

R. M. HOE & S. D. TUCKER.
PRINTING-PRESS.

No. 173,295.

Patented Feb. 8, 1876.

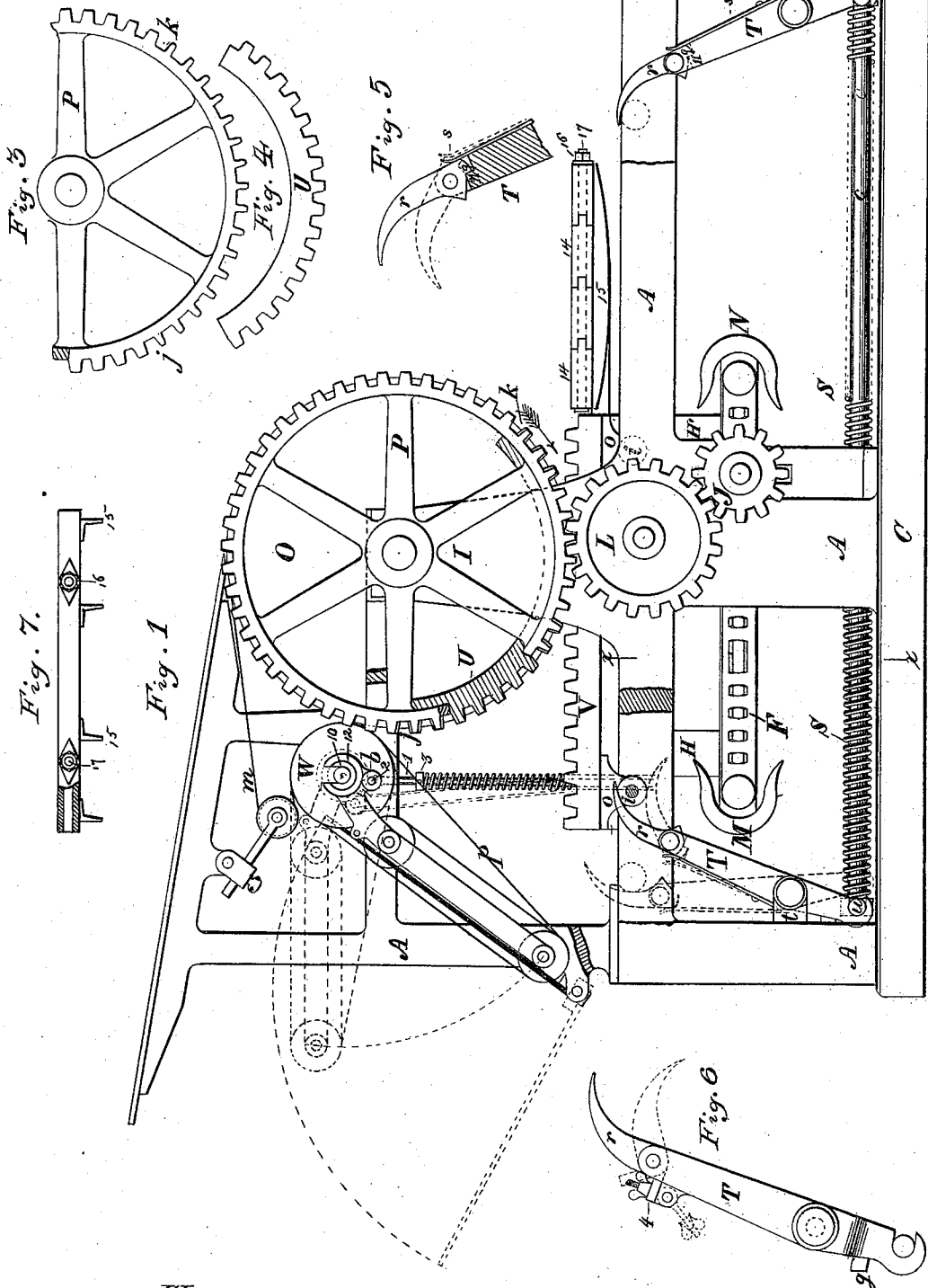


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses
W. H. H. H. H.
W. H. H. H. H.

