(No Model.)

3 Sheets—Sheet 1.

T. B. DOOLEY.

PRINTING PRESS.

No. 286,689. Patented Oct. 16, 1883.

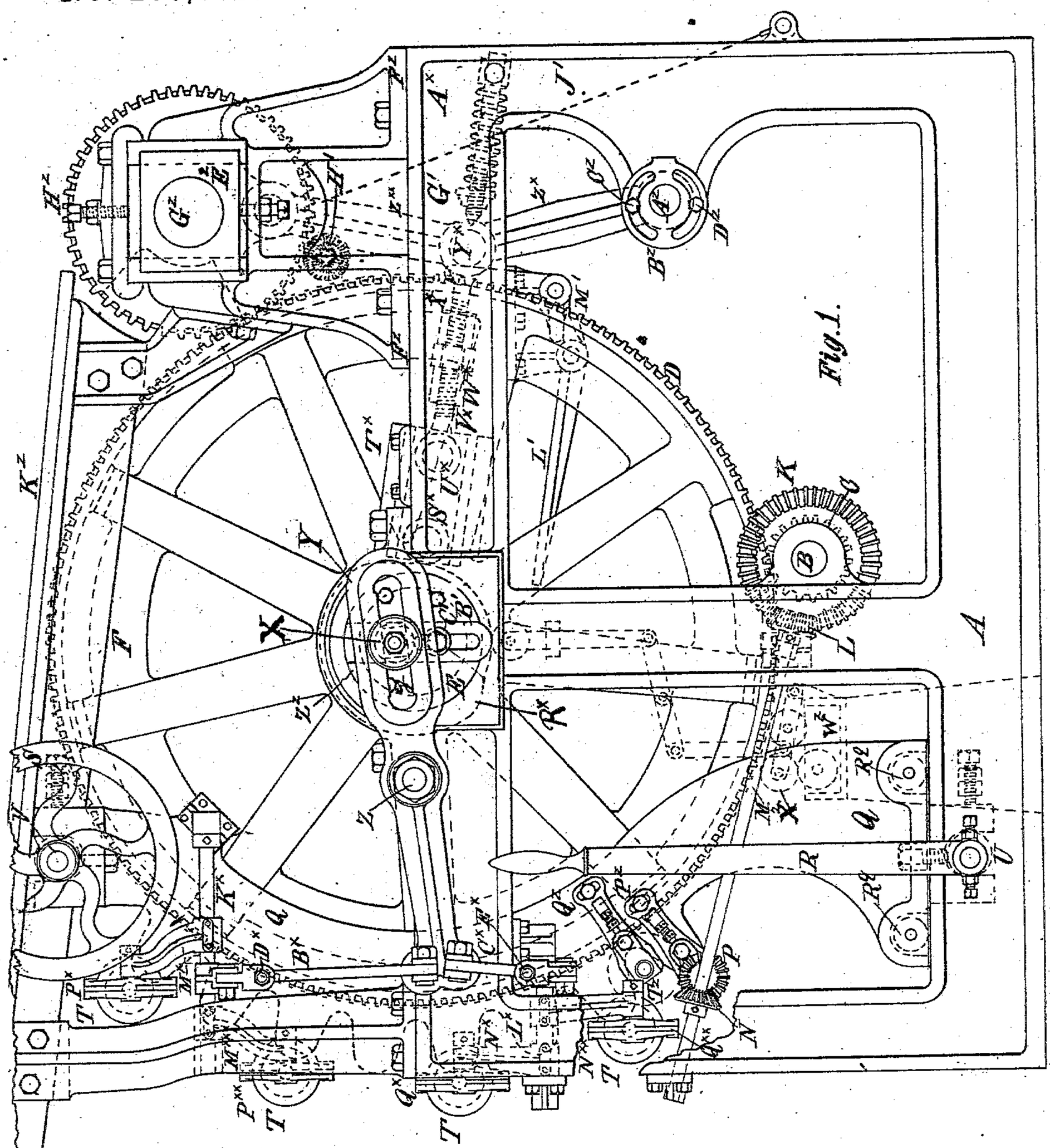

Fig. 1.

Witnesses:
Richard W. Shew
John A. Coffey

Inventor:
Thomas Brown Dooley,
by Lemuel P. Jenks. atty.

(No Model.)

3 Sheets—Sheet 2.

T. B. DOOLEY.

PRINTING PRESS.

No. 286,689. Patented Oct. 16, 1883.

