

R. M. HOE & S. D. TUCKER.

Printing Press.

No. 84,627.

Patented Dec. 1, 1868.

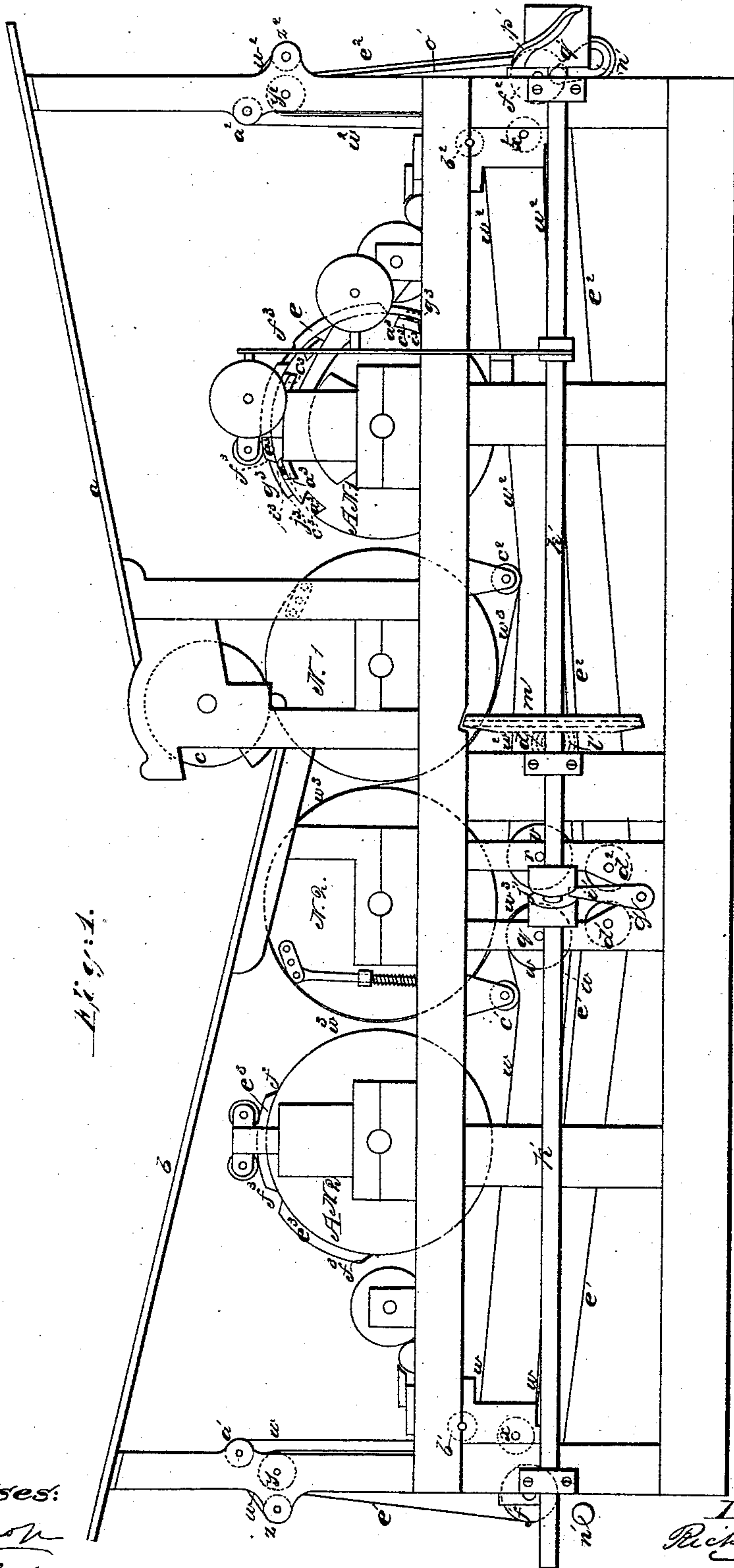


Fig. 1.

