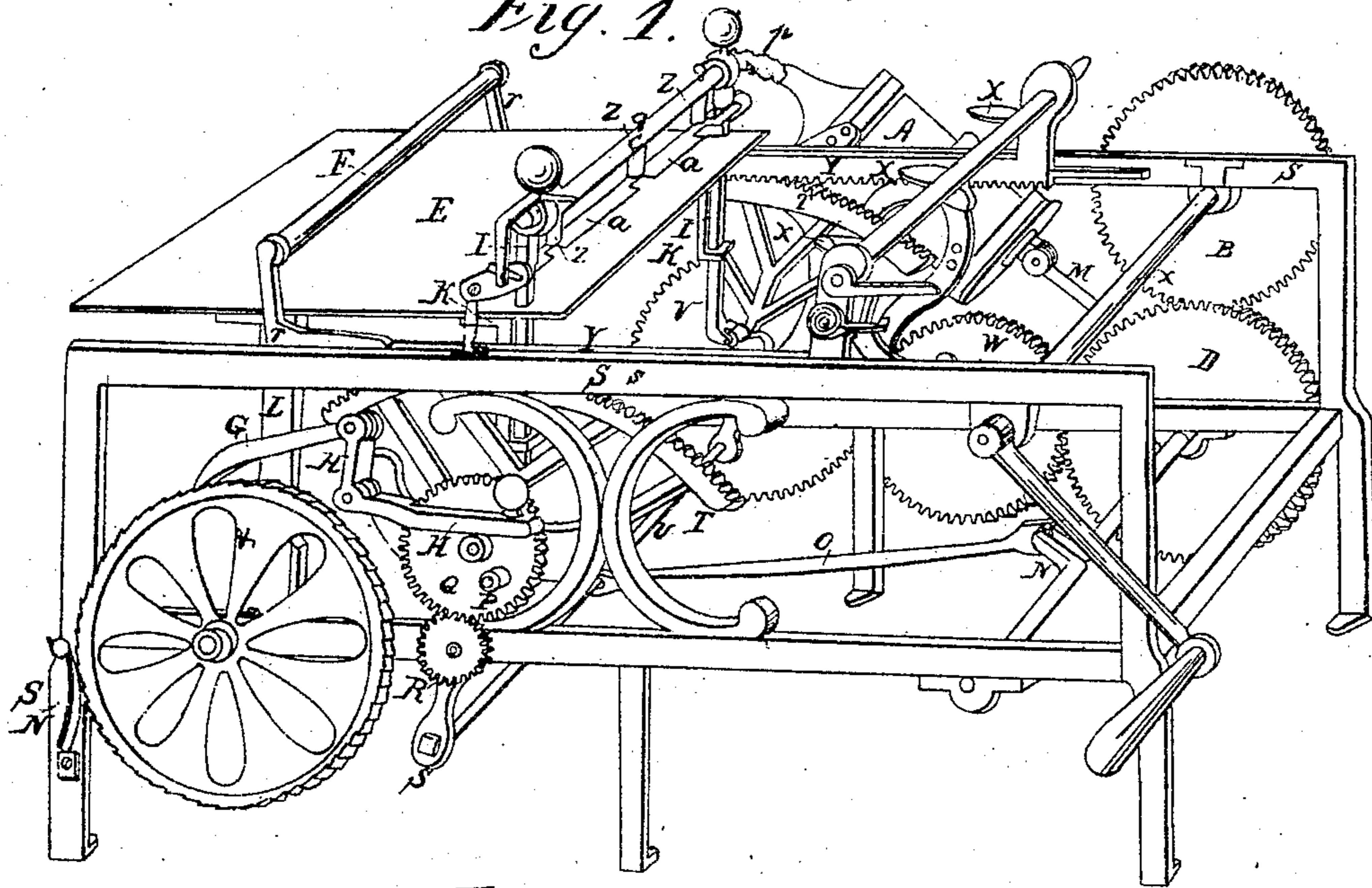
