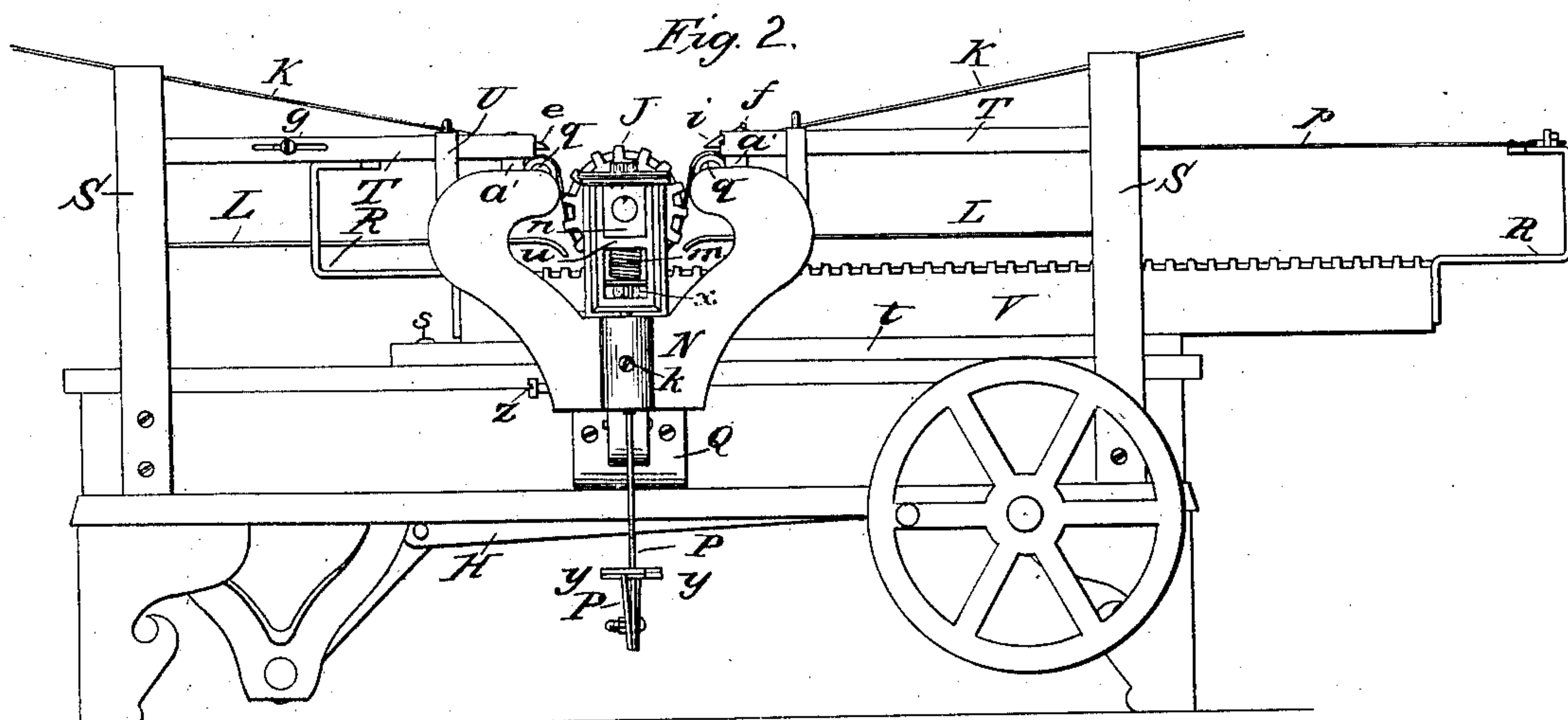
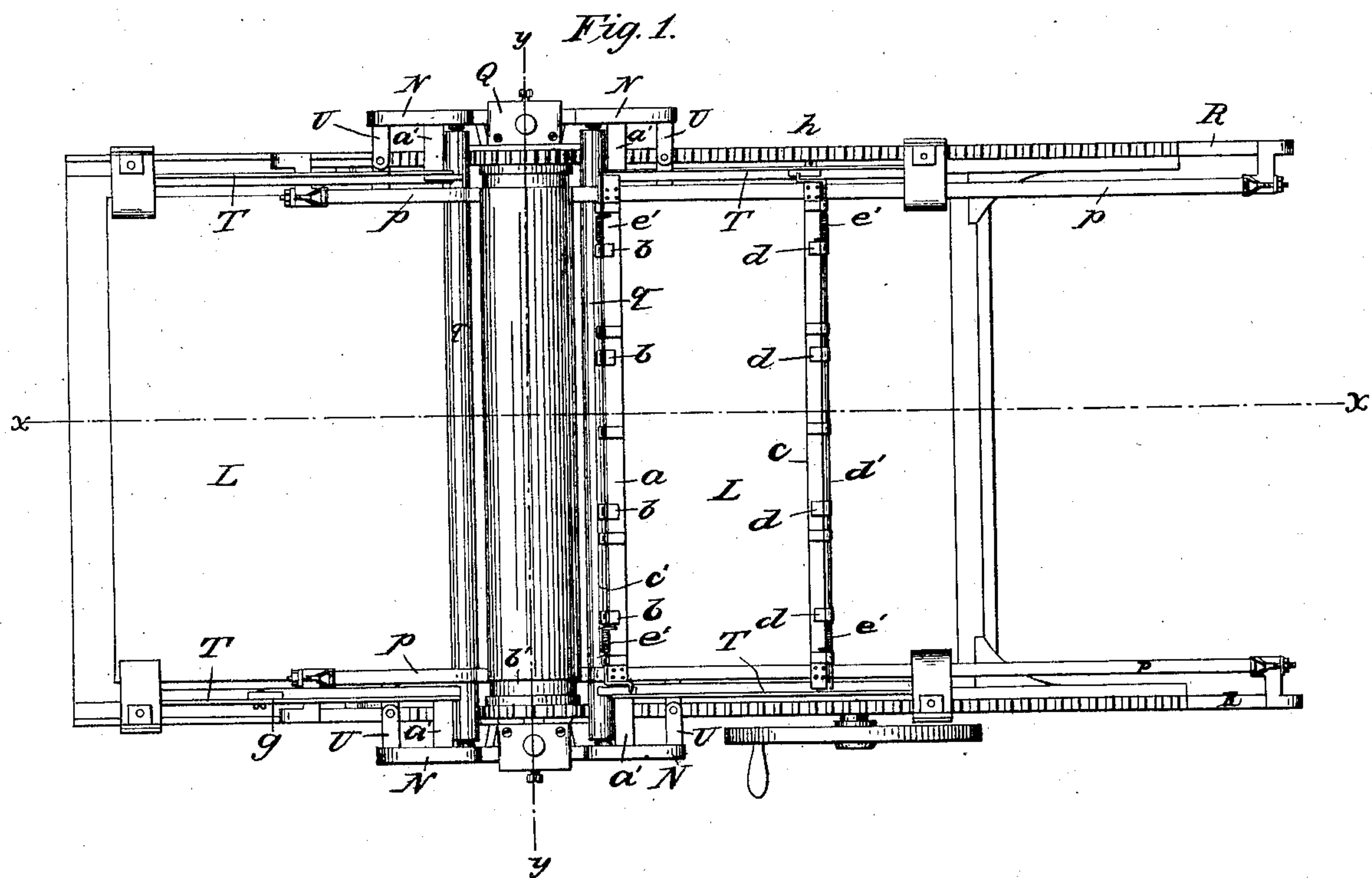