Witnesses:  
*Wm. H. Quinn*  
*Andrew A. Barclay*

Inventors:  
*Rich. M. Hoe.*  
*Stephen D. Tucker*

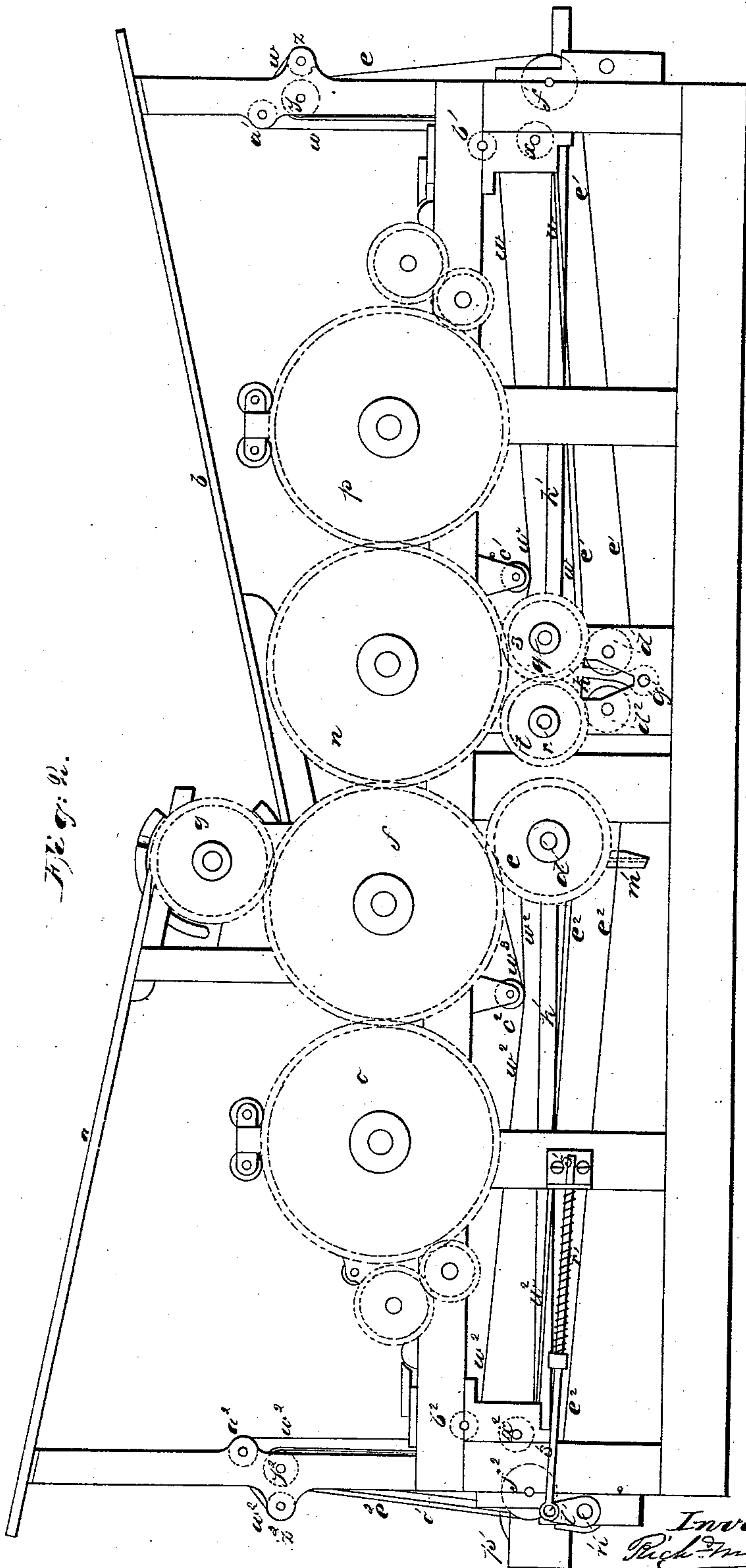
R. M. HOE & S. D. TUCKER.

4 Sheets—Sheet 2.

Printing Press.

No. 84,627

Patented Dec. 1, 1868.



