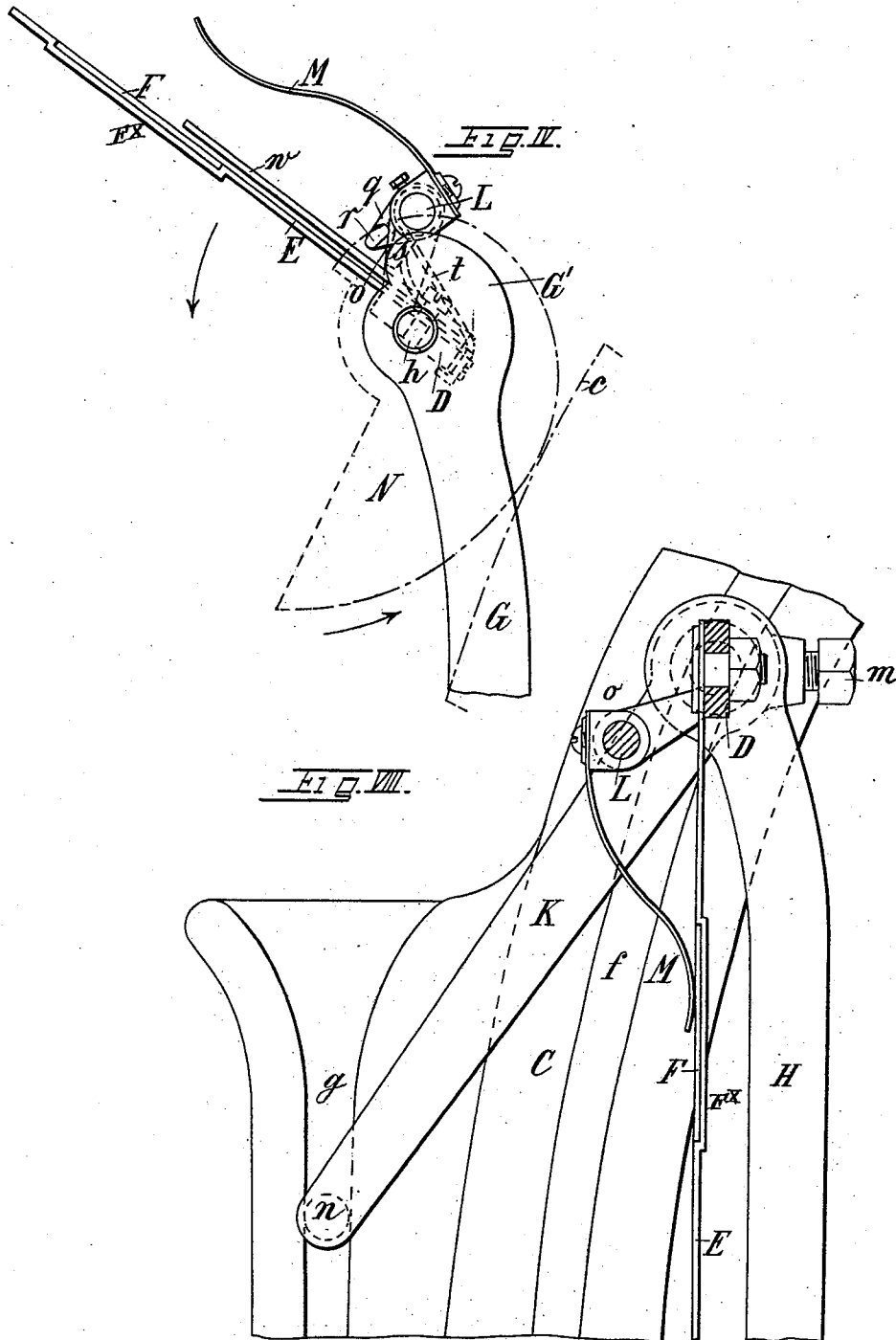
(No Model.)

5 Sheets—Sheet 4.

K. ALMÉN.
PRINTING PRESS.

No. 486,365.

Patented Nov. 15, 1892.



Witnesses:

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(No Model.)

5 Sheets—Sheet 5.

K. ALMÉN.
PRINTING PRESS.

No. 486,365.

Patented Nov. 15, 1892.

FIG. V.