A. H. CRAGIN, M. BUCK, J. H. BUCK & F. A. TENNEY.

Printing Press.

No. 9,426.

Patented Nov. 23, 1852.



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Fig. 4.

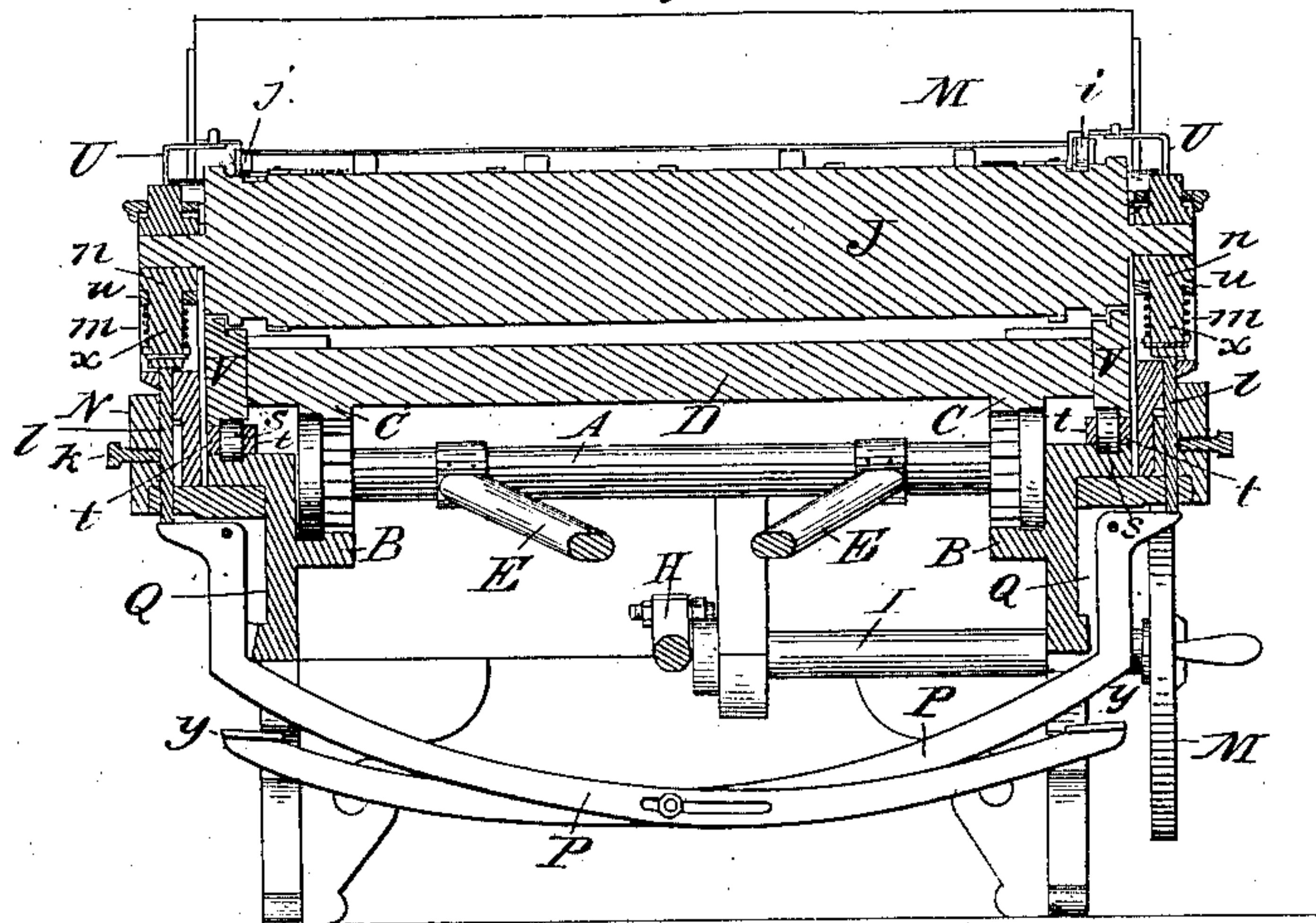
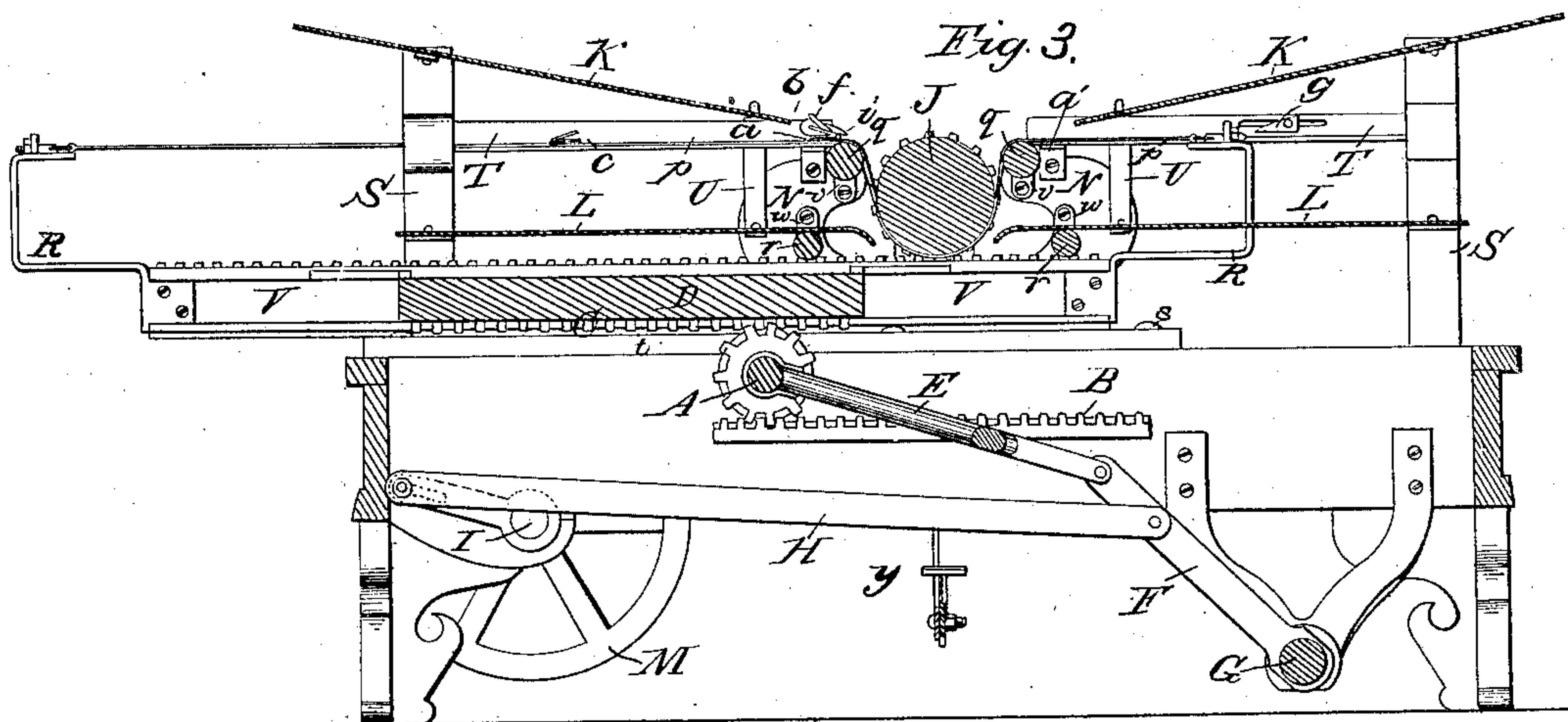