Witnesses:  
Wm. H. Bishop  
Andrew DeLoay

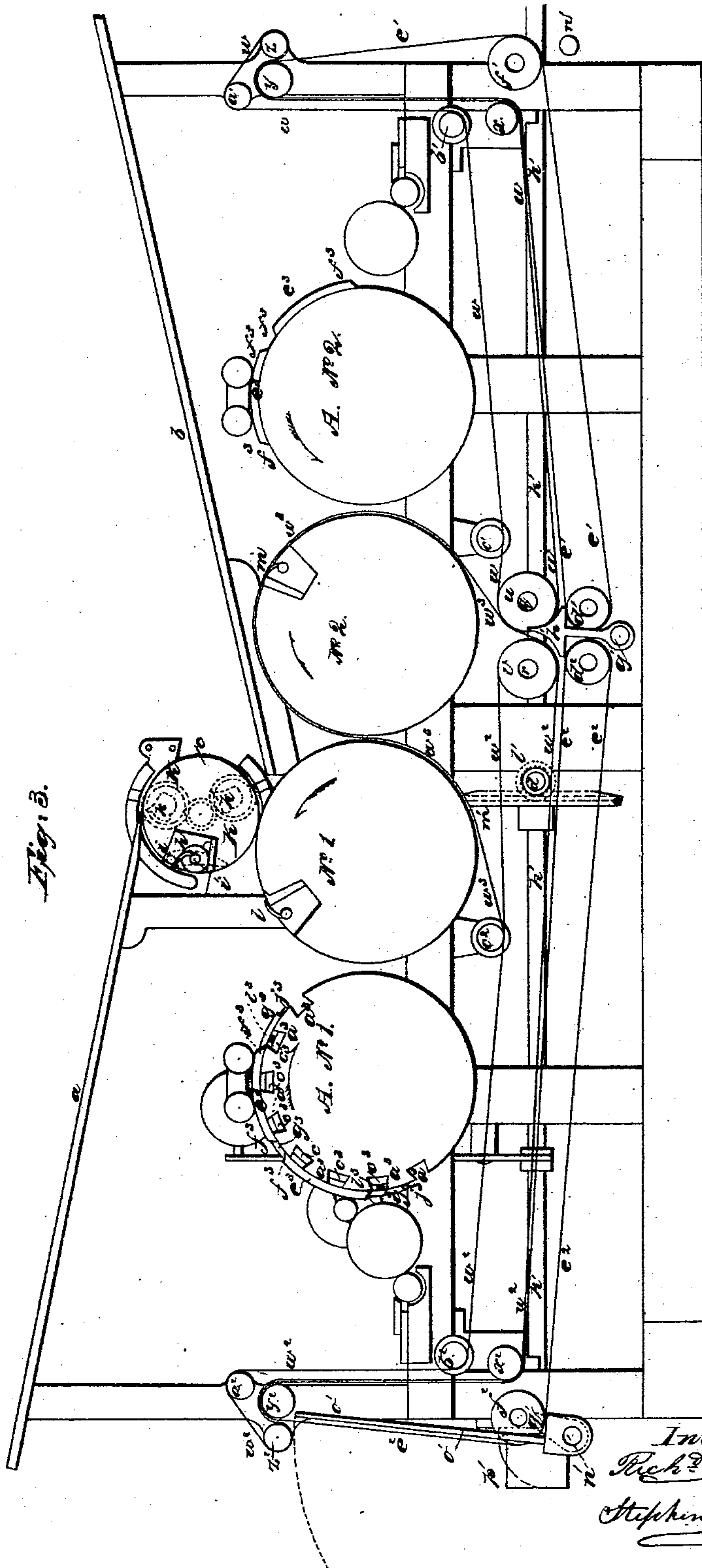
Inventors:  
Rich<sup>d</sup> M. Hoe.  
Stephen D. Tucker

R. M. HOE & S. D. TUCKER.

Printing Press.

No. 84,627.

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Witnesses:  
*J. H. Pinkon*  
*Andrew J. Lacy*