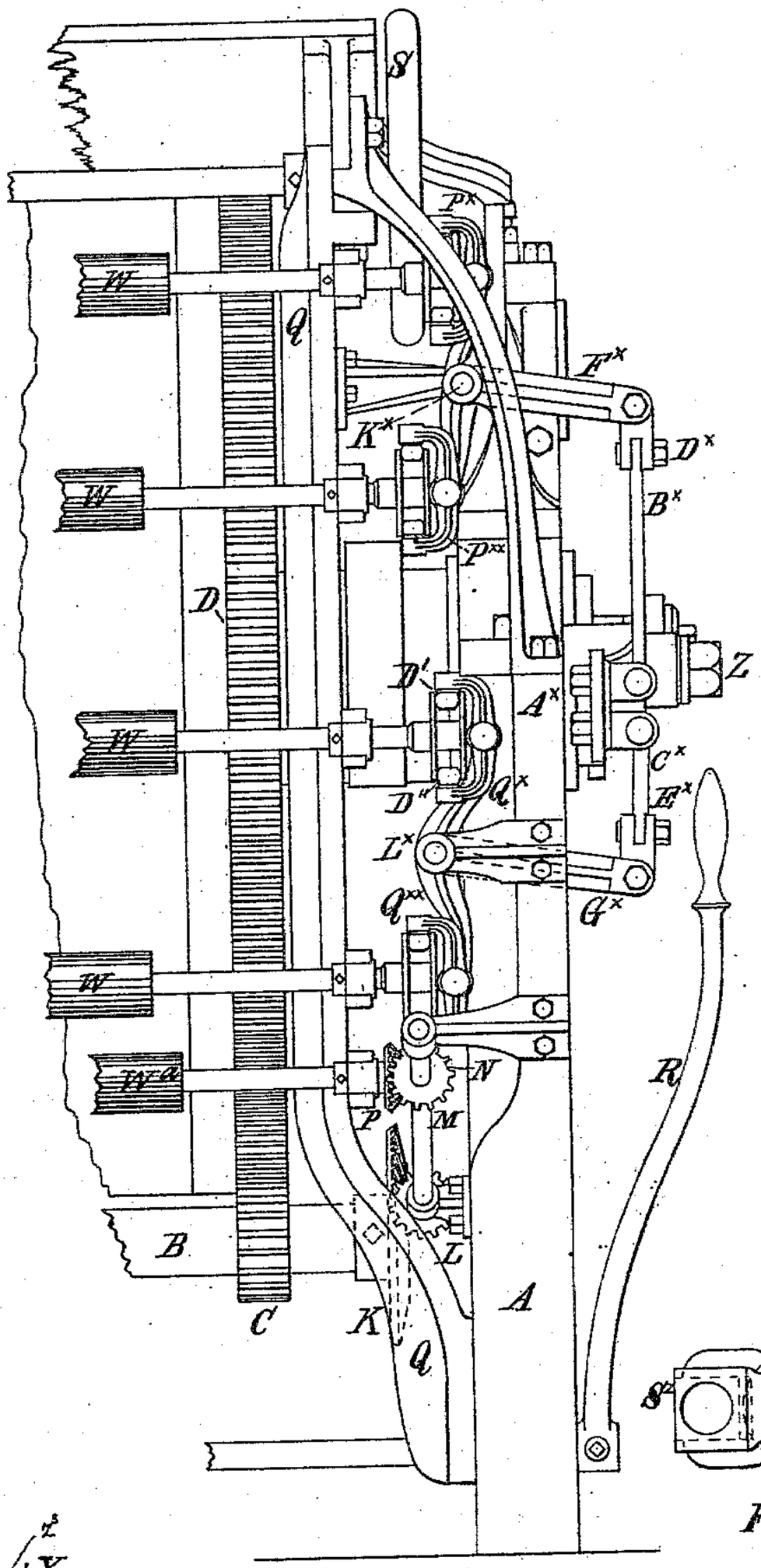

Fig. 2.

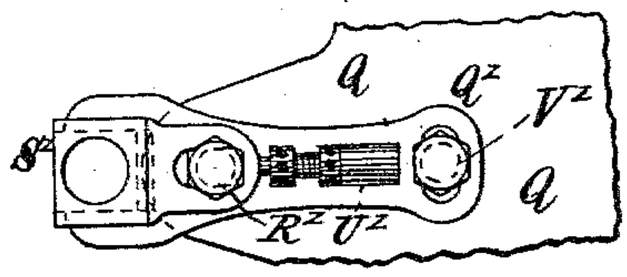

Fig. 5.

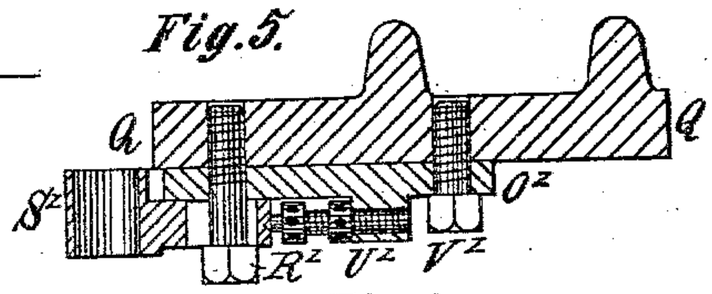

Fig. 6

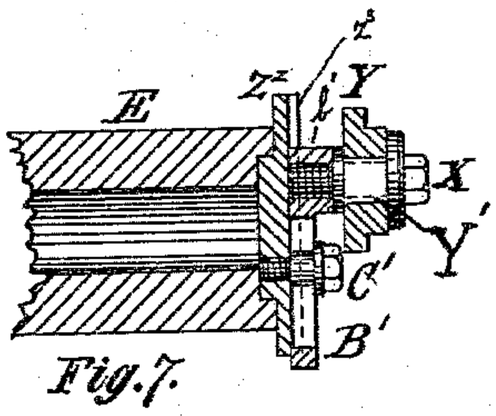

Fig. 7.