Inventors
Richard M. Hoe & Stephen D. Tucker,
by *Munson & Philipp,*
Attorneys.

R. M. HOE & S. D. TUCKER.
PRINTING-PRESS.

No. 173,295.

Patented Feb. 8, 1876.

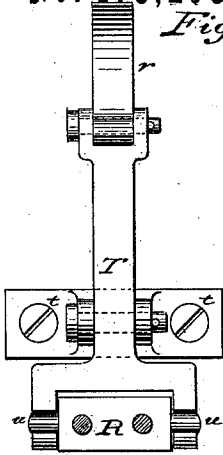


Fig. 9.

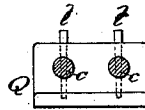


Fig. 8.

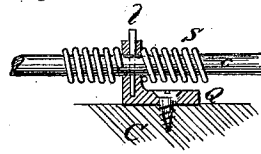
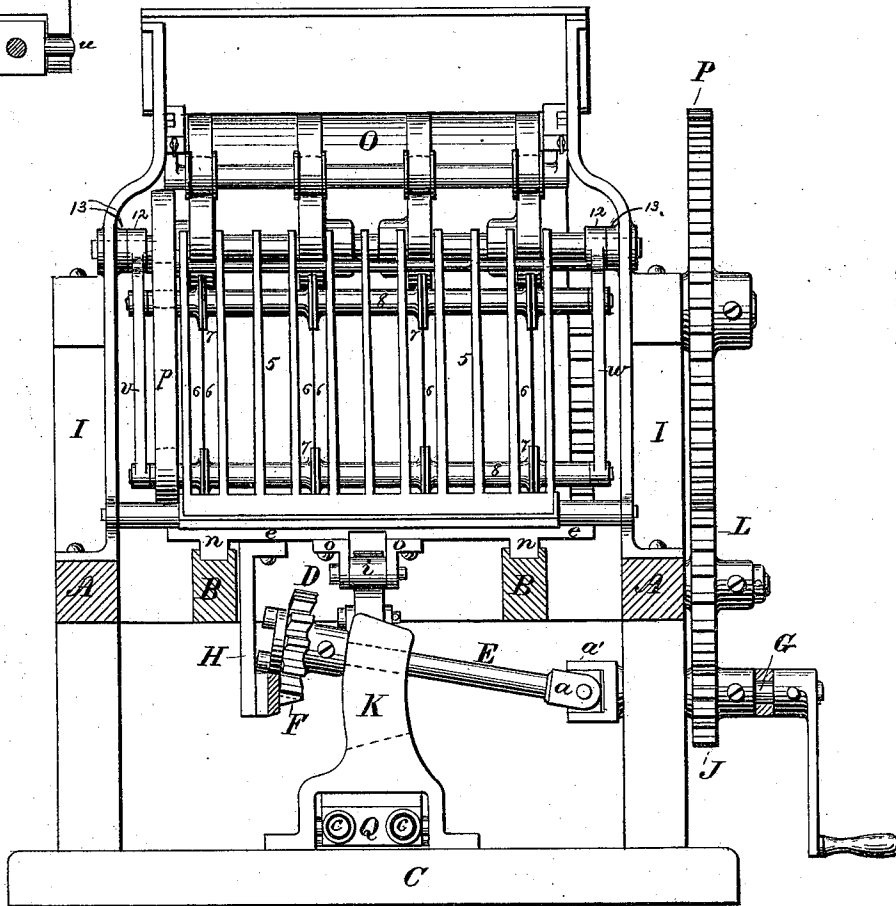


Fig. 2.



Witnesses
Wm. H. H. H. H. H.
W. H. H.

Inventors
Richard M. Hoe & Stephen D. Tucker,
& *Munson & Philipp,*
Attorneys.

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. **173,295**, dated February 8, 1876; application filed October 11, 1875.