Fig. 3.





# UNITED STATES PATENT OFFICE.

AARON H. CRAGIN, MARTIN BUCK, J. H. BUCK, AND F. A. TENNEY, OF LEBANON, NEW HAMPSHIRE, ASSIGNORS TO AARON H. CRAGIN.

## PRINTING-PRESS.

Specification of Letters Patent No. 9,426, dated November 23, 1852.

*To all whom it may concern:*

Be it known that we, AARON H. CRAGIN, MARTIN BUCK, JAMES H. BUCK, and FRANKLIN A. TENNEY, of Lebanon, in the county of Grafton and State of New Hampshire, have invented a new and Improved Printing-Press; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, Figure 1, being a top view; Fig. 2, a side elevation; Fig. 3, a longitudinal vertical section, in the line  $x x$ , of Fig. 1, showing the machine in a reversed position to that represented by Figs. 1 and 2; and Fig. 4, is a transverse vertical section of the machine in the line  $y, y$ , of Fig. 1.

Similar letters indicate like parts in all the figures.

The nature of our invention consists, first, in the exceedingly compact arrangement of the parts for operating the bed; (D, shown in Fig. 3;) viz; the pinion shaft A, having pinions upon it which gear into stationary racks B, B, made fast to the sides of the frame, and into racks C, C, secured to the under side of the bed D: the forked lever E, having its forked extremities connected by boxes to the said pinion shaft, (A,) and its opposite end jointed to a lever F, that rises from the oscillating shaft G; and the pitman H, connecting the said lever F, with the crank on the driving shaft I, which compact arrangement and combination of parts, enables the crank to impart an extent of motion to the bed, about double that of the diameter of the circle described by its own rotation; and yet without occupying more space than is required for the alternating movements of the bed. The second feature of our invention consists in the combination of the pressure cylinder J, and the bed D, with the conveying bands P, P, which are connected to arms R, R, rising from the said bed, and have sets of nippers  $a, b$ , and  $c d$ , combined with them: and also the combination of the said cylinder, bed, and conveying bands and nippers, with the pairs of upper and lower tables K, L, placed on opposite sides of the said cylinder, and so arranged, that at each passage of the bed under the cylinder, a sheet will be taken from the upper table K on one side of the cylinder, and carried forward between the cylinder and bed to receive an impression, and thence on-

ward and be smoothly deposited upon the lower table L on the opposite side of the cylinder, at the same moment that another set of nippers will seize another sheet from the upper table on this side of the cylinder and pass it between the cylinder and bed to receive its impression, and then deposit it upon the lower table on the opposite side of the cylinder situated immediately below the upper table from which the first sheet was taken, and so on.

