

R. M. HOE.
Printing Press.

No. 5,199.

Patented July 24, 1847.

Fig. 2.

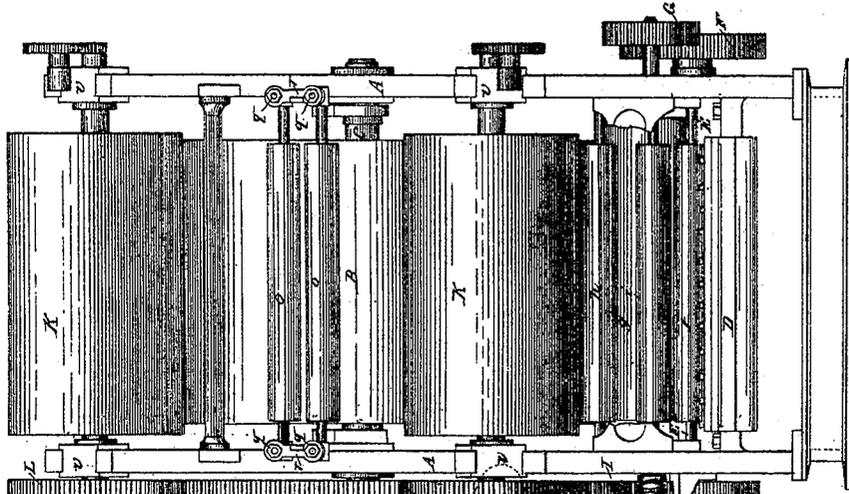
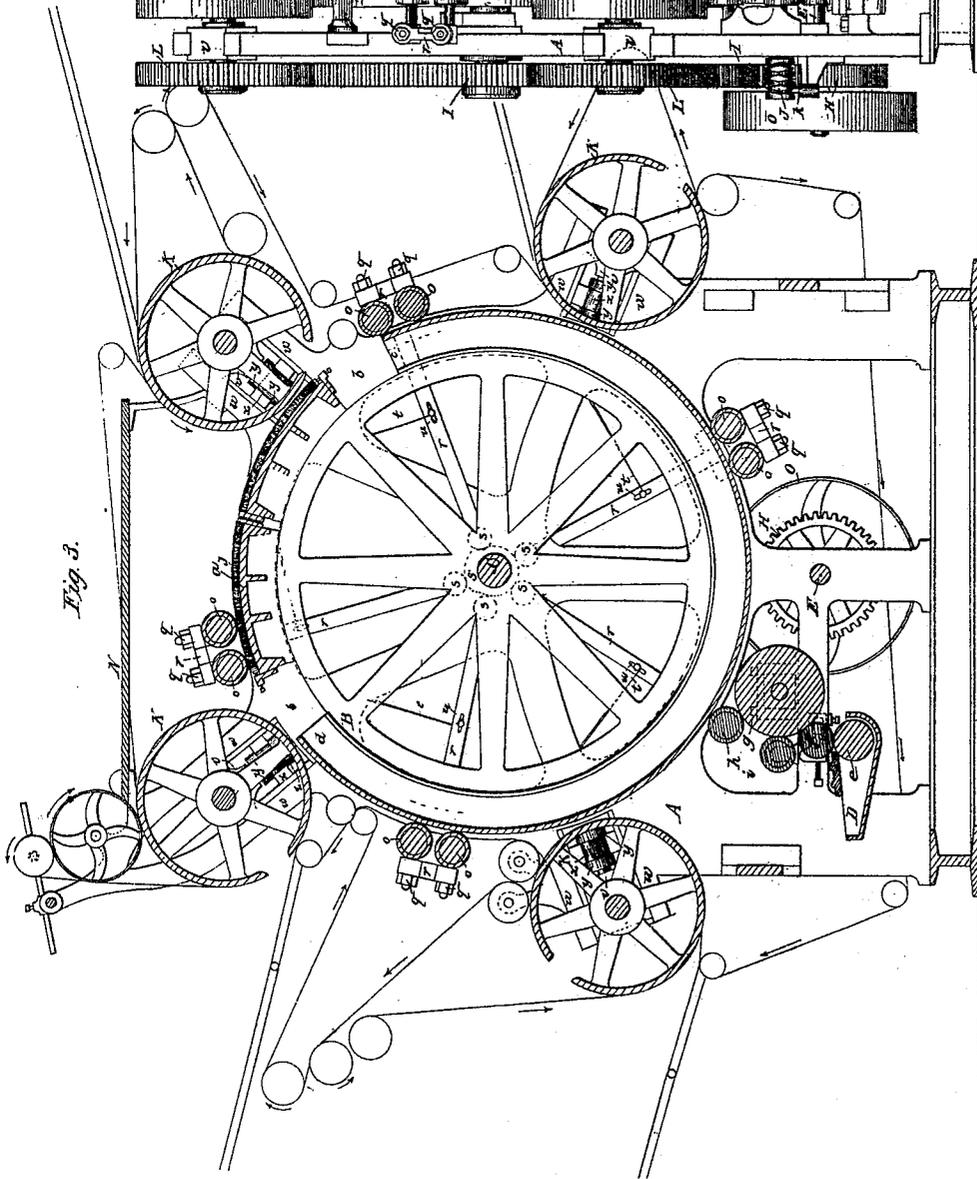