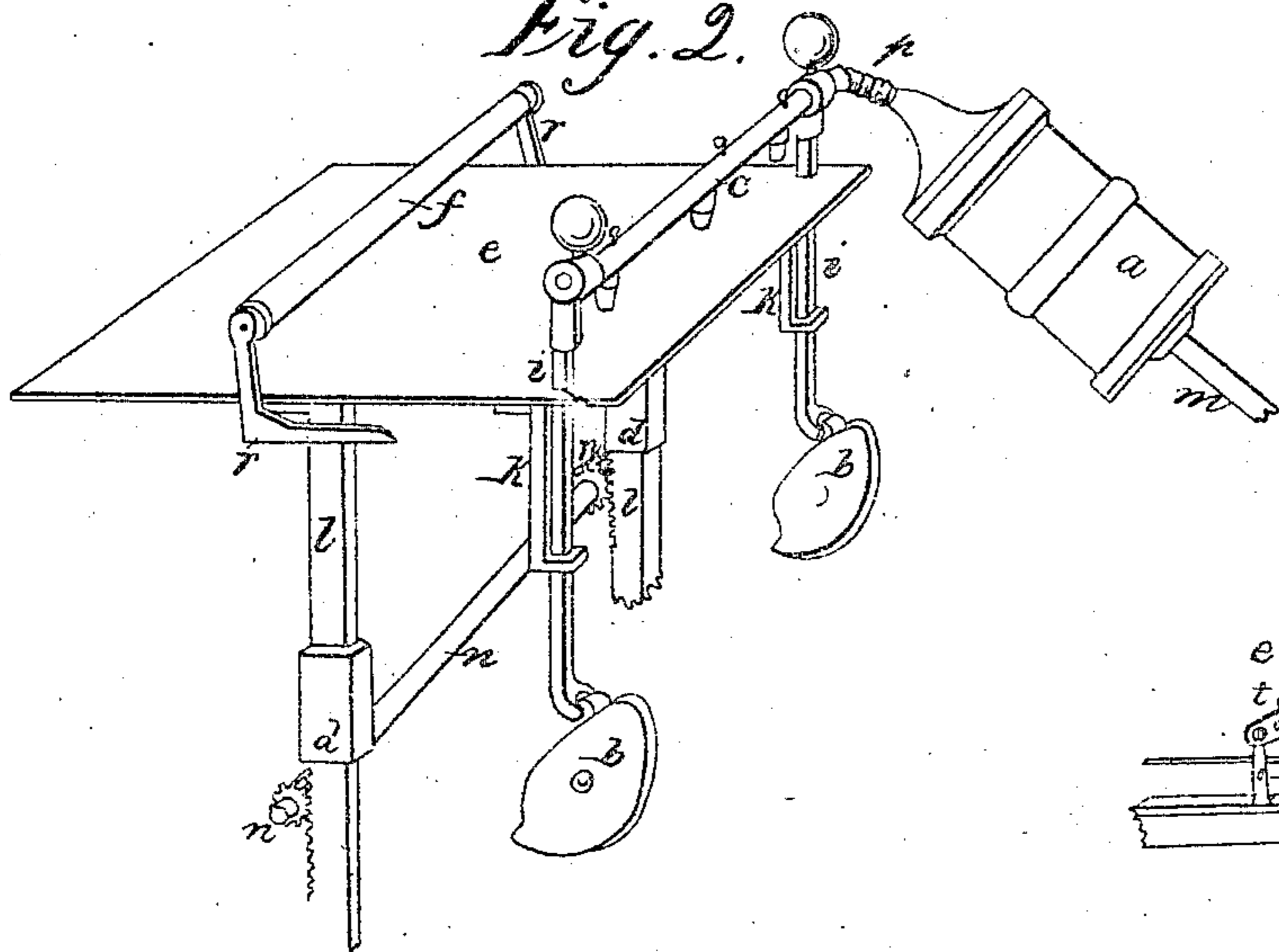