The bed D, is placed between the beams V, V, which rest on friction rollers  $s, s$ , that are riveted between the slats  $t, t$ , and move in guiding grooves formed in offsets from the sides of the machine—as shown in Fig. 4. The journals of the cylinder J, work in the boxes  $n, n$ , which are arranged in the supports Q, Q, that are secured to the central portions of the sides of the machine, in the manner shown in Figs. 2, and 4: viz:—a shank  $x$ , descends from each bearing box  $n$ , through the cross-piece  $u$ , and is embraced by the spiral spring  $m$ , which is connected to the lower end of the said shank, and bears upward against the cross-piece  $u$ , for the purpose of giving the requisite degree of elasticity to the bearing of the cylinder J, upon the form. The cylinder J, can be elevated at any moment, by a person standing on either side of the machine, by means of the transverse levers P, P, which are arranged in the manner shown in Fig. 4;—viz; the operating ends of the said levers, pass into slits in projections from the lower ends of the supports Q, Q, and are retained therein by fulcrum pins; the central portions of the said levers, where they cross each other, have curved slots formed in them, in which slots a connecting bolt is placed and secured in such a manner as to form a slip joint connection of the said levers, so that when pressure is exerted upon the foot piece  $y$ , on the extremity either lever, it will convey an equal amount of motion to the operating ends of both levers. The fulcrum ends of the levers P, P, are connected with the bearing boxes  $n, n$ , of the cylinder J, by means of the rods  $l, l$ , as shown in Fig. 4.

N, N, are the bearing supports of the band rollers  $q, q$ , and the inking rollers  $r, r$ ; (see Fig. 3;) these supports are placed upon the fixed supports Q, Q, by means of the latter being received into grooves in the



former. The bearing supports N, N, can be firmly secured to the supports Q, Q, by means of set screws *z*, which pass through the sides of the grooves in the former, and bear against the edges of the latter; or they may slide freely upon the supports Q, Q, by loosening the said set screws *z*. The bearing supports N, N, may be connected to the bearings *n*, *n*, of the cylinder J, by means of the set screws *h*, which pass through the centers of the former and bear against the connecting rods *l*, *l*, as shown in Fig. 4; and when thus connected, the cylinder J, the band rollers *q*, *q*, and the inking rollers *r*, *r*, may be all elevated or depressed together. In case the nippers should fail to grasp a sheet of paper, the cylinder J or the said cylinder and the inking rollers must be instantly elevated to prevent the smearing of the cylinder with ink.

The journals of the aforesaid band rollers *q*, *q*, work in the adjustable bearings *v*, *v*,—Fig. 4—which are connected by set screws to the supports N, N. The journals of the inking rollers *r*, *r*, work in the adjustable bearings *w*, *w*, also secured by set screws to the supports N, N. The pairs of upper and lower tables K, and L, are placed in the positions shown in Fig. 3, and are supported in the following manner, viz:—The inner ends of the said tables are placed upon the inwardly projecting legs of the angle pieces U, U, which are bolted to the inner sides of the supports N, N; and the outer ends of the said tables rest upon ledges projecting from the uprights S S. Brackets *a'*, *a'*, are also secured to the inner sides of the upper extremities of the supports N, N, to which are connected the inner ends of the four rails T, T, &c.—the outer ends of which are made fast to ledges projecting inward from the uprights S, S, &c. To the inner ends of two of the said rails which are respectively placed diagonally to each other on opposite sides of the cylinder J, we connect, by joint pins, the cams *i* and *e*, of the shape shown in Fig. 3. And to the inner sides of the two other rails, are placed the cams *g*, and *j*,—of the shape shown in Fig. 3—in such a manner that their positions can be varied and adjusted in a horizontal direction out or in. The conveying bands *p*, *p*, are connected by means of stirrups and set screws to the arms R, R, &c., rising from the ends of the bed beams V, V. The said bands pass along close by the inner sides of the rails T, T, &c., over the rollers *q*, *q*, and under the ends of the cylinder J; two series of nippers are connected to the said conveying bands in the manner shown in the drawings, viz: thin metallic strips *a*, *c*, pass from one band to the other and are properly secured to them. Loops are formed in the outermost edges of the said metallic strips, which receive respectively the rods *c'*, *d'*; nippers