To all whom it may concern:

Be it known that we, RICHARD M. HOE and STEPHEN D. TUCKER, of the city, county, and State of New York, have invented an Improvement in Cylinder Printing-Machines, of which the following is a specification:

In the accompanying drawings, in which like letters indicate like parts, Figure 1 is a side elevation with portions of the frame-work removed, so as to better exhibit the interior parts; Fig. 2, a rear view, in which the lower portion is a section taken on line *x x* of Fig. 1; Fig. 3, a view of a portion of the cylinder-wheel; Fig. 4, a view of the cylinder-segment; Fig. 5, a view, partly in section, of the upper portion of one of the spring-levers; Fig. 6, a side view of one of the spring-levers; Fig. 7, a front view of the inking-table; Fig. 8, front and side views of the rod-holding bracket; and Fig. 9 a side-face view of one of the spring-levers.

The invention relates to that class of cylinder or rotary printing-machines in which the printing-form reciprocates horizontally; and it consists in various details of construction which are particularly hereinafter specified and described.

The main frame A, in which the several parts of the machine are supported, rises from the bed-plate C, and has suitably secured to it the longitudinal ribs or ways B B, upon which the type-bed *e* reciprocates. This type-bed is provided with the usual runners *n*, and may be provided with friction-rollers or a roller-frame, as is common, which travels in the ways B B, and supports the bed in all positions of its horizontal reciprocation. The bed is driven by a pinion, D, on the end of a vibrating shaft, E, which is connected by a universal joint, *a a'*, with the driving-shaft G, and engages with a double rack, F, pendent from the bed *e* by means of hangers H H'. The shaft E is guided in its vertical vibrations in a bifurcated post, K, and the driving-pinion D is guided from the upper to the lower side of the double rack F by curved segments M and N at each end thereof, to produce the reverse movement of the bed in the well-known manner. The bed is provided on its under side at its either end with rollers *i i* hung between brackets *o o*, so as to provide a clear

space above them. (See Fig. 2.) Two rods, *c c*, lying parallel to each other, pass through proper openings in a short bracket, Q, bolted or screwed to the bed-plate, which rods are fixed therein by pins *l* or by other convenient means, to prevent their longitudinal movement. The outer ends of these rods *c* pass through openings in swivel-blocks R, which are thus capable of sliding upon them; and bearing against and between these blocks and the bracket Q are spiral springs S, which surround said rods *c c*. At each end of the machine levers T T, fulcrumed in brackets *t*, projecting from the end frames, are inclined forward, and their hook-shaped lower ends are made to embrace the journals *u u* of the sliding swivel-blocks R. The outward pressure of the springs S upon these blocks forces the tops of the levers T into an inclined or forward position toward the center of the press, which inclination is determined by a projecting lug, *g*, bearing against the bracket *t*, or by any other suitable stop.

The upper ends of said levers T are bifurcated, as seen in Fig. 9, so as to receive a curved arm, *r*, which is journaled between the jaws thus provided. Each of these curved arms *r* is so shaped at its lower end as to provide for its forward movement upon its journals independently of the motion of the lever T, and they may thus be folded down to clear the path in which the rollers *i i* travel, as in Fig. 5. The curved arms and the levers T are each provided with shoulders or stops 9 and 11, (Fig. 1,) which engage each other to prevent the backward movement of the said arms beyond a point where they form perfect continuations or extensions of said levers. Springs *s*, fastened upon the backs of the levers T and bearing upon the lower ends of the curved arms *r*, serve to hold them in their upright and folded positions respectively, as in Figs. 1 and 5, though the springs or some equivalent holding means is essential only in holding the arms upright, since they will remain folded or bent down by gravity alone.