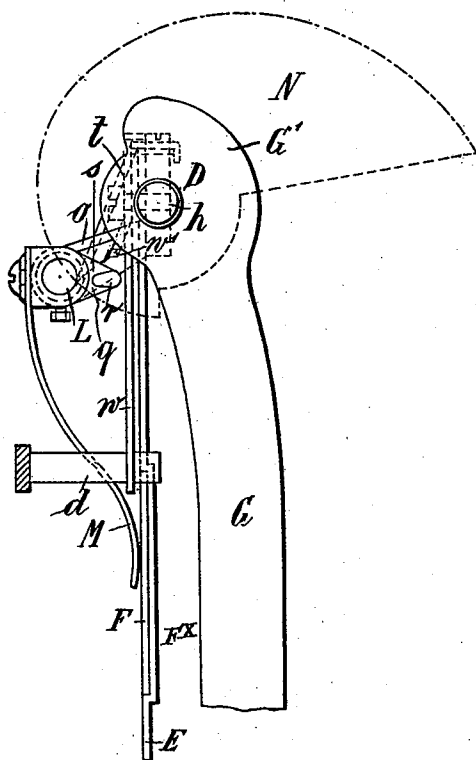
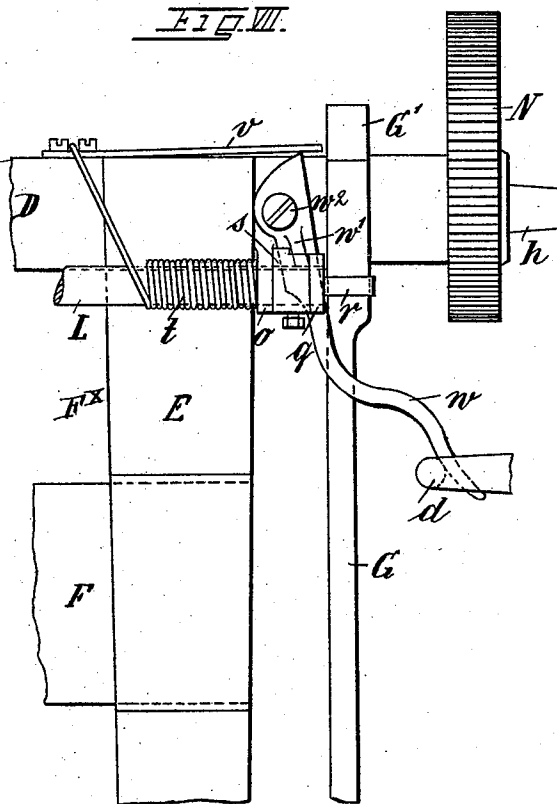


FIG. VII.



Witnesses:

H. G. Dietrich
J. H. Sommers,

Inventor:

Karl Almén,
By Henry M. M. Atty:

UNITED STATES PATENT OFFICE.

KARL ALMÉN, OF STOCKHOLM, SWEDEN, ASSIGNOR TO F. M. WEILER'S
LIBERTY MACHINE WORKS, OF BERLIN, GERMANY.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 486,365, dated November 15, 1892.

Application filed October 14, 1891. Serial No. 408,701. (No model.) Patented in Germany August 1, 1891, No. 62,547; in Belgium August 1, 1891, No. 95,871, and in Austria-Hungary November 23, 1891, No. 36,742 and No. 61,710.

To all whom it may concern:

Be it known that I, KARL ALMÉN, a subject of the King of Sweden and Norway, residing at Stockholm, Sweden, have invented certain new and useful Improvements in Printing-Presses, (patented in Germany August 1, 1891, No. 62,547; in Belgium August 1, 1881, No. 95,871, and in Austria-Hungary November 23, 1891, No. 36,742 and No. 61,710;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The invention relates to printing-presses, and particularly to delivery mechanism for that class of presses in which the bed and platen have a reciprocal motion, whereby the printed sheets are removed from between said bed and platen and deposited upon the delivery-table; and my said invention has for its object the combination, with the flier, of the grippers and mechanism for actuating these devices.

The invention has for its further object a construction whereby the movements of the flier are controlled by the movements of the platen and bed, while the grippers are controlled by the movements of the flier.

To these ends the invention consists in the combination, with the flier of a printing-press, of grippers and mechanism for operating the flier and grippers, as will now be fully described, reference being had to the accompanying drawings, in which I have illustrated my improvements as applied to the well-known "Liberty" press. In said drawings, Figure 1 is a side elevation of so much of a printing-press as is necessary to illustrate the application thereto of my invention, the flier being shown in its position relatively to the platen and bed when an impression is about to be taken and in dotted lines when the printed sheet is being or after being delivered to the receiving-table. Fig. 2 is a vertical section thereof taken on a line between the platen and bed in front of the flier. Figs. 3, 4, and 5 are detail views illustrating the relative positions of the flier and gripper on

their return movement after having delivered a printed sheet. Fig. 6 is a detail top plan view, and Fig. 7 a detail elevation of a portion of the flier-frame, and Fig. 8 is a sectional elevation of the flier and a portion of one of the connecting-rods and guide-standards.