*b* *b* and *d*, *d*, are connected respectively to the said rods *c'* and *d'*; which nippers are pressed down upon the strips *a*, *c*, by the action of the springs *e'*, *e'*; a crank lever *f*, is formed at one end of the rod *c'*, and a crank lever *h*, is formed on the opposite end of the rod *d'*. Grooves *b'*, *b'*, are formed near the ends of the cylinder J, for the reception of the said crank levers *f*, *h*, when the nippers pass under the said cylinder.

The operation of our improved printing press is as follows, viz:—The prepared sheets having been placed upon the upper tables K, K, and motion imparted to the machine, the nippers will be opened and closed at the proper moment to receive and grip a sheet by the crank lever on the rod to which they are connected, being carried over one of the cams *i* or *e*; when the said crank is passing up on to the said cam, the nippers will be opened to receive a sheet, as shown in Fig. 3, and when the said crank glides over the cam, the action of the springs *e'*, *e'*, causes the nippers to fly down upon and embrace the edge of the paper between them and the metallic strip to which they are jointed: at the same moment that this takes place, a reverse movement is imparted to the said bands, when the crank lever *f*, or *h*, will pass under the cam *e*, or *i*, and the sheet, which has been seized, as aforesaid, will be carried forward between the pressure cylinder J, and the form to receive an impression, and thence will be carried forward up over the roller *q*, and through the space below the inner end of the upper table on the opposite side of the pressure cylinder from the starting point, and along between the said upper and lower tables until the crank lever *f*, or *h*, reaches the detaching cam *g*, or *j*, which will open the nippers—as shown in Fig. 3—and allow the printed sheet to fall smoothly upon the said lower table. At the same moment that the nippers are opened by the cam *g*, or *j*,—as the case may be—to deliver a printed sheet upon its appropriate lower table, the other set of nippers are opened by the cam *e*, or *i*, to receive a sheet from the table immediately above the aforesaid lower table, and at the same moment the motion of the bed and conveying bands is reversed, which carries the said sheet forward between the cylinder J, and the form, to receive an impression, and thence onward and discharges the said sheet upon its appropriate lower table, in the same manner as before described. And so on, giving two impressions at each revolution of the crank shaft and smoothly depositing the sheets upon appropriate tables.

Having thus fully described our improved printing press, what we claim therein as new and desire to secure by Letters Patent, is—

1. The arrangement and combination of the movements in connection with the bed



D, by which an extent of motion is imparted to the said bed much larger than that of the sweep of the operating crank, while the whole of said movements only occupy the space within the frame work of the press below the bed, viz:—the pinion shaft A, having pinions upon it which gear into stationary racks B, B, made fast to the sides of the frame, and into racks C, C, secured to the under side of the bed D,—the forked lever E, (or its equivalent) having its forked extremities connected to the said pinion shaft, and its opposite end jointed to the lever F, that rises from the oscillating shaft G,—and the pitman H, connecting the said lever F, with the crank on the driving shaft I, or the equivalents of the said movements, when combined and operating substantially as herein set forth. Disclaiming however the principle of imparting motion to a printing press by direct application of power to the bed.

2. We claim the combination and arrangement of the pressure cylinder J, and the bed D, with the conveying bands *p, p*, the nip-

pers secured to the said bands, and the cams for operating the said nippers, substantially as herein set forth.

3. We also claim the arrangement of the upper and lower tables K, and L, with the pressure cylinder J, the bed D, the conveying bands *p, p*, the nippers attached to the said bands, and the cams for operating the nippers, in such a manner that an impression can be made at each right, and each left movement of the form under the cylinder, and the sheets be deposited, after receiving their impressions, upon the said lower tables, substantially as herein set forth.

The above specification of our improved printing press, signed this 18th day of May 1852.

AARON H. CRAGIN.  
MARTIN BUCK.  
J. H. BUCK.  
F. A. TENNEY.

Signed in presence of—

E. F. DURANT,  
M. F. BRIDGMAN.