Fig. 3.



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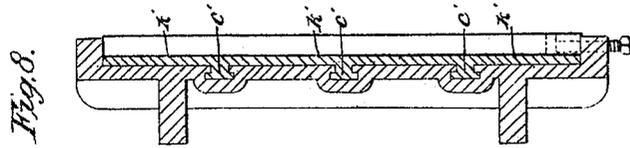


Fig. 8.

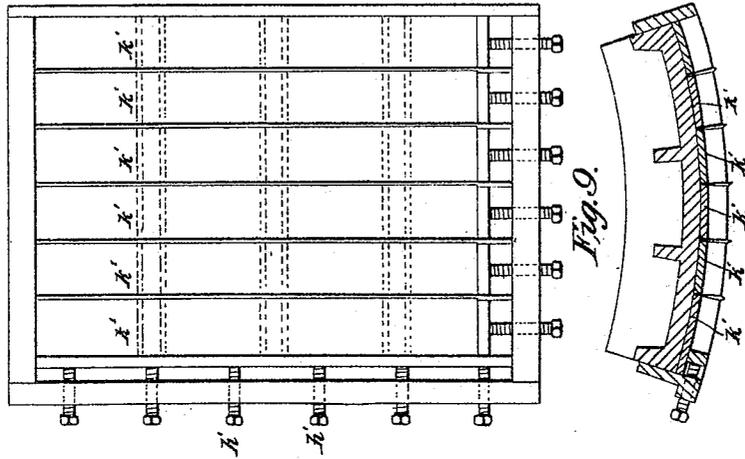


Fig. 7.

Fig. 9.

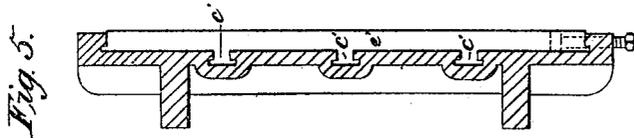


Fig. 5.

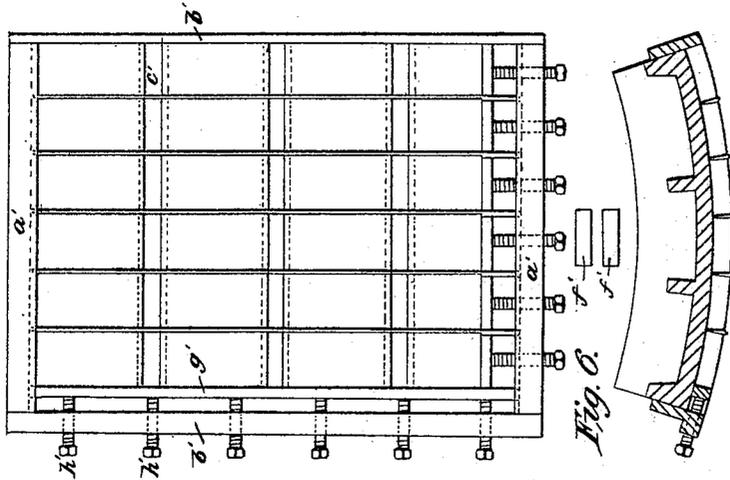


Fig. 4.

Fig. 6.