When the bed has the heavy form of type upon it, and is reciprocated by the operation of the machine, its weight and momentum are such that powerful springs are required to arrest its movements at each end of its reciprocation.

cation; hence, when it is to be run out by hand-power to the front of the machine to receive the form, the great power necessary to overcome the resistance of the springs cannot be conveniently applied, but by constructing the arms *r* to fold down below the path or plane in which the rollers *i* upon the bed travel, the bed may be readily moved into the proper position to receive the form or make it ready without compressing the springs. When the bed is reciprocated and approaches either end of the machine, one of the rollers *i* passes under one of the curved arms *r*, which is in the proper position to thus meet it, as in Fig. 1; and, as the movement of the bed continues the roller *i* runs under the curved end of the arm *r*, and thus pressing against its curved under side, which is in a plane nearly the same as that in which the top of the bed-roller *i* is traveling, gently presses the said arm *r* upward and backward as the said roller runs down its curved face. The backward movement of this arm, and consequently of that of the lever *T* upon its fulcrum, is thus gradually imparted and increased from a slow to a rapid pace, thereby with like speed compressing the springs *S* upon the rods *c* through the sliding movement of the swivel-block *R* against them. The increasing power of the springs is thus opposed to the movement of the bed until it is arrested at the end of its stroke, when the lever *T* stands in a vertical position and at right angles to the bed, at which time the bed-roller *r* presses squarely against the face of the lever, and the springs exert their greatest power. The transition from a slight pressure to that finally exerted by the springs is graduated and regular, which enables the bed to be stopped at the end of its stroke in either direction, without concussion or jar.

In the movement of the bed away from the spring-lever it has pressed backward, the greatest power of the springs is applied while the lever is in its vertical position, and so gradually withdrawn as the lever returns to its inclined position by means of the curved arm, that the bed is relieved from the pressure of the springs without the slightest interference with the regular motion, which at this time it receives from its driving-gears, and the lever *T*, as its curved arm leaves the roller *i*, gently seats itself upon its stop *g* without jar or concussion. As the roller *i* runs under the curved arm *r* the bed is thereby held down in its ways, and is thus prevented from jumping as its driving-pinion passes around the ends of the double rack. The curved arm thus holds the bed steady at this time, and does not leave the roller *i* until the said pinion has fairly re-engaged the top or bottom of the said rack, and thus insures a smooth and regular motion, to be imparted to the bed from its driving-pinion.

The impression-cylinder has its bearings in standards *I*, rising from the main frame, and to one end of its shaft is keyed a gear-wheel, *P*, which is connected with the gear *J* on the

main or driving shaft by an intermediate gear *L*.

When the sheet has been fed to the grippers on the cylinder *O*, and said cylinder is rotated by the gear-wheel *P* and the gears *L* and *J* to bring the sheet into printing position, the bed will have been carried out to the front end of the machine by means of its driving-pinion, as has been explained. As the reverse movement of the bed takes place, and it and that portion of the cylinder carrying the sheet, move in contact, to cause an impression to be printed upon the sheet, the segment *U* on the cylinder will engage the inside rack *V* on the bed, causing the two to move in unison; and, in order that the united movements of the cylinder and bed shall be exact and perfect during the time when the impression is being made upon the sheet, that portion of the teeth of the cylinder-wheel *P* which would engage the intermediate driving-gear *L* at this time—viz., those from *j* to *k*—are reduced in thickness, or removed, and hence rendered inoperative, so that no motion shall be communicated to the cylinder from the gear *L* during the time the impression is being effected, thus leaving the cylinder wholly dependent upon the motion derived from the rack upon the bed, which thus causes both cylinder and bed to move in perfect unison.

This construction accomplishes perfect work, since any irregularity resulting from the connections between the bed and cylinder being made through the double rack *F*, driving-pinion *D*, universal joint *a a'*, driving-gear *J*, intermediate gear *L*, and cylinder-wheel *P*, is obviated by the connection being made direct from the cylinder to the bed by the rack *V* and segment *U*.