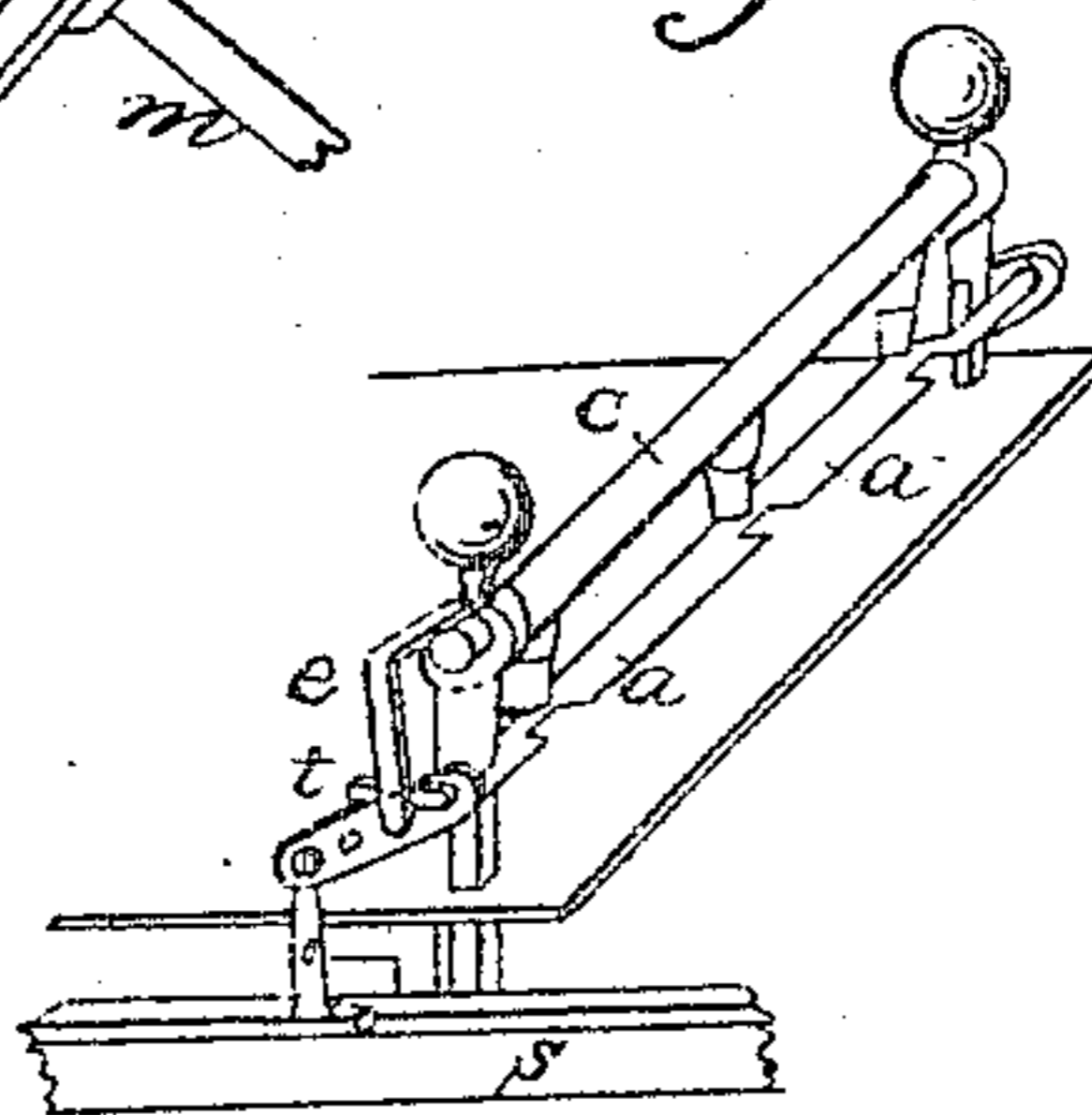
*J.P. Comby.*  
*Paper Separator.*  
*N<sup>o</sup> 9023.* *Patented Mar. 22. 1853.*  
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