UNITED STATES PATENT OFFICE.

RICHARD M. HOE, OF NEW YORK, N. Y.

IMPROVEMENT IN ROTARY PRINTING-PRESSES.

Specification forming part of Letters Patent No. 5,199, dated July 24, 1847.

To all whom it may concern:

Be it known that I, RICHARD M. HOE, of the city, county, and State of New York, have invented new and useful Improvements in the Printing-Press which I denominate "Hoe's Cylindrical-Bed Press," and I do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side elevation of the press; Fig. 2, a front elevation; Fig. 3, a longitudinal vertical section; Fig. 4, a plan of the cylindrical bed that receives the types to exhibit the method of securing them; Fig. 5, a longitudinal section, and Fig. 6 a cross-section thereof; and Figs. 7, 8, and 9 like views of a modification of the method of securing the types.

The same letters indicate like parts in all the figures.

My improvements are applied to that class of printing-presses in which the form of types is arranged on the surface of a cylinder with a series of impression-cylinders, inking-rollers, &c., arranged around it, so that by its rotation the types are successively inked and give their impression to the sheets of paper as they are fed in by the impression-cylinders, the number of sheets to be printed by one revolution of the cylindrical bed depending on the number of impression-cylinders arranged around it, the number of impression-cylinders being governed by the diameter of the cylinder that carries the types and the distance between the impression-cylinders.

The nature of the first part of my invention consists in arranging the form or forms of types on a segment of a cylinder, while the other portion of its surface is employed to distribute the ink, and therefore answering the purpose of a distributing-table.

The second part of my invention consists in giving to the inking-rollers, which are arranged in sets around the cylindrical form and distributing-table, and also to the transferring-roller of the inking apparatus, a motion in and out or toward and from the axis

of the cylinder, around which they are arranged, so that they may make pressure on the cylindrical distributing-table as it passes under them to distribute the ink and be thrown out sufficiently far from the center to transfer the ink to the form of types, as the face of the types must be the segment of a larger cylinder than the segment that forms the distributing-table, that this (the distributing-table) may not ink the impression-cylinders when passing by them.

The third part of my invention relates to the inking apparatus; and it consists in giving to the ductor or fountain roller that takes the ink from the fountain a slow continuous rotary, instead of an intermitting motion, as heretofore, so that the ink shall be regularly transmitted to the taking-roller and thence to the distributing-roller, &c., and also in connecting the arbor of this ductor or fountain roller with the mechanism that gives to it the slow rotary motion by means of a ratchet, that it (the ductor-roller) may be turned forward when desired to alter the supply of ink.

The last part of my invention relates to the method of securing and retaining the types on the cylindrical bed by means of column-rules, which are thicker at the outer than at the inner edge, so that the faces of any two of them shall be parallel with each other, or nearly so, to hold the column of type as tight at the top as at the base, the said rules being made with projections from the lower edge to fit in rabbeted grooves in the bed, so that the columns of types, with the rules separating them, may be pressed together by screws at the side of the bed, in the usual manner of securing types, and thus secure and hold the form of types on a cylindrical surface as effectually as on a flat surface, this important object having long been essayed in various ways, but never before to my knowledge successfully attained.

In the accompanying drawings, A represents a frame properly adapted to the various parts of the press, and B a cylinder of large size mounted on a shaft C, running in appropriate bearings. About one-fourth of the circumference of this cylinder constitutes the bed *a* of the press, the periphery of which is of course the segment of a cylinder adapted to receive the form of types either in the manner to be pres-

ently described or in any other manner which may be desired. On each side of this bed there is a small open space $b b$ to give free access to the ends of the bed for putting in and removing the types, and then the remnant of the periphery of the cylinder from c to d constitutes the cylindrical distributing-table, its surface being properly adapted to the distribution of ink, as distributing-tables for this purpose are generally made, except that it is cylindrical instead of flat. The diameter of this part of the cylinder should be less than that of the form of types, that it may pass by the impression-rollers without touching them.