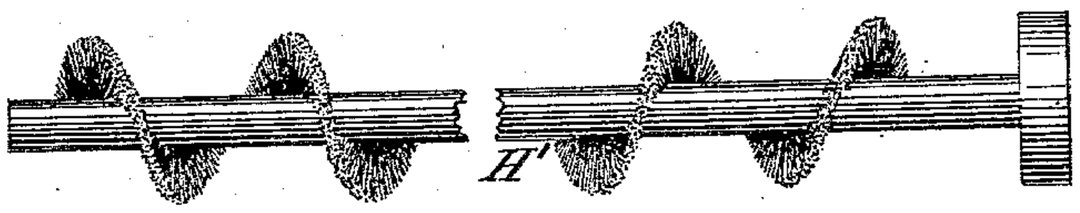

Fig. 8.

Witnesses:

Richard W. Shea.

John A. Cole

Inventor:

Thomas Broom Dooley

per Lemuel P. Deaks. atty.

(No Model.) 3 Sheets—Sheet 3.

T. B. DOOLEY.

PRINTING PRESS.

No. 286,689. Patented Oct. 16, 1883.

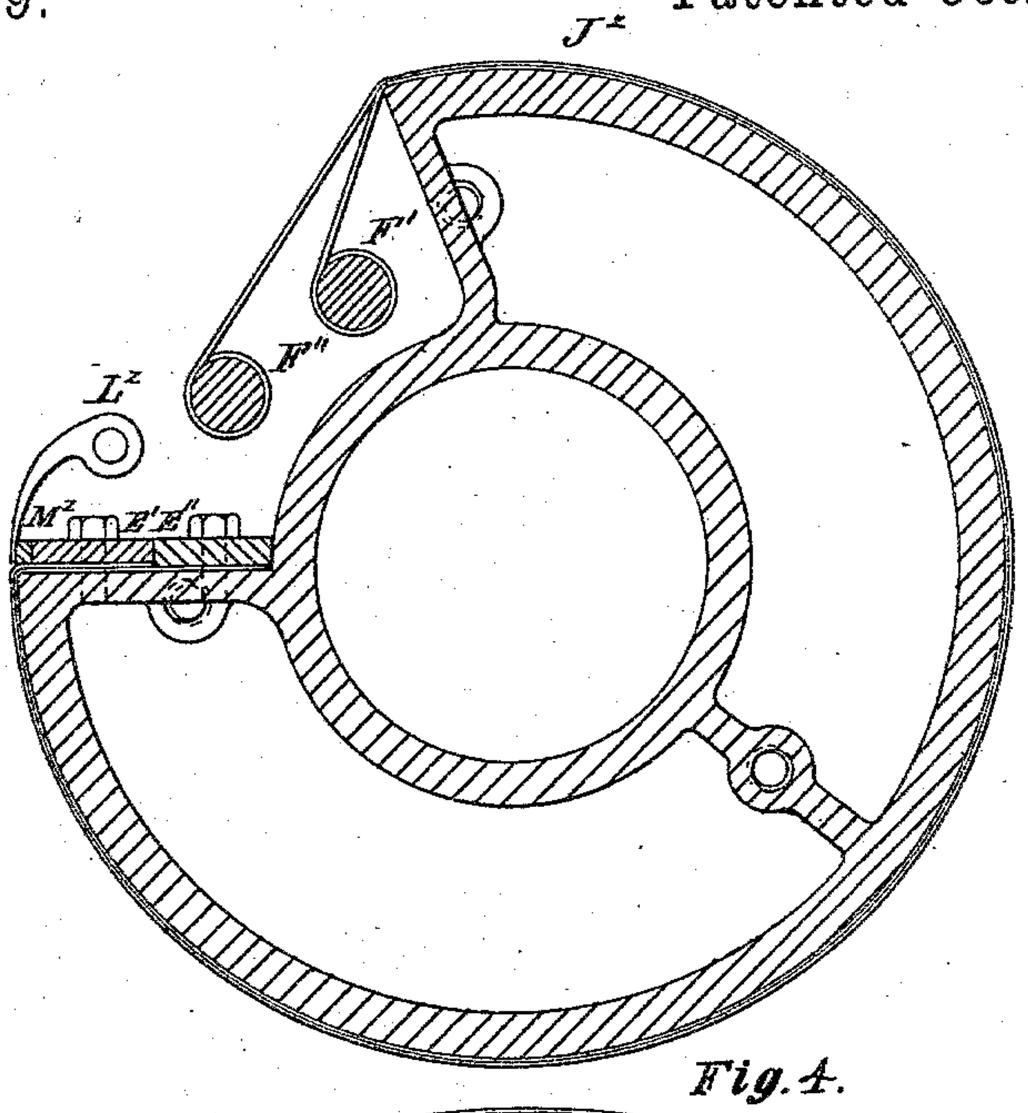

Fig. 4.