Similar letters of reference indicate like parts wherever such may occur in the above-described figures of drawings.

In the drawings I have shown my invention in its application to a well-known construction of printing-press, the combined flier and grippers being detachably connected with the platen and bed-pivot, while the guides and part of the operating mechanism for the flier and grippers are detachably connected with the frame of the press, and they are so constructed as to be readily applied to any other construction of printing-press in which the platen and bed have a reciprocal movement.

The guides for the flier consist of two standards B and C, whose upper ends are curved in the direction of the delivery-table P, which latter is supported from said standards and is detachably secured to its supporting-arms z^2 by means of a screw and thumb-nut y , Figs. 1 and 2, said supporting-arms z^2 being bolted to the upper end of the standards and suitably braced by means of brace-rods z' , Fig. 1. One of the standards—as, for instance, the standard B—is provided at its upper end with a toothed sector c , and both standards have a guide-groove f extending the full length thereof, the standard C having an additional guide-groove g , that does not extend the full length thereof. (See Figs. 1, 2, and 8.)

The platen P^x and the bed B^x are hinged or pivoted together at j in a well-known manner, the pivot-pins l being made sufficiently long to project some distance from one side of the hinge-joints j .

The flier F^x consists of a rectangular frame composed of the side bars $E E$, secured to a cross-bar D , and the cross-bars $F F'$, secured to the side bars $E E$, as shown in Fig. 2. The cross-bar F is of greater width than the like bar F' and serves as a bearing for the grippers M , which are composed of spring-fingers secured to a shaft L , that has its bearings in radial arms o , projecting from the cross-bar

D. A spring *t*, Figs. 2, 6, and 7, wound on said shaft L and having one of its ends secured thereto and the other to the cross-bar D, tends to turn the shaft in the direction of the flier to keep the grippers M in contact with the cross-bar F thereof. The cross-bar D, that supports the flier, has a journal *h* at each end projecting into the groove *f* in the standards B C and has mounted on said journals one end of a connecting-rod G and H, respectively, whose opposite ends are pivoted on the hinge or pivot pin *l* of the platen and bed-arms of the press, as shown in Fig. 2. The connecting-rod G on the side of the standard B has a cam-shaped head G', (more clearly shown in Figs. 3, 4, and 5 for purposes presently to be explained,) and said rods G and H are braced together by a cross-brace *k*, Fig. 2, at or near their lower end. It will be readily understood that the rods G and H may be pivotally connected with the platen or bed at any other suitable point than the hinge-pin *l*; but this is the most convenient means of connection that I know of.

A pawl W, provided with a short arm *w'* and a longer arm *w*, is pivoted on a pin *w*² to one end of the cross-bar D. The free end of a flat spring *v*, secured to the back of the bar, has bearing on said pawl and tends to maintain the same in a normal position. The gripper-shaft L has at its end proximate to the standard B a crank-arm *q*, whose pin *r* is adapted to ride on the cam-head G' of the connecting-rod G, as hereinafter explained. The shaft L also carries a radial arm or tappet *s*, adapted to be engaged by the short arm *w'* on the pawl W, said radial arm or tappet being formed on a collar adjustable on shaft L by means of a set-screw. That journal *h* of the cross-bar D which lies in the groove *f* of standard B carries a toothed segment N, that is adapted to gear with the toothed sector *c* on said standard, while that journal *h* of said cross-bar which lies in the groove *f* of the standard C carries a radial guide-arm K, the free end of which is provided with a pin *n*, that projects into the shorter groove *g* of said standard C.

The operation of the described devices is as follows: Let it be supposed that a printed sheet has just been dropped by the flier F^x onto table P, the flier and grippers being in the relative positions shown in Figs. 1 and 3 in dotted lines and full lines, respectively, and a fresh sheet laid on the platen P^x, so as to overlap the outer or left-hand edge thereof. The connected arms of said platen P^x and of the bed B^x now descend, carrying the connecting-rods G and H, and consequently the flier and the grippers connected therewith, along with them. The pin *r* on radial arm *q* of shaft L is now bearing on the cam-face of head G' of connecting-rod G. The segment N is in gear with the sector *c*, while the short arm *w'* on cam W is out of engagement with the radial arm or lug *s* on shaft L, which latter is held against the stress of its