# UNITED STATES PATENT OFFICE.

JOHN P. COMBY, OF DAYTON, OHIO.

## SEPARATING PAPER BY SINGLE SHEETS.

Specification of Letters Patent No. 9,623, dated March 22, 1853.

*To all whom it may concern:*

Be it known that I, JOHN P. COMBY, of Dayton, Montgomery county, Ohio, have invented a new and Improved Mode of Separating Paper by the Single Sheet; and I do hereby declare that the following is an exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in a method of feeding or supplying paper sheet-by-sheet from a heap, through the agency of atmospheric pressure and having reference especially to instances in which the sheet has to be raised and drawn forward by one edge, as in the case of printing, and is intended to supersede the services of the attendant now found necessary to feed the machine.

Plate 1 is a perspective view of the machine as constructed by me for the application of the vacuum. Plates 2 and 3 are drawings of the important parts of the machine independent of the driving power.

In the application of this principle I make use of, 1st, an elevating table, 2d, a roller, 3d, an air pump or exhauster attached by a flexible tube or bracket to a horizontal tube pierced on the under side with small holes in which I insert small tubes of say one inch in height and caliber in proportion to the size of the horizontal tube and the power of the exhauster, 4th, a supporting bar.

1st. The elevating table (E, Plate 1 and Plate 2) is that on which the heap of paper which is to be fed, or separated is placed, and is so constructed that the top sheet of paper being at the required distance from the tubes Z, Z, Z, Plate 1 which are to take it up, each successive sheet shall be so raised as to occupy the place of the one last taken up, and when the whole shall have been taken off the top of the table will be raised to the height of the top sheet of paper when the operation of feeding from the heap was commenced.

I construct this table with a square or oblong board or plate of any required size. (See E, e, Plates 1 and 2.) Beneath it on each side, equidistant from the ends, are firmly attached two upright racks (l, l, Plate 2,) of wood or metal. The table is elevated by small cog-wheels (n, n, Plate 2)

working in these racks. These cog-wheels are attached to a shaft or rod of metal on one end of which is firmly attached a large ratchet or notched wheel (&, Plate 1). This wheel is pushed forward by a feed hand "G," Plate 1 which is attached to an elbow device H, H, with a joint at the extremity next the wheel (&). The lever H, H, Plate 1, is attached at the elbow by a metallic pin which permits it to work around the pin as a center. This feed hand is worked by a cog-wheel, 2, Plate 1, in which there is placed an iron pin near the periphery, as at P, Plate 1, which extends so far that at each revolution it raises the lever H, H, and pushes forward the feed hand turning the ratchet wheel "&" one notch. Q is driven by the small wheel R which has just half the number of cogs as Q. It requires two revolutions of R to make one of Q, and one revolution of the large wheel "&," Plate 1, makes one of the small wheels n, n, Plate 2 which work in the racks l, l, L, L, Plates 1 and 2, and the table is raised faster or slower as the cog-wheels (n, n, Plate 2) are larger or smaller, and a double upward speed may be given to the table (for instance, when the sheets are of double the common thickness) by inserting two pins on opposite sides, instead of one pin as at P, Plate 1.

Near the end of the table from which sheets are to be taken off and say an inch from each side, I make holes, say one inch square, and on the under side and fitted to these holes I attach guides (K K, Plate 1 and k k, Plate 2) through which holes in these guides, the frames I, I, Plate 1, i i, Plate 2 to which the horizontal tube C is attached, work perpendicularly.

S. N, Plate 1, is a spring catch or stop to hold the ratchet wheel "&" Plate 1 from being forced backward, when the feed hand G, Plate 1 is drawn back by the lever H, H.

2d. The roller F, Plate 1, f, Plate 2, is used to run out the paper, loosen the heap, facilitate the entrance of air between the sheets, and to guard against more than one sheet being taken up at a time. This roller passes forward and backward on the sheet of paper to be raised from the heap—the forward motion runs out the sheet slightly, so that the vacuum may act upon the edge

of the top sheet only, when it is taken up by the tubes Z Z Z Plate 1 and is held there by atmospheric pressure and by the catch *a a* Plate 3 while the roller passes back again and straightens up the heap of paper, when it is again passed forward over the heap of paper, running it out again as fast and as often as a sheet may be required.

I make the roller of wood or metal of say three inches in diameter, and of the same length as the width of the elevating table, and I attach it at both ends by two uprights *r r*, Plates 1 and 2, which are firmly attached to the racks Y Y, Plate 1. The racks work in a groove in the frame *s s*, Plate 1, which are horizontal and parallel with the sides of the elevating table. The racks are moved forward and backward by the segments T, T, Plate 1, by means of a rod O, which is attached by a rod U Plate 1 to a lever, formed by the extension of the radii of circle of which T T Plate 1 are segments this lever is R, S. O is moved by the crank V, Plate 1 which is attached to the driven wheel D; the driver B to the crank *t*. To this rack Y Y may also be attached a set of fingers X X X Plate 1 made in any of the known modes to carry off the sheets as they are raised from the heap by means of the vacuum. A rake with flexible fingers or other device may be substituted for the roller in certain cases.