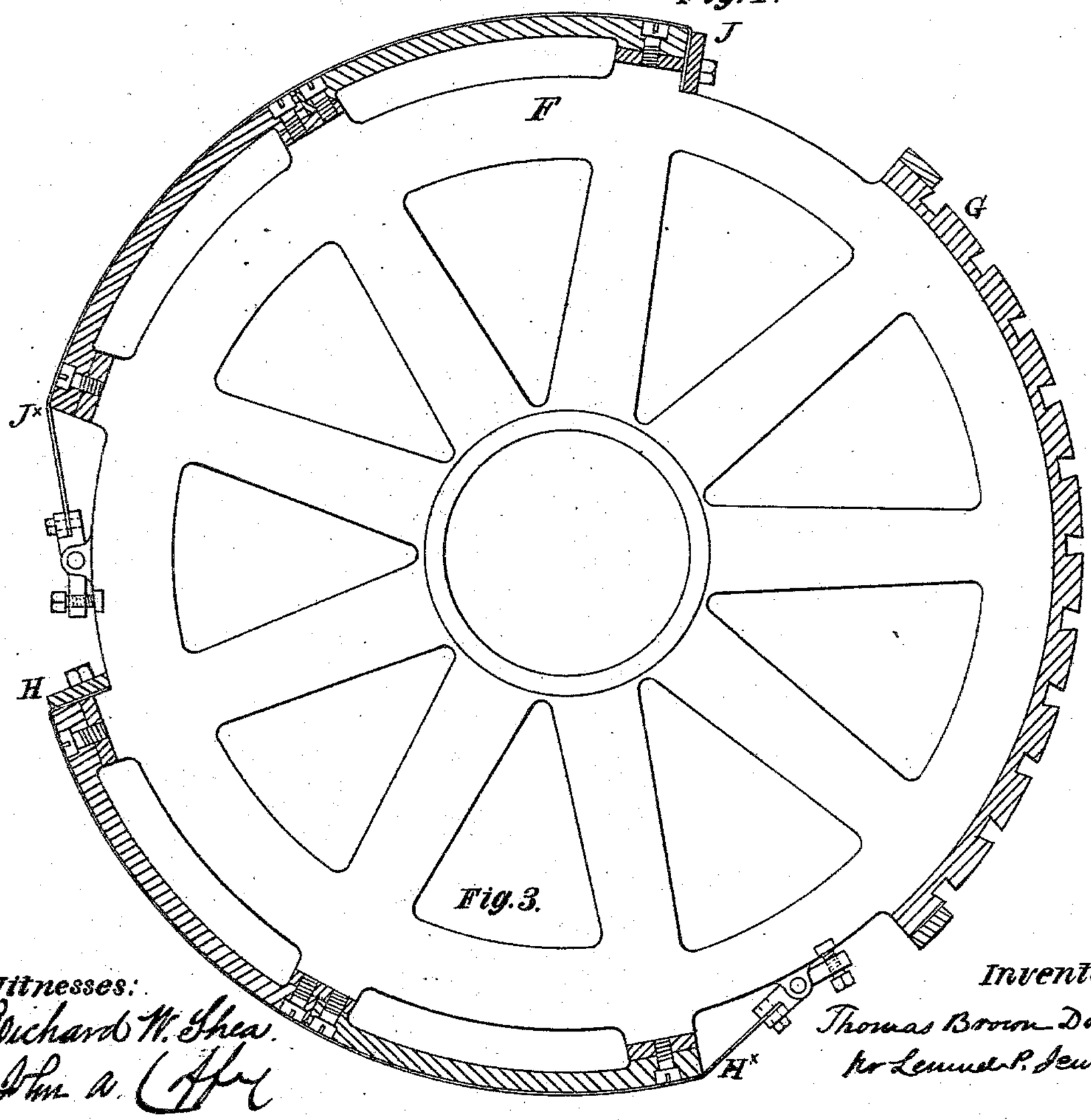

Fig. 3.

Witnesses:
Richard W. Shea.
Thos. A. Shea

Inventor:
Thomas Broom Dooley
by Lemuel P. Jenks. Atty

UNITED STATES PATENT OFFICE.

THOMAS B. DOOLEY, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO JOHN SOUTHER, OF SAME PLACE.

PRINTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 286,689, dated October 16, 1883.

Application filed November 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS BROWN DOOLEY, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and Improved Printing-Press, of which the following is a specification.