Inventors:  
*R. M. Hoe.*  
*Stephen D. Tucker*

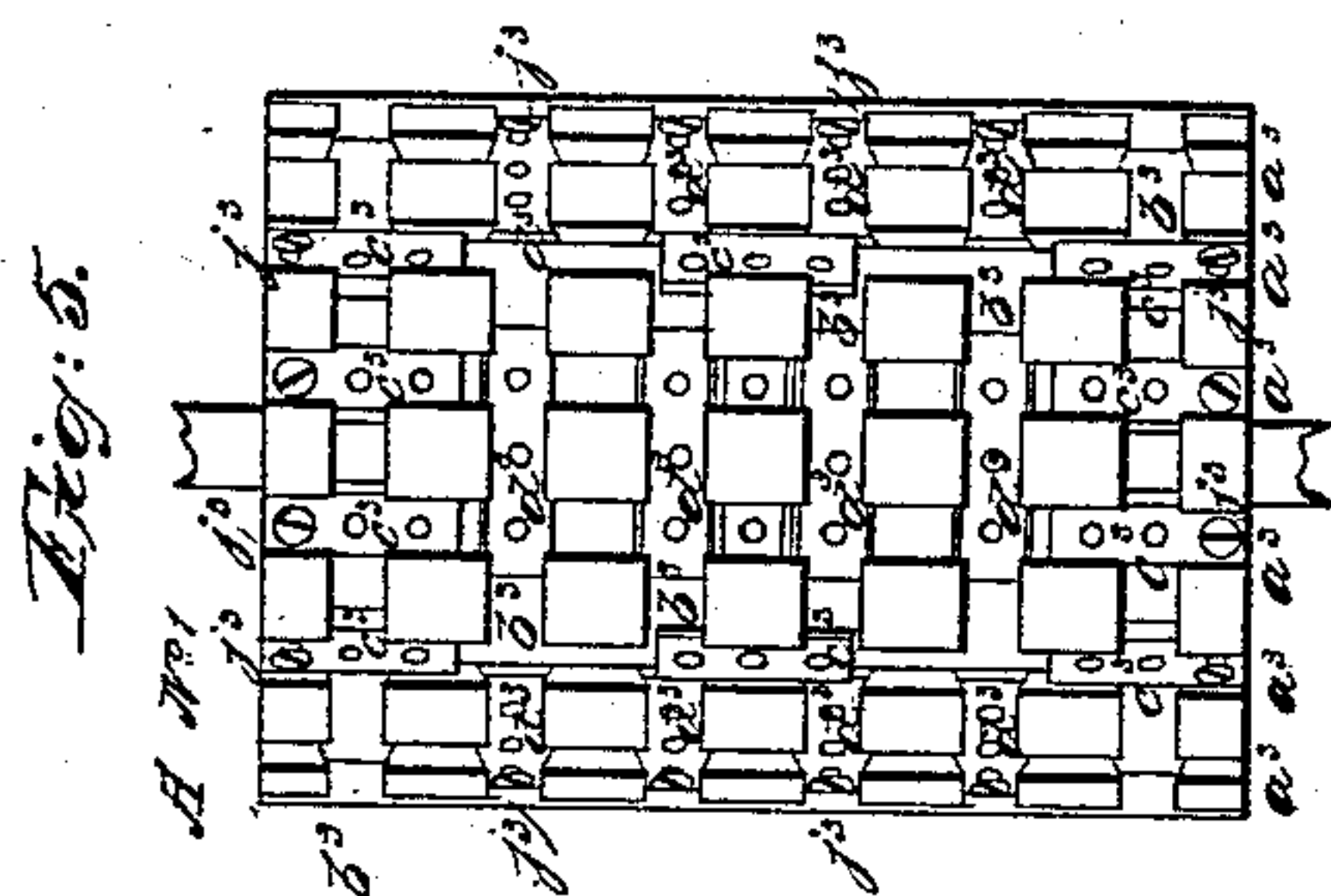
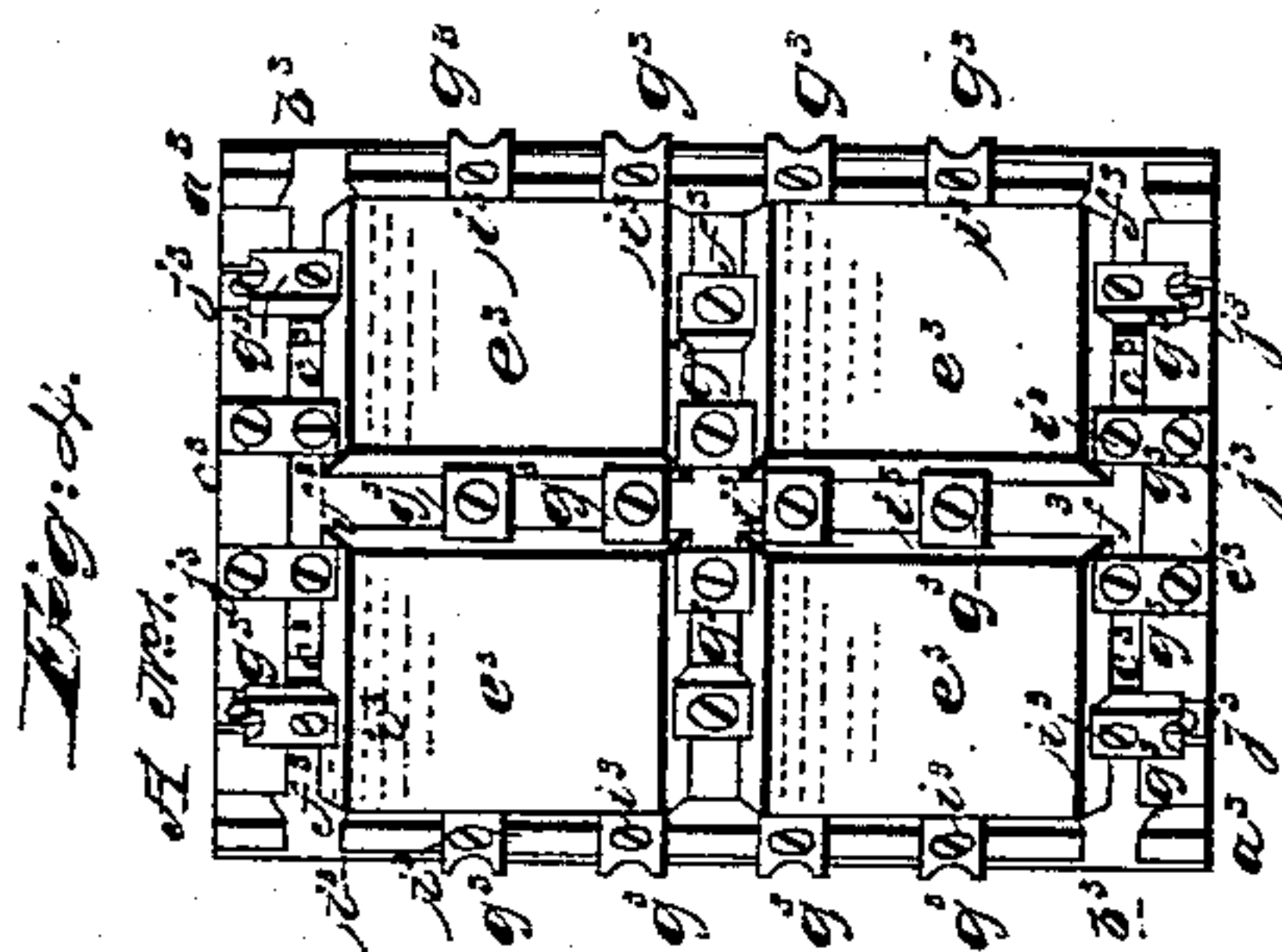