3. The air pump or exhauster see "A" and "*a*" Plates 1 and 2 is used to create a vacuum in the horizontal cylinder C, *c* Plates 1 and 2. The air being exhausted in the cylinder C, rushes through the small tubes Z, Z, Z, Plate 1 and the sheet next them is taken up and held by atmospheric pressure against the orifices of the tubes, when it is further raised from the heap at that point by the revolution of the cam wheels *b, b*, Plate 2 acting on the rollers in the extremities of the rods *i i*, I I Plates 1 and 2 to which the horizontal tube or cylinder C is attached.

I use an air pump of any kind, and suitable size A, *a*, in Plates 1 and 2, which I attach, by a flexible tube or a bracket (*p* Plates 1 and 2) to the horizontal tube or cylinder *c, c*, Plates 1 and 2 of the same length as the width of the elevating table and from one to two inches in diameter. I pierce this tube *c*, on the under side with any required number of holes, in which I place tubes at Z, Z, Z, Plate 1 of a caliber proportioned to the size of the main tube, the number of tubes to be inserted in it, and the power of the exhauster. These tubes may be an inch or more in length and inserted in the main tube or horizontal cylinder, perpendicularly or nearly so. At each end of the horizontal tube C, I attach firmly two metallic rods *i i* I I Plates 1 and 2 which may be half an inch square and of

the required length, in the lower end of which are rollers which rest on cam wheels (*d, d* Plate 2). These rods *i i* I I make a frame which works perpendicularly through the table in the guides K K, *k k* Plates 1 and 2 by the revolution of the cam wheels. The air is exhausted from the tube (C, *c*, Plates 1 and 2) at the moment when the tubes Z, Z, Z, are nearest to the top sheet of paper, at which time the revolution of the cam wheels immediately raises the tube C, with the sheet, at which time it may be seized by machinery and taken from the heap to any required point.

4. The supporting bar (see *a a* Plate 3) is used to hold up the end of the sheet, after it has been raised by atmospheric pressure, while the roller passes back off of the heap of paper. I make the supporting bar of a thin metallic plate out of which I cut pieces to match the number of fingers X X X Plate 1. The plate may be 4 or 6 inches wide, and of the same length as the roller F *f* Plates 1 and 2. It is attached to the frame S S, Plate 1 by an upright *o, o*, see Plate 3 and is so constructed that it shall pass under the sheet when raised, hold it from falling back till it is seized by the fingers X X X Plate 1 and carried off. The catch then falls back to a perpendicular position, being forced down by the bent rod *e* Plate 3 attached to the end of a crank *t*, Plate 3. This crank is formed by rods extending from the extremities of the plate *a a*, through the uprights O Plate 3 after which they are bent at right angles in the same plane with the plate *a a*, making a crank. While the tube C, Plate 1 is being raised by the revolution of the cam-wheels acting on the extremities of the frame to which it is attached the supporting bar *a a* (Plates 1 and 3) is turned from a perpendicular to a sloping position corresponding to that of the top sheet and entering between the heap of paper and the top sheet supports, the latter when disengaged from the tubes Z, Z, Z, Plate 1 and holds its front edge convenient for seizure by the fingers X X X, Plate 1 and continuing to support the sheet while being drawn away prevents the displacement of the sheet below. When the sheet is carried off over the bar *a a* Plates 1 and 3. The edge of the bar in which the notches are cut being the axis, the other edge sinks back again to the perpendicular position.

What I claim herein as new and desire to secure by Letters Patent, is—

1. A tube or range of tubes, communicating with an exhaust pump or vacuum, for separating the edge of a sheet from a heap of paper by atmospheric pressure, in combination with a roller or its equivalent, traversing to and fro on the upper sheet, for the several purposes of loosening and ad-

mitting air between the leaves, presenting the edge of the top sheet to the tubes, and (on its backward stroke) serving to straighten the pile.

- 5 2. The tube or tubes aforesaid, in combination with the vibrating supporting bar, for upholding the forward edge of the sheet,

when dropped by the tubes, presenting it properly to the fingers, and supporting it from the heap while being drawn away.

JOHN P. COMBY.

Witnesses:

JOHN HOWARD,

FRANCIS COLLINS.