spring by the cam-head G' in a position in which the gripper-fingers are held out of engagement with their bearing-bar F of the flier-frame. Finally, the pin *n* on radial arm K is out of engagement with the groove *g* in standard C. As the platen and bed descend the segment N revolves on the sector *c*, and the pin *r* of crank *q* on shaft L rides over the cam-face of head G' of standard G, the flier F^x revolving simultaneously in the direction of the arrow, Figs. 1 and 3. Inasmuch as the short arm *w'* of pawl W is not in engagement with the radial arm or lug *s* on shaft L, said pawl under the stress of its spring lies in its normal position with said short arm in front of or below the radial arm *s* on shaft L. (See Figs. 3 and 6.) As soon, however, as the pin *r* of radial arm *q* on shaft L moves out of contact with the cam-face on head G' of connecting-rod G, during the further downward movement of the said rod and the rod H, the said radial arm *s* will bear upon the short arm *w'* of pawl W, as shown in Fig. 4, thereby locking the grippers M against motion toward the flier under the stress of the spring *t*, acting on the gripper-shaft L. As the segment N rolls over the sector *c*, the flier F^x is turned from a horizontal position in rear or to the right of the standards B C to a nearly-vertical position in front or to the left of said standards, at which time the said segment N will have moved out of gear with the sector *c*, as shown in Fig. 5, and when this takes place the pin *n* on arm K of cross-bar D will enter the groove *g* in standard C. During the further downward movement of the connecting-rods G and H the flier will move in a vertical plane, being guided in the vertical portion of the grooves *f* and by the vertical groove *g*, and its movement is so timed as that it will lie between the platen and bed of the press about the time they come into parallelism for the taking of an impression, the flier bearing upon the sheet on the platen. At the moment the flier comes in contact with the platen and paper thereon the long arm *w* of the pawl W comes in contact with the fixed abutment *d*, Figs. 2, 5, and 7, thereby turning the said pawl against the stress of its spring, Fig. 7, and moving the short arm *w'* out of engagement with the radial arm or tappet *s* on shaft L and releasing the same, said shaft being turned under the stress of its spring *t* to move the grippers M, which press and hold the paper to the cross-bar F of the flier, at or a little after which the platen P^x and bed B^x are brought onto the intervening sheet and the impression is taken, the flier moving synchronously with said platen and bed.

Inasmuch as the movements of the flier are not only timed to the movements of the platen and bed, but correspond in speed therewith, a displacement of the sheet on the platen after having been seized by the grippers cannot take place. After the impression is taken the platen and bed move away from each other, the flier ascending vertically at the

same speed, thereby lifting the sheet gradually from the platen. This vertical movement of the flier continues until the segment N moves into engagement with the sector c, at which moment the pin n on arm K of cross-bar D moves out of its shorter guide-groove g. As the flier is turned from left to right and from a vertical into a horizontal position the crank-pin r comes in contact with the cam-face on head G' of connecting-rod G and rides along the same, and when the flier is about to assume a horizontal position the shaft L will have been turned sufficiently by the action of said cam-face on the crank-pin to release the printed sheet, which drops onto table P.

As shown in Figs. 1 and 2, the standards B and C are detachably secured to the press-frame by means of bolts a and b, so that they can be readily attached to or detached from the press.

Inasmuch as the flier is connected directly to and is operated by the bed and platen, such operating mechanism as would otherwise be necessary to actuate the flier is dispensed with, so that the mechanism of the press is not rendered more complex, and as the standards B and C and connecting-rods G and H are readily connected with the frame of a printing-press and the bed or platen or the hinge-pin thereof my combined flier and gripper may be properly considered as an attachment for printing-presses.

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

1. In a printing-press, the combination, with a reciprocally-movable platen and bed, a flier provided with a gripper-bearing reciprocating vertically between said platen and bed, a toothed segment connected with the flier, a crank-shaft having its bearing on the flier, grippers secured to the crank-shaft, and a tension device operating on said shaft to hold the grippers in contact with their bearing, of a fixed toothed sector adapted to mesh with the like segment on the flier and a fixed abutment in the path of the crank of the gripper-shaft, operating to successively impart a partial revolution to the flier and gripper-shaft, respectively, after said flier has moved clear of the bed and platen, for the purpose set forth.