R. M. HOE & S. D. TUCKER.  
Printing Press.

4 Sheets—Sheet 4.

No. 84,627.

Patented Dec. 1, 1868.



Witnesses:

*Wm. A. B. Ingham*  
*Andrew B. Laury*

Inventors:

*R. M. Hoe*  
*Stephen D. Tucker*



# UNITED STATES PATENT OFFICE

RICHARD M. HOE AND STEPHEN D. TUCKER, OF NEW YORK, N. Y.

## IMPROVEMENT IN PRINTING-PRESSES.

Specification forming part of Letters Patent No. 84,627, dated December 1, 1868.

*To all whom it may concern:*

Be it known that we, RICHARD M. HOE and STEPHEN D. TUCKER, both of the city, county, and State of New York, have invented certain new and useful Improvements in Printing Machinery; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is an elevation of the front of the machine; Fig. 2, an elevation of the back; Fig. 3, a vertical section in a plane parallel to the plane of Figs. 1 and 2, and representing by dotted lines the mechanism beyond the feeding-in cylinder; Fig. 4, a face view of one of the type-cylinders with the stereotype-plates secured to it; and Fig. 5, a like view with the stereotype-plates removed.

Like parts are indicated by the same letters in the several figures in which they appear.

The first part of our said invention relates to a method of more rapidly feeding the sheets of paper to be printed in printing-machines; and this part of our said invention consists in combining two feeding-tables, from which the sheets of paper to be printed are supplied; with mechanism for taking the sheets of paper alternately from the opposite feeding-tables and presenting them in rapid succession to the impression-cylinder.

We will first describe the construction and operation of this part of our said invention as we have found it best to construct it.

In Figs. 1, 2 and 3 of the drawings, *a* and *b* represent two inclined feeding-tables, on which the sheets of paper are to be placed, and from which they are successively presented, by boys or other attendants, to the feeding-in cylinder. The lower end of the upper feeding-table, *a*, is just above and that of table *b* just below the feeding-in cylinder *c*. They are to be provided with the usual means to enable the attendant to present the lower edge of each sheet to the proper place to be taken by the mechanism.