The nature of the invention is that of a combination of devices in a printing-press in the shape of a rotating type-bearing cylinder accompanied by a series of rollers to ink the types on said cylinder, and machinery to place the rollers in and out of contact with it to admit of cleaning the cylinder, &c., all in combination with a paper-sheet-bearing rotating cylinder and a device to effect permission of its rotation, and at the same time prevent the indiscriminate inking of the paper sheet; also, of a device to be used, in case of accident, to prevent an impression being taken, and a device for keeping the paper sheets duly spread, the whole furnished with the usual feeding-table for the unprinted sheets and the usual fly for taking the printed sheets away, to which are added a water-receptacle and some attachments and facilities for certain changes, hereinafter explained, to permit of a process of printing analogous to lithographing. The object of the whole is the furnishing of a compact, rapid-working, efficient, and low-priced combination of devices to print with electro-plates or stereo-plates, or, at pleasure, in the other manner referred to above.

Figure 1 is a side view of the press. Fig. 2 is an edgewise view from the left-hand side of Fig. 1. Fig. 3 is a sectional view of the type-bearing or form cylinder. Fig. 4 is an enlarged view, in vertical section, of the impression-cylinder. Figs. 5, 6, 7, and 8 are details hereinafter explained.

In the drawings, A A^x, Fig. 1, is called hereinafter the "frame," but is but part of it, being one of a pair of cast-iron frames, bearing the machinery between them.

B, Fig. 1, is a shaft actuated by a pulley and belt, (not represented,) whose rotation actuates the whole machine. This shaft B bears a pinion-gear, C, Fig. 1, (seen in dashed lines,) which gears with D, Fig. 1, a large cog-wheel borne by the main shaft E, Fig. 1, which is supported in appropriate bearings (not represented) carried by the frame A A^x. This main shaft E carries the type-bearing or form cylinder F, Fig. 1, borne by nine radiating arms. (Seen in Figs. 1 and 3.) The space appropriated to the form is seen at G, Fig. 3.

The form-cylinder F bears at the points between H and H^x, Fig. 3, a covering of a sheet of zinc, secured by screws thereon. Three of these screws are seen in Fig. 3, being part of a set extending the length of the sheet parallel with the shaft E. Another sheet of zinc similarly arranged and secured is seen between the points J and J^x, Fig. 3. The zinc-covered portion of the face of the cylinder comes into contact with a series of composition ink-rollers, hereinafter mentioned, and act to distribute the ink evenly upon them, and are called the "ink-distributing surfaces" of the form-cylinder. The object of the use of these zinc sheets is to cover the cast-iron cylinder at these points, to prevent the contact of the ink with the iron, and thus to prevent the usual chemical effect resulting from the contact—the discoloration of the ink; also, to increase or reduce the size of the cylinder bearing them; and they are removable by detaching the screws (see Fig. 3) holding them.

K, Fig. 1, is a bevel-wheel borne by the shaft B, gearing with a smaller bevel-wheel, L, Fig. 1, which latter is carried at one end of the diagonally-disposed shaft M, Fig. 1, which is held by appropriate bearings attached to the standard or frame A A^x, and bears, near to its other end, another small bevel-wheel, N, Fig. 1, which gears into bevel-wheel P of the same size, which is borne by a sliding or adjustable frame, Q Q, called the "roller-frame." This is a metallic frame, which is seen in Fig. 1 to reach from the top nearly to the bottom of the frame A A^x, and slides on it to the left and back again to the position shown in Fig. 1. This sliding is effected by the action of two devices: first, the lever or arm R, Fig. 1, (with its handle,) which is borne at its lower end by the frame A A^x, and carries there, in appropriate bearings attached to the frame, an eccentric, U, Fig. 1, which is partially rotated by rocking the lever R. The roller-frame Q Q is thus pushed back to the left, rolling on the trucks R*q* R*q*, Fig. 1; second, assistance to the adjustment of the roller-frame is given by

the hand-wheel S, Fig. 1, which is borne by the frame A A^x at its upper part. The shaft carrying the hand-wheel S carries, also, an eccentric, V. These eccentrics U and V impinge, respectively, on the upper and lower edges of the roller-frame Q Q, and being partially rotated simultaneously the frame is rolled on the rollers R*q* R*q* to the left in Fig. 1, carrying the sheave-wheels T T T T, Fig. 1, and the ink-distributing rollers W W W W, Fig. 2, called the "riders," attached to their shafts, away from the form-cylinder F, and thus permitting the cleaning or washing up of the machine, after which the frame and rollers are returned to their normal working position. The surfaces of the composition rollers or riders W W, &c., Fig. 2, come in contact with those of another series of rollers, (not shown,) called the "form-rollers," which impinge on the surface of the form-cylinder F. These latter act in the manner usual with rotary presses, and are borne, respectively, by the scallops, into which (see Fig. 1, dashed lines) the left-hand edge of the sliding frame Q Q is seen to be fashioned. There are three of these form-rollers, and they are placed alternately between the rollers W W, &c. The ink is received from the ink-fountain (not represented) by a composition roller, W^a, Fig. 2, borne by the shaft which carries the bevel-gear P, Fig. 1, from which it passes to the roller T^z, Fig. 1, thence to the rider-roller W next to it, thence to the form-roller, (not represented, as above stated) whose surface touches the rider-roller referred to, and thence, in the usual manner with rotary presses, over the alternate rider and form rollers. The rotation of these several form and rider rollers is thus effected. In the rotation of the shaft M and the bevel-gear N the bevel-gear P is also rotated, from which, as above mentioned, rotation is communicated through a rider, W^a, Fig. 2, (on the shaft which bears the bevel-gear P,) to the roller T^z, Fig. 1, whose rotation is communicated by the friction of said roller T^z upon the adjoining rider-roller W, the lowest of the series W W, &c., in Fig. 1. The rotatory friction of this lowest roller (marked W) actuates the next form-roller (not shown) above it, and so on to the end of the series of alternate rider-rollers and form-rollers.