When the impression is completed the cylinder-wheel *P* is in such a position that its full teeth re-engage the gear *L*, at which time the segment *U* leaves the rack *V*, and the reverse movement of the bed is accomplished by the driving-pinion *D*, while the continued rotation of the cylinder carries the printed sheet, by means of the tapes *m*, to the delivering rollers or pulleys *W*, by which it is directed upon the endless cords *6* over the fly-frame *5*, whence it is carried to the piling-table. The cord-frame consists of pulleys *7* on shafts *8* journaled in the side bars *v* and *w*, and continuously moved by a band, *p*, running over one of the delivery-pulleys *W*. The side bars *v* and *w* are connected together by suitable braces or tie-rods, and swing upon bosses *10* which project from the main frame. These bosses *10*, the bearing-hubs *12*, and the bearings or boxes *13* of the shaft of the delivery-pulleys *W* are all slotted, as in Fig. 1, so that the shaft carrying the delivering-pulleys may be lifted up and out when occasion requires their removal. Arms *b* project from the upper ends of the side bars *v* and *w*, so as to form therewith bell-crank levers. Rods *1*, jointed to these arms *b*, have their free ends sliding in suitable guide sleeves or plates attached to the main frame, and spiral springs

encircling the rods 1 exert an upward pressure against collars 3, which are adjustable upon said rods.

When the fly cord-frame is raised into the position shown by dotted lines, Fig. 1, as it may be when access to the cylinder or other parts at this end of the machine is desired, the arms *b* will carry the joints connecting them with the rods 1 into such position that the pressure of their springs will securely support the cord-frame; and when it is to be lowered to its working position, shown in full lines, Fig. 1, the jointed connections of the rods and the arms *b* are carried to positions slightly in front of the centers on which said cord-frame swings, where they continuously but slightly press with an upward tendency upon the side bars of the cord-frame. They thus act as cushions, sustaining the weight of the cord-frame, and prevent its falling or being carried down with such force as would injure it. Suitable stops fixed to the main frame limit these motions of the swinging fly cord-frame in either direction.

Instead of the spring *s* holding the curved arms *r* in proper extended position, a heel, 4, and a swinging bolt with thumb-nut may be used, as in Fig. 6.

The inking-table is composed of narrow wooden strips tongued and grooved, the joints being left dry or unglued. Stay-rods 17, passing transversely through these strips 14, hold them together, and by means of the nuts 16, any separation of the seams caused by the shrinkage of the strips, may be taken up.

Braces 15 support and strengthen the table to which they are fastened, by screws passing through elongated slots, which provide for the movements of the strips when their seams are tightened by the rods 17 and nuts 16.

Parts of the press not herein particularly described are of the ordinary construction.

What I claim is—

1. The combination of the roller or rollers *i* with the type-bed for operating the spring-brake lever, substantially as shown and described.

2. A spring-brake lever constructed with a curved head or arm, which forms an inclined bearing-surface upon which travels an engaging part of the type-bed, substantially as shown and described.

3. The combination of the bed roller or roll-

ers, and the curved brake-lever, substantially as shown and described.

4. In combination with a reciprocating type-bed, an inclined brake-lever, having a curved head or arm, substantially as described, whereby the power of the lever is gradually transmitted to the bed as the lever is forced backward into a vertical position, substantially as shown and described.

5. A brake-lever, constructed with a folding upper or bearing end, substantially as shown and described.

6. In combination with brake-lever T, and its folding arm, a stop limiting the rearward motion of said arm upon the lever, substantially as shown and described.

7. The combination of the lever T, folding arm *r*, and means, substantially as described, for holding said arm in its upright or extended position.

8. The combination of the cylinder-wheel, having a portion of its periphery inoperative, driving-gear wheel J, main and bed driving-shafts, and their connecting universal joint, substantially as shown and described.

9. The combination of the inside rack, segment, cylinder-wheel, having a portion of its periphery inoperative, driving-gear J, main and bed driving-shafts and their connecting universal joints, substantially as shown and described.

10. In combination with the swinging fly cord-frame, the spring-supporting device, substantially as described.

11. The combination with the swinging fly cord-frame of an arm, *b*, and spring supporting-rod, so constructed that the said spring-rod shall support the cord-frame in its raised position, and form a cushion when the frame is lowered, substantially as shown and described.

12. An inking-table, constructed of tongued and grooved wooden strips, held adjustably together by means of stay-rods 17, substantially as shown and described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

RICHD M. HOE.

STEPHEN D. TUCKER.

Witnesses:

ISAAC KRAUS,

ROBERT COCHRAN.