The feeding-in cylinder *c* is of the usual construction, and receives motion from the main shaft *d* by the train of cog-wheels *e f g*. It is provided in the usual manner with griping-fingers *h*, projecting from a shaft, *i*, mounted in a recess made for that purpose, and one

end of the said griper-shaft projects beyond one end of the cylinder, and is provided with a wing and crank-pin, *j*, which are actuated by the mechanism *k*, mounted in the side frame, to turn it when the griping-fingers are turned in one direction to gripe the edge of a sheet of paper against the surface of the cylinder, and then in the opposite direction to liberate the sheet.

This mechanism *k* is of the usual and well-known construction heretofore used; but that part of it for closing the fingers is duplicated, the two sets being represented at *K K*, one set being above and the other below the shaft of the feeding-in cylinder *c*, one set to operate the fingers for taking the sheets from the upper and the other for taking the sheets from the lower feeding-table.

The machine being in operation, a sheet of paper on the feeding-table *a* is moved down by the attendant to the proper gage, so that its lower edge will be in the required position to be griped by the fingers of the feeding-in cylinder. So soon as griped, the sheet is carried around and presented to the impression-cylinder No. 1, which is on the shaft of the cog-wheel *f*, and receives motion from the main shaft by the cog-wheel *e*. This cylinder is provided, as in the usual manner, with griping-fingers *l*, operated in the usual manner, and which gripe the same edge of the sheet as it is liberated by the griping-fingers of the feeding-in cylinder.

The sheet of paper thus transferred is presented to the type-cylinder *A*, No. 1, and receives the required impression on one surface, and while it is being so printed it continues to be held to the surface of the impression-cylinder No. 1 until the self-same edge is carried up and presented to and griped to the surface of the impression-cylinder No. 2 by its griping-fingers *m*, at the same time that it is liberated by the griping-fingers *l* of the impression-cylinder No. 1.

The impression-cylinder No. 2 is constructed in all respects like No. 1, and is provided in like manner with griping-fingers. It is turned with equal velocity, but in the reverse direction, by the cog-wheel *n* on its shaft, which receives motion from the cog-wheel *f* on the shaft of the impression-cylinder No. 1. That end of the sheet of paper which is not griped



is held up by tapes against the under side of the impression-cylinder No. 1 as it is passing to the cylinder No. 2. These tapes will be hereafter described.

The sheet of paper, by being thus transferred from impression-cylinder No. 1 to No. 2 is reversed, so that the surface which has been printed is in contact with the surface of impression-cylinder No. 2, and its unprinted surface outside, and that is in succession presented to and printed by the type-cylinder A, No. 2.

The type-cylinder A, No. 1, receives motion from impression-cylinder No. 1 by cog-wheels *f* and *o*, and the type-cylinder A, No. 2, from impression-cylinder No. 2 by the cog-wheels *n* and *p*. The surfaces of all four of these cylinders travel at the same speed, and in the directions indicated by the arrows in Fig. 3.

After this sheet of paper has been printed on the second surface by the type-cylinder A, No. 2, it is to be carried off and delivered, which operation will be presently described.

While the first sheet of paper is being printed on one side and delivered by the impression-cylinder No. 1 to the impression-cylinder No. 2, as above described, a second sheet of paper is presented on the feeding-table *b*, as described with reference to the first sheet on the feeding-table *a*, so that, at the next operation, the gripping-fingers of the feeding-in cylinder, instead of being operated when opposite the lower end of the feeding-table *a*, are operated when they come opposite the lower edge of the lower feed-table, *b*, from which they take the second sheet, which is in turn presented to and taken by the fingers of the impression-cylinder No. 1 at the beginning of the second revolution of that cylinder, carried around to be printed on one surface by the type-cylinder A, No. 1, presented to the impression-cylinder No. 2, and the reverse side presented by it to the type-cylinder A, No. 2, to be printed, and then delivered, as before.

In the manner above described, the sheets of paper are taken alternately from the two feeding-tables by the same feeding-in mechanism, so that the machinery can be carried at the desired velocity to print on both sides as fast as the sheets can be presented by the attendants on two feeding-tables.

The type-cylinders are to be provided with the usual or other suitable inking apparatus, not necessary to be described.

The sheets of paper will be delivered from such a printing-machine too rapidly to be laid in one pile by the mechanism usually employed for that purpose, and known as the "fly," as such mechanism has been heretofore applied.