The shaft bearing the bevel-gear P (and its roller which receives the ink from the ink-fountain) and the shaft bearing the roller T^z are supported by the adjustable roller-stands P^z and Q^z, which are both attached to the sliding frame Q Q, and are similar in construction. One only, therefore, is represented enlarged in Fig. 5 and in sectional view in Fig. 6: In these Figs. 5 and 6, Q Q is part of the sliding frame. The adjustable roller-stand Q^z (under which title, in the nomenclature above, are included, for the purpose of simplification, all the immediate attachments shown in Figs. 5 and 6) is seen to be held by the screw R^z to the frame Q Q, and on this screw the stand partially rotates. S^z is a box or bearing carrying the shaft bearing the roller T^z, Fig. 1, which box is borne by a short arm overlapping the end of the stand Q^z, in which arm is an oblong slot, through which the screw R^z passes. The oblong shape (seen in Fig. 5) of the slot permits the box S^z to slide to the left and right in Figs. 5 and 6 for adjustment by means of the screw U^z, thus giving the roller T^z greater or less pressure, as may be required, upon the rider-roller W, Fig. 1, which touches it. V^z, Figs. 5 and 6, is a screw passing through an oblong slot in the right-hand end of the stand Q^z into the sliding frame Q Q. The oblong shape of this slot, as seen in Fig. 5, gives still greater facility to the adjustment of the stand Q^z, and thus to the box S^z. These adjustable roller-stands P^z Q^z are respectively one of a pair, the other members of the pairs being at the other end of the press.

A device for supplying water to the form at the point marked G in Fig. 3 is thus made and worked: W^z, Fig. 1, is a box supplied with water, called the "water-fountain," in which rotates the roller seen in the drawings, which roller communicates water to the roller X^z above it, which latter is one of two borne by a bar hinged, as seen in Fig. 1, to the side of the box W^z. Thence, by raising the rollers borne by the bar, the water is passed by contact to the form, as above referred to. The raising is thus effected. The roller-bearing bar mentioned is seen to be connected at its middle to a bar proceeding perpendicularly upward, to where its upper end is hinged to another bar nearly horizontally disposed, which is borne by a pin (which makes a fulcrum) attached the frame A A^x. To the other end of this last-named bar is hinged a second perpendicular bar, borne by a box fastened to the inner side of the frame A A^x which permits its sliding up and down. This bar carries at its top end a roller, which is caused to ascend by the weight of the two rollers named as being below and that of the two bars next to them. The roller is made to descend by the action of a cam, R^x, Fig. 1, borne by the form-cylinder shaft E. Thus by the alternate ascent and descent of the rollers borne by the bar the form is wetted, but (owing to the intermittent descent of the water-rollers) not at the other points of the cylinder. The means of the rotation of the roller in the water-fountain it has not been thought necessary to represent. This water-fountain is used in that process of printing in which a zinc surface is substituted for a lithographic stone.

The device for vibrating the ink-distributing rollers is now to be described.

The shaft E, Figs. 1 and 7, has a cap or plate, Z^2, attached to one end of it, so as to turn therewith, a diametrical guideway, Z^3, being formed in said plate. This guideway receives a longitudinally-slotted bar, B′, which is made adjustable in said guideway by a set-screw, C′, that passes through said slot and into the bed of said guideway. A block, *b*′, which is rigid with said bar at one end thereof, extends out-