The ink is taken from the fountain D , of the usual construction, by the ductor-roller e , transferred from this to the taking-roller f , thence transferred to the vibrating distributing-roller g , and taken from this by the transferring-roller h to the distributing-table $c d$ of the cylinder B , one or more small distributing-rollers i being applied to the surface of the vibrating distributor and between the taking and transferring rollers for the purpose of more equally distributing the ink. This small distributing-roller may be composed of rings of cloth slipped onto an inclined cylinder or shaft. The vibrating distributing-roller g receives its rotary motion with considerable velocity (the surface moving with an equal velocity to the distributing-table $c d$) from the main shaft E by means of a cog-wheel F , which engages another cog-wheel G of less diameter on the arbor of the rollers, and these wheels are of sufficient thickness to allow of the vibration of the roller, with its arbor, in the direction of its axis without disengaging the cogs, and this vibrating motion is obtained by means of the double worm j on the end of the arbor, the two grooves crossing each other, so that by running on a swivel-feather k one of the grooves or worms will travel on the feather to the end, and then as it turns to run into reverse groove the feather is turned, which carries the arbor back, and so on back and forth.

The taking-roller f , the transferring-roller h , and the small distributing-roller i are carried by the rotating motion of the vibrating distributing-roller by contact of their surfaces, and the ductor or fountain roller receives a slow and continuous rotary motion to carry up the ink from the fountain by a worm l , that takes into the cogs of a worm-wheel l' on the arbor of the ductor, motion being communicated to the arbor of the worm by a belt m from a pulley (not seen in the drawings) on the main driving-shaft E . The worm-wheel l' on the arbor of the ductor turns freely thereon, and is connected by a ratchet-wheel and pawl n , so that the mechanism can carry the ductor in one direction, while the ratchet admits of turning it forward independently of the worm and its connections when it becomes necessary to alter the supply of ink.

The main cylinder B receives motion from the main shaft E by means of the pinion H , which engages with a cog-wheel I on the shaft C of the cylinder, and as the cylinder B rotates in the direction of the arrow the form of types J thereon is in succession carried to and under four impression-cylinders $K K K K$, arranged at proper distances around the cylinder to give the impression to four sheets of paper introduced between the form of types and the impression-cylinders, one sheet being introduced by each impression-cylinder in the same manner as in the well-known double-cylinder press. The impression-cylinders are constructed in the same manner as those employed in the class of presses just referred to, and they are either provided in the well-known manner with fingers for taking and liberating the sheets; or a system of tapes may be used for this purpose, and as these make no part of my invention it is deemed unnecessary to describe them.

The shaft of each of the impression-cylinders has a cog-wheel L on one end, which engages with the cog-wheel I on the shaft of the cylinder, by which the impression-cylinders receive their appropriate motion, and care must be taken to have the pitch-line of these cog-wheels so regulated that the surface of the form of types and that of the impression-cylinders shall move with the same velocity to prevent the slipping of one surface on the other, which would destroy the impressions.

Between every two of the impression-cylinders there is a set of inking-rollers, making one set to each impression-cylinder, each set consisting of two rollers $o o$, the journals of which run in boxes that are adjustable by screw-nuts $q q$ in the ends of two sliding bars $r r$, one on each side of the press and moving in appropriate slides in the sides of the frame. These bars converge to the axis of the cylinder B , and are provided at the inner end each with a friction-roller s , (represented in Fig. 3 by dotted lines,) which run on the periphery of a cam s' , (also represented by dotted lines,) and this cam is so formed as to force out these bars with the inking-rollers just as the form of types approach them, that they may make a gentle pressure to ink the types, and as the form leaves them to permit the bars and rollers to be moved in by the tension of a spring t , which bears on an adjustable pin u on the bars, so that the inking-rollers may run on the distributing-table to receive the ink from it. There must of course be one spring for each bar.

The journals of the impression-cylinders run in boxes v , that slide in standards $w w$, and from the inner end of each there is a screw-stem with a nut y above and below a cross-bar x , through which the stem passes, by means of which the position of the impression-cylinders relatively to the form of types can be regulated, and below this and passing through the frame there is a set-screw z , (one for each

sliding box,) which determines the depth to which the screw-stem of the sliding box shall move toward the axis of the form of types. This sets the impression-cylinders for the degree of pressure to be given in taking the impression, while by means of the screw-nuts on the stems of the sliding boxes the impression-cylinders can be raised at pleasure and thrown out of play.

Each impression-cylinder is provided with one feeding-table M and one delivery-table N to receive the printed sheets.