The second part of our invention relates to the more rapid delivery of the printed sheets; and this part of our said invention consists of a mechanism by which the sheets, as they come from the printing mechanism, are directed alternately on opposite sides, so as to be de-

livered in two piles, alternately on one and then on the other side, either by two separate fly-frames, or, as the equivalent thereof, a double-acting fly-frame.

Still referring to the same drawings, *q* and *r* represent two parallel shafts, which are rotated in opposite directions by pinions *s* and *t* on their outer ends, the one, *s*, receiving motion from the cog-wheel *n* on the shaft of the impression-cylinder No. 2. These two shafts carry each a series of pulleys, *u* and *v*.

A series of tapes, *w*, passes around the series of pulleys *u* of the shaft *q*. From the under side of pulleys *u* they pass under a guide-roller, *x*, at one end of the frame, and thence upward over a second guide-roller, *y*, near the top of the frame; thence under and around a third guide-roller, *z*, to and over a fourth guide-roller, *a*; thence down to and under a fifth guide-roller, *b*<sup>1</sup>, just above and a little back of the roller *x*, before described; then back to the series of pulleys *u*, passing under a sixth guide-roller, *c*<sup>1</sup>, near the pulleys *u*.

Just below the series of pulleys *u* there is a corresponding range of pulleys, *d*<sup>1</sup>, on a loose shaft, and these pulleys carry another series of tapes, *e*<sup>1</sup>, which pass from the top of the pulleys *d*<sup>1</sup> to and under the tapes *w*, where they pass under the guide-roller *x*, thence up over the guide-roller *y*, down to and under a series of pulleys, *f*<sup>1</sup>, back to the series of pulleys *d*<sup>1</sup>.

A sheet of paper being delivered between the two series of tapes *w* and *e*<sup>1</sup> at the bight of the two series of pulleys *u* and *d*<sup>1</sup> will be carried along, in nearly a horizontal direction, between the two series of tapes, to and under the guide-roller *x*, thence, nearly in a vertical direction, to and over the guide-roller *y*, over to the front of this roller, where the series of tapes *w* leaves it to return, and it will then descend in nearly a vertical direction in front of the series of tapes *e*<sup>1</sup>, and in front of the fly-frame, so that, at the instant the upper end of the sheet is liberated in front by the series of tapes *w* it can be thrown down onto the pile by the fly-frame.

At the other end of the frame there is a like arrangement of pulleys, tapes, and guide-rollers, to carry and deliver sheets of paper in the opposite direction.

These corresponding duplicate parts are indicated on the drawings by corresponding letters, which are marked <sup>2</sup> to designate them from the parts above described.

Some of the series of tapes marked *w*<sup>2</sup> on this end of the machine, instead of being arranged as the others of the series, or like the tapes *w* at the end of the machine already described, are made of greater length, and pass from the sixth guide-roller, *c*<sup>2</sup>, under and around a portion of the impression-cylinder No. 1, to hold up the sheets of paper and prevent them from falling from the impression-cylinder before being effectually transferred. From this they pass over and around the im-



pression-cylinder No. 2, and thence down to the series of pulleys  $v$  on shaft  $r$ , before described.

These tapes of the series  $w^2$  are marked  $w^3$ , to distinguish them from the rest of the series.

Where they pass around the impression-cylinder No. 1, they are outside of the sheet of paper which may be passing through the machine; but where they pass around the impression-cylinder No. 2, they are between the sheet of paper and the surface of the cylinder, so that they guide the end of the sheet of paper, after it has been printed, to the space between the two series of pulleys  $u$  and  $v$  on the shafts  $q$  and  $r$ .

And as the sheets of paper are to be delivered alternately in opposite directions, when they enter the space between the pulleys  $u$  and  $v$ , to be carried to one end between the two series of tapes  $w$  and  $e^1$ , or to the opposite end, between the two series  $w^2$  and  $e^2$ , the ends of the sheets are to be pushed alternately in opposite directions.

For this purpose there is a horizontal rock-shaft,  $g^1$ , just below the shafts  $q$  and  $r$ , and in a plane perpendicularly between them.

From this shaft projects upward a series of guide-rods,  $h^1$ , which play in the spaces between the pulleys  $u$  and  $v$ .