ward from the face of said bar and is tapped to receive a screw, X. A part of said screw is made smooth and cylindrical, to form a wrist-pin, Y, which works in the longitudinal slot *y* of the inner end of a vibrating bar, Y, the latter turning on a fulcrum, Z. The outer end of bar Y′ is loosely connected to two connecting-rods, B^x C^x, which respectively extend upward and downward, and are respectively loosely attached at their operative ends by pins D^x E^x to the approximate ends of levers F^x G^x. These levers are attached to the shafts K^x L^x, respectively, said shafts being at right angles to said levers, and being held to sliding frame Q by a bearing which admits of their semi-rotation. These shafts carry, respectively, firmly fixed to them, two arms, M^x M^{xx}, N^x N^{xx}, Fig. 1, (four in all,) seen in dotted lines in Fig. 1, which arms carry at their ends, respectively, a device, P^x P^{xx} Q^x Q^{xx}, Fig. 2, of shape as seen in side view in Fig. 2, which devices pass over the ends, respectively, of the shafts which carry the composition rollers W W, &c. These devices P^x, &c., envelop, respectively, in part the sheave-wheels T T, &c., in such manner, as seen in Fig. 2, that the motion to the right and left of these enveloping devices pulls the respective shafts to which the sheave-wheels T T, &c., and the composition rollers W W, &c., are attached also to the right and left. [In Fig. 2 one of these devices, Q^x, (which may serve as a sample for the four,) is seen to have its bent ends furnished each with an interiorly-projecting roll, D′ D″, which rolls pass between two circular plates, firmly fastened at a little distance from each other, to the end of the shaft bearing a composition ink-distributing roller.] The action of this last-described combination of devices proceeds thus, effecting the vibration of the ink-rollers: In the rotation of the form-cylinder shaft E (see Fig. 1) the eccentrically-disposed pin X vibrates the vibrating arm Y. The left-hand end vibrating correspondingly, the arms B^x C^x are carried alternately up and down, thus working the right-hand extremities in Fig. 2 of the bars F^x G^x up and down, partially rotating, respectively, the shafts K^x L^x, above referred to. These shafts K^x L^x thus draw the extremities of the arms M^x M^{xx} N^x N^{xx} (alternately, as the arms project on opposite sides of the shaft) hitherward, (in Fig. 1,) and with them, through means of the four devices above referred to, (seen in Fig. 2,) the sheave-wheels T T T T, with the riders W W, &c., attached to them, to be returned to their former position, when the completion of the rotation of the shaft E restores the right-hand end of the vibrating arm Y to its original place. The slot (with its set-screw) in the right-hand portion of the vibrating arm Y and the slot in the slotted bar B′ (with its set-screw) give a facility of adjustment which, it is seen, permits the riders to be drawn (or to vibrate) parallel to the axis of the form-cylinder to a greater or less distance, as occasion may require.

The impression-cylinder and its action is now to be described.

R^x, Fig. 1, dotted lines, is a cam (borne by the form-cylinder shaft E) whose surface in rotation impinges upon a roller, S^x, borne by the box T^x, which box slides to the right and left in a box bolted to the frame A A^x by screws. (Seen in Fig. 1.) This box T^x carries at its other (right-hand) end a pin, U^x, which bears, loosely semi-rotating on it, a ring attached to the left-hand end of a short shaft, V^x, with a screw turned on it, over which screw passes a sleeve, W^x, bored with a female screw. At its other end this screw-sleeve bears a left-handed female screw, into which passes a corresponding male screw, borne by the short shaft X^x, which bears at its right-hand end a ring, carrying at right angles to the shaft X^x a pin or short shaft, Y^x. Upon this pin impinge two arms, (thus making a toggle-joint,) one of which arms, Z^x, passes diagonally downward to where, by means of a ring borne by its lower end, it is held to a pin, A^z, which pin passes through a projecting portion of the frame A A^x, on the other (and outer) side of which the pin bears a circular plate, B^z, which carries two curved slots, the arcs of which are eccentric to the pin A^z. Through these curved slots pass, respectively, pins C^z D^z, (firmly attached by screws on them to the frame A A^x,) whose function is to hold the curved-slot plate B^z in position after the slots have been adjusted, so as to give desired greater or less length (within the limits of the eccentricity of the curved slot) to the arm Z^x. The other arm, Z^{xx}, partially rotating on the pin Y^x, proceeds diagonally upward to where a ring, attached to its upper end, hinges on a pin borne by the bottom side of the impression-cylinder box E^z, Fig. 1. This box E^z slides up and down (with grooved bearings) on the impression-cylinder frame F^z F^z, which is seen in Fig. 1 to be firmly bolted on the upper edge of the right-hand side of the frame A A^x. This box E^z is adjusted, when desired, as to its height by a set-screw above and one below, attached to the frame F^z F^z, and bears the shaft G^z, which carries the cog-wheel H^z, which gears into the large cog-wheel D. This shaft G^z carries, also, the impression-cylinder J^z, (not represented in Fig. 1,) seen in sectional view and enlarged in Fig. 4. The action connected with the impression-cylinder is this: The cam R^x, pressing on the roller S^x, pushes the box T^x to the right, (in Fig. 1,) and with it the short shafts V^x and X^x, thus pressing to the right the toggle-joint, hinged by the pin Y^x. The upper end of the arm Z^x (as the lower end is held from passing downward by the pin A^z) rises, carrying with it, upward, the arm Z^{xx}, and the box E^z, and its shaft G^z, with the impression-cylinder J^z, the paper sheet on the latter being thus not in contact, while the raised condition of the cylinder continues with any portion of the form-cylinder F. Thus the passage, in rotation of the