2. In a printing-press, the combination, with a reciprocally-movable platen and bed, a flier reciprocating vertically between said platen and bed and having a bearing for the grippers, a toothed segment connected with said flier, a crank-shaft mounted on the flier, grippers secured to the crank-shaft, and a tension device operating on the shaft to hold the grippers in contact with their bearing on the flier, of a fixed toothed sector adapted to gear with the segment on the flier, a fixed abutment in the path of the crank-shaft, operating to successively impart to said flier and shaft, respectively, a partial revolution, a locking device for locking the crank-shaft against re-

turning to its normal position under the action of the tension device, and a releasing device for releasing said crank-shaft from the locking device, said elements being timed in their operation to the movements of the platen and bed, as and for the purpose set forth.

3. In a printing-press, the combination, with the bed and platen hinged together, as described, of a combined flier and gripper comprising a rectangular frame D E F F', having motion on and with the hinge-pin of said bed and platen between the latter and having bearing on and motion with the platen when the latter is in a given position, a rock-shaft connected with the frame at its upper end, gripper-fingers secured to said shaft, actuating devices operating to hold the fingers in contact with the upper cross-bar of the frame, to move said fingers out of contact therewith as said frame comes in contact with the platen, and again return said fingers to seize the sheet to be printed, said frame moving upwardly with the hinge-pin after the impression is made, and mechanism for tilting said frame and moving the gripper-fingers to release the printed sheet, as set forth.

4. In a printing-press, the combination, with the bed and platen hinged together, as described, of a flier consisting, essentially, of a rectangular frame, the connecting-rods G and H, connecting the flier with the hinge-pin of the bed and platen, said connecting-rod G having a cam-head G', the spring-actuated rock-shaft L, provided with gripper-fingers and mounted at the upper end of the flier, said rock-shaft having a crank adapted to be engaged by said cam-head to move said shaft against the stress of its spring, and means for tilting the flier in one direction when about to reach the limit of its upward movement and in a reverse direction at the beginning of its downward movement, for the purpose set forth.

5. In a printing-press, the combination, with the bed and platen hinged together as described, of a flier consisting, essentially, of a rectangular frame, the connecting-rods G and H, connecting the flier with the hinge-pin of the bed and platen, said rod G having a cam-head G', a spring-actuated pawl pivotally connected to the upper cross-bar of the flier, the rock-shaft L, provided with gripper-fingers, mounted on the flier near said upper cross-bar and carrying a crank q r, adapted to be engaged by the cam-head G' and by the pawl when said flier moves in opposite directions, a releasing device for releasing the crank from engagement with the pawl, and means for tilting the flier in one direction as it is about to reach the limit of its upward motion and in a reverse direction at the beginning of its downward motion, for the purpose set forth.

6. In a printing-press, the combination, with the bed and platen hinged together as described, of a flier consisting of the frame D E F F', the connecting-rods G and H, connect-

ing the flier with the hinge-pin of the bed and platen, said rod G having a cam-head G', a spring-actuated pawl pivotally connected to the upper cross-bar of the flier and provided
 5 with an arm *w*, the rock-shaft L, mounted on the flier near said upper cross-bar, said shaft carrying gripper-fingers M and a crank *q r*, adapted to be engaged by the cam-head G' and by the pawl when said flier moves in op-
 10 posite directions, a fixed abutment in the path of the arm *w* of the pawl, and gearing adapted to tilt the flier in one direction as it is about to reach the limit of its upward movement and in a reverse direction at the beginning
 15 of its downward movement, for the purpose set forth.

7. An attachment for printing-presses, having a reciprocally-movable platen and bed consisting of a flier F^x, composed of the sup-
 20 porting-bar D, provided with journals *h*, the toothed segment N and guide-arm K on said journals, the side bars E and the cross-bars F F', a gripper for clamping the work to the flier, releasing devices for releasing the work
 25 from the gripper, the connecting-rods G and H, said rod G having the cam-shaped head G' for operating the releasing devices, the standard B, provided with guide-groove *f* and

toothed sector *c*, and the standard C, provided with guide-grooves *f* and *g*, said parts being
 30 arranged for operation substantially as and for the purpose set forth.

8. An attachment for printing-presses, having a reciprocally-movable platen and bed
 35 consisting of the flier F^x, composed of the supporting-bar D, provided with journals *h*, the toothed segment N and guide-arm K on said journals, the side bars E and the cross-bars F F', the spring-actuated pawl W, provided
 40 with the short arm *w'* and the long arm *w*, connected with the bar D, the spring-actuated gripper-shaft L, having crank *q r* and tappet *s*, the connecting-rods G and H, said rod G having the cam-shaped head G', the standard
 45 B, provided with guide-groove *f* and toothed sector *c*, and the standard C, provided with guide-grooves *f* and *g*, said parts being arranged for operation substantially as and for the purpose set forth.

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Witnesses:

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AUGUST NILSSON,
Book-keeper.