It will be obvious from the foregoing that the form of types can occupy more or less of the surface of the cylinder at the pleasure of the constructor, and that the number of impression-cylinders can be increased or decreased, as it may be desired, to make the press of greater or less capacity; but it must be observed that there must be one set of inking-rollers for each impression-cylinder, although one inking apparatus is sufficient for several impression-cylinders, although it is deemed advisable not to have more than four cylinders for one inking apparatus.

Power is applied to drive this press by a belt from some first mover running onto a belt-wheel O on the main shaft E, or in any other manner which may be preferred.

If desired, stereotype-plates may be secured to the cylinder instead of the form of types, a portion of the surface of the said cylinder being made and employed as a distributing-table for the distribution of the ink.

Having thus described my improvements in the press and the manner of constructing and using the same, I will proceed to describe my improved method of securing the form of types on a cylindrical surface. The bed *a* is a segment of a cylinder with flanges *a' b'* at the ends and sides. In the direction of the periphery there are rabbeted parallel grooves *c'*, cut to receive correspondingly-formed tongues projecting from the lower edge of column-rules *e'*, the ends of which are made to fit in rabbets cut in the inside face of the flanges *a' a'* of the bed. These column-rules are made thicker at the outer than at the inner edge; or, in other words, they are so formed as to present the form of a wedge in their cross-section, so as to bind the types near their upper end. As the types are set on a cylindrical surface and their sides are parallel instead of radiating from the center of the circle, if the rules were made of equal thickness—that is, with parallel sides—it will be obvious that the types, however tight they might be bound together at the base, would be loose at the top; but by making the rules thicker at the outer than the inner edge the types of each column are bound together just as tight at the top as at the base, and by this means are as firmly held on a cylindrical as they would be on a flat surface, for the rules are held down by the tongues fitting in the grooves and the ends in the rabbets of the side flanges of the bed, and

so long as the rules are held in place so long will the types be. The grooves in the bed are fitted up with blocks *f'*.

In setting up the form the blocks *f'*, No. 1, are put in the grooves so as to be flush with the surface of the bed. The first column of types is set up. Rule No. 1 is then inserted; then blocks 2, the second column of types, rule 2, and so on to the end, and then finally a bar *g*, against which bear the ends of the screws *h'*, that pass through one of the end flanges *b'* of the bed to bind the form of types in one direction, the usual or any other method being used for binding them in the other direction.

It will be obvious to every one skilled in this branch of the art that the principle which I have adopted for securing the types on a cylindrical bed may be variously modified without changing the character of my invention, and as an evidence of this it may be well to describe one of the modifications which I have contemplated, which is as follows, viz: Instead of making tongues to project from the lower edge of the rules, they (the rules) are attached to plates *k*, which are segments of a cylinder corresponding with the cylindrical bed and connected with it by tongues fitting in grooves *c'*, in the same manner as the tongues of the rules. By this modification the rules, which of necessity are made very thin, are sustained along their whole length by their attachment to the segment-plates, instead of being sustained at intervals by the tongues, as in the first modification.

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

1. Putting the form or forms of types on a movable or permanent segment of a cylinder which forms the bed and chase, substantially as described, and also when this is combined with the cylindrical distributing-table, which occupies another segment of the same cylinder, substantially as described.

2. Giving to the inking-rollers a movement toward and from the center of the cylinder that carries the form of types, substantially as described, when this is combined with the form of types and the distributing-table made on one and the same cylinder and of different radius, as described, whereby the inking-rollers are adapted to the different diameter of the form of types and the distributing-table, as described.

3. Giving to the ductor or fountain roller of the inking apparatus a slow continuous rotary motion, in combination with the ratchet-connection between the roller and the mechanism from which it receives its continuous rotary motion, substantially as described, whereby the ink is more regularly supplied, and by which, also, this supply may be altered when desired, as described.

4. The method of securing the form of types on a cylindrical surface with column-rules

made thicker toward their outer than their inner edge by connecting these with grooves in the bed, by which they are permitted to approach and recede from each other, and at the same time kept down to the same radius, substantially as described, whereby prismatic types can be secured and held on a cylindrical

surface as effectually as on a flat surface, as described.

RICHD. M. HOE.

Witnesses:

CHAS. M. KELLER,
JAMES MACLYON, Jr.