form-cylinder, of the zinc ink-distributing surfaces of that cylinder, covered with ink, effects no defilement of the paper sheet. When these inked surfaces have passed, the formation of the cam R^x permits the descent of the impression-cylinder, and, the two cog-wheels D and H^z not having been thrown out of gear, the rotation of both wheels, and consequently the printing of the paper sheets, proceeds, as before. The impression-cylinder J^z is covered with two layers—one of paper and the other of cloth, or both of either—the sheets being held at one end by two blocks of wood or metal, E′ E″, called the "clamps," fastened, respectively, by a screw to one side of the notch in the cylinder seen in Fig. 4, from whence the layer passes round the cylinder to the rollers F′ F″, on which they are rolled, the rollers being held by attachments to the cylinder. (Not represented.) G′, Fig. 1, is the spring-shaft, hinged to the frame A A^x, and bearing a spiral spring, and having its left-hand end pointed, the point impinging in a small cavity on the edge of the pin Y^x. The function of this spring-shaft G′ is to press backward to the left the pin Y^x, (and the respective ends of the arms Z^x Z^{xx},) when the rotation of the cam R^x permits it, and thus draw down the box E^z, bearing the impression-cylinder.

H′, Fig. 1, is a shaft running parallel with and below the impression-cylinder, (seen enlarged and in side view in Fig. 8,) and bearing, as seen in that figure, two brushes fastened spirally, like a helical screw, on the shaft. This shaft and brushes are called the "brush-paper extensor." The ends of the brushes impinge on the paper sheets to be printed as they pass over the impression-cylinder, and, being rotated, (by simple devices not represented,) the brushes draw the paper sheet from the center of the shaft respectively to the right and left, and spread it smoothly upon the cylinder J^z. This cylinder J^z receives the paper sheets from the feed-table K^z as fed to it by hand, the operator passing the end of the sheet to the gripper L^z, Fig. 4, (which is actuated in the usual manner with rotary presses, not necessary to be explained.) The end of the gripper, closing down on the paper, presses it down (not, as usual, on the periphery of the cylinder, but below the periphery) on a piece of rubber, M^z, held in the open space seen in Fig. 4. by the screwing up of the clamp E′. The impression-cylinder J^z, rotating with the rotation of the larger cog-wheel D, the paper sheet is wound round it, being kept spread smoothly upon the cylinder-face by the action of the brush-paper extensor H′, and the sheet in due course of rotation comes in contact with the form of types at the point G, Fig. 3, and is duly printed. It is then, by the action of the fly J′, (which is constructed and operated in the usual manner with the flies of rotary presses,) withdrawn from the impression-cylinder and spread upon the delivery-table.

A device is added to the machine by which, when desirable, the printing by the impression-cylinder, is stopped. This is to be used when a sheet of paper is fed in askew, or in other similar contingencies.

L′, Fig. 1, is the throw-off, a lever hinged to the frame A A^x, (on the further side of the press, but represented, as shown, for convenience sake,) which, the left-hand end being pressed down by the foot, or otherwise, raises, on the right-hand side of its fulcrum, the horizontal arm of the bell-crank lever M′, Fig. 1, (borne by the frame,) which action presses the arm Z^x just below the pin Y^x, which action raises the arm Z^{xx} above it, and with them the impression-cylinder box E^z, and the impression-cylinder which it carries, thus putting the latter out of contact with the form, and so stopping the printing of the impression-cylinder. The foot being removed from the throw-off, the box E^z, with all its attachments, returns to its usual position, as seen in Fig. 1, and the printing is resumed.

I claim in printing-presses—

1. The vibrating arm Y, with its slot, as shown, and the pin Z and screw X, in combination with the rotating shaft carrying a guideway, a bar and block adjustable in said guideway, a wrist-pin which enters said block, the rider ink-distributing rollers, and the connecting-rods, bolts, and shafts between the arm Y and the said rollers, all constructed and arranged substantially as shown and described.

2. The toggle composed of the pin Y^x and the arms Z^x and Z^{xx}, in combination with the actuating-cam R^x, the impression-cylinder, the impression-cylinder box E^z, the circular plate B^z with its pins C^z D^z, and means of connection between cam R^x and pin Y^x, substantially as set forth.

3. The toggle composed of the pin Y^x and the arms Z^x Z^{xx}, in combination with the actuating-cam R^x, the impression-cylinder, and a sliding bar or piece for operating said toggle, said bar being connected to pin Y^x and arranged to be operated by said cam, substantially as set forth.

4. In combination with a transverse guideway carried by the end of a shaft, a bar adjustable therein, a slotted vibrating bar or lever having a wrist-pin connection with said adjustable bar, and devices interposed between said vibrating bar and the inking-rollers, substantially as and for the purpose set forth.

THOMAS BROWN DOOLEY.

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THOMAS J. CULLIMY.