On the outer end of the shaft  $g^1$  there is an arm,  $i^1$ , the upper end of which is in a cam-groove,  $j^1$ , on a longitudinal shaft,  $k^1$ , which receives motion from the main shaft  $d$  by a bevel-pinion,  $l^1$ , and bevel-wheel  $m^1$ , so proportioned as to give to the longitudinal shaft  $k^1$  half a revolution to one of the impression-cylinders, the cam-groove being so formed as to vibrate the guide-rods  $h^1$  to one side for one revolution of the impression-cylinders, and in the opposite direction for the next revolution.

The upper end of the guide-rods is spear-shaped, so that when thrown in one direction between the pulleys of the series  $u$  they will form guides to direct the sheet of paper between the two series of tapes  $w^2$  and  $e^2$ , and when vibrated in the opposite direction they will guide the sheet of paper to and between the two series of tapes  $w$  and  $e^1$ . In this way the sheets of paper are taken and alternately delivered in opposite directions.

At each end of the frame there is a rock-shaft,  $n^1$ , with a series of parallel rods,  $o^1$ , which constitute the fly-frames.

Both these shafts are represented in the accompanying drawings; but only one of the fly-frames and appendages is represented, as one is but the repetition of the other.

When at rest, the rods of the fly-frame are in a nearly vertical position, and a little back of the series of tapes  $e^2$ , where these are nearly in a vertical position, and as soon as the sheet of paper is liberated by the series of tapes  $w^2$  it is struck by the rods  $o^1$  of the fly-frame, and thereby thrown down and onto a pile.

The fly-frame is drawn up by a cam,  $p^1$ , on the end of the longitudinal shaft  $k^1$ , which

acts on an arm,  $q^1$ , at one end of the rock-shaft, the cam being so formed as to hold up the fly after lifting it, and until a sheet is to be delivered; and then the cam passes the arm  $q^1$  and permits the fly to be thrown out by a spring,  $r^1$ , on a rod,  $s^1$ , which is connected with the crank-pin of an arm,  $t^1$ , on the end of the rock-shaft  $n^1$ .

The cams at the two opposite ends of the shaft  $k^1$  are to be so placed that they will alternate the operations of the two fly-frames.

The third part of our said invention relates to means for securing stereotype or other solid printing plates or surfaces directly to the surface of the type-cylinders of printing-machines, by means of which we are enabled to dispense with the use of the blocks and iron frames heretofore employed for this purpose, and avoid the serious inconveniences experienced in the use of them.

Referring to Figs. 3, 4, and 5 of the accompanying drawings, longitudinal and transverse grooves  $a^3$  and  $b^3$  are formed in the periphery of printing-cylinders. These grooves are dovetailed, and to them are fitted counter-clamp blocks  $c^3$  and  $d^3$ , so as to slide therein.

The stereotype or other printing plates  $e^3$ , curved so that their inner surfaces will fit the periphery of the printing-cylinders, are formed with their outer edges beveled from the outside or printing-surface, as represented at  $f^3$ .

The plates so prepared are placed in the required positions on the periphery of the printing-cylinder, and there clamped by outer clamping-blocks,  $g^3$ , by means of screws  $i^3$ , which pass through the outer clamping-blocks, and which are tapped into the counter-clamping blocks.

The outer clamping-blocks, at the outer edges of the outer plates, are prevented from yielding outward when clamping the beveled edges of the plates by screws  $j^3$ , which are tapped into the counter-clamping blocks and bear against the cylinder, and their heads are fitted to semicircular recesses in the outer ends of the clamping-blocks.

As the two series of counter-clamping blocks are fitted to slide in two series of grooves which are at right angles to each other, and the outer clamping-blocks are fastened to these, it follows that they can be adjusted in position to clamp plates of any size directly to the surface of the cylinder, for when the outer and the counter-clamping blocks are drawn together by the screws the outer blocks are drawn to the counter-blocks and to the outer beveled faces of the edges of the plates, thereby drawing the plates directly to the surface of the cylinder.

Having thus fully described the novel features and characteristics which distinguish our said invention from all others before known to us, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of two feeding-tables with the means described, or the equivalent thereof, for taking the sheets of paper alter-



nately from the opposite feeding-tables and conducting them to the impression-cylinder, substantially as and for the purpose described.

2. Separating the sheets by mechanism substantially as described, so that they will be delivered in files, substantially as set forth and specified.

3. The means, substantially as herein de-

scribed, for clamping stereotype or other printing plates directly to the surface of a type-cylinder, as set forth.

RICHD. M. HOE.

STEPHEN D. TUCKER.

Witnesses:

ANDREW DE LACY,

WM. H. BISHOP.