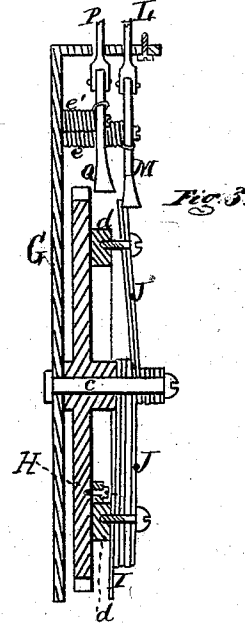
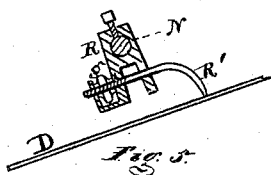
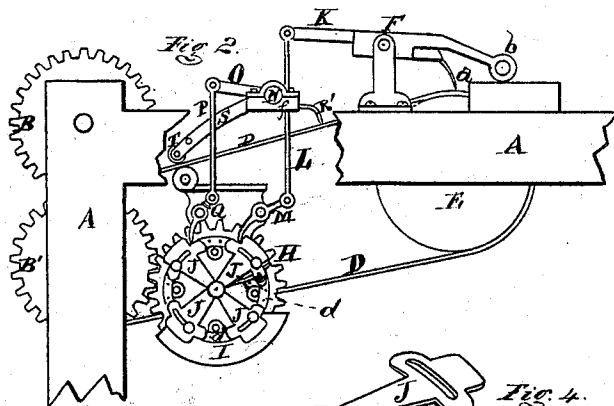
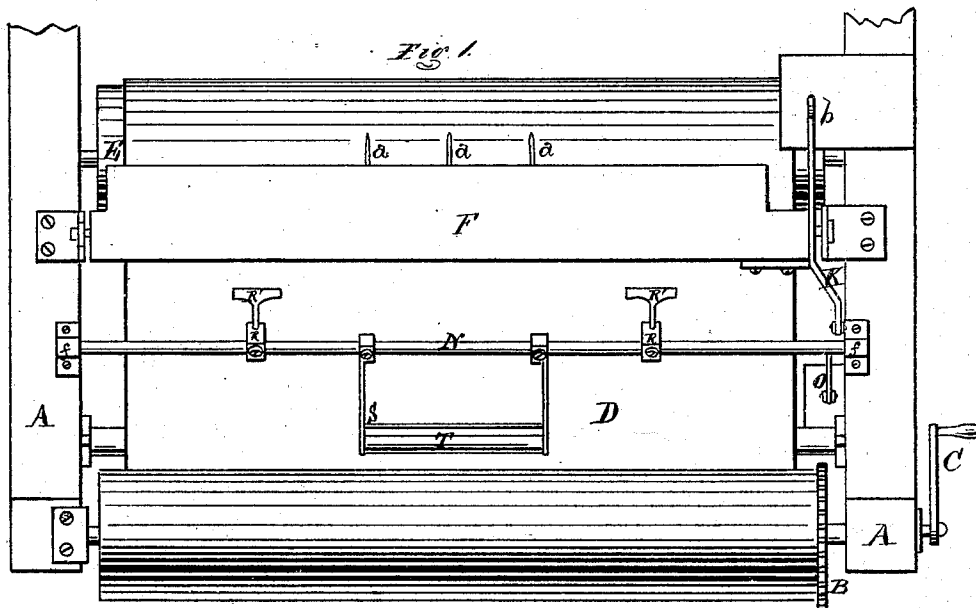


H. T. CLIFF & J. E. MARTIN.

Paper-Ruling Machines.

No. 144,064.

Patented Oct. 28, 1873.



ATTEST:
H. F. Eberts.
J. Sprague

INVENTORS:
Horatio T. Cliff,
John E. Martin,
per attorney,
J. Sprague

UNITED STATES PATENT OFFICE.

HORATIO T. CLIFF AND JOHN E. MARTIN, OF DETROIT, MICHIGAN, ASSIGNORS
TO GEORGE H. SMITH, THORNDIKE NOURSE, AND NOAH D. LAPHAM, OF
SAME PLACE.

IMPROVEMENT IN PAPER-RULING MACHINES.

Specification forming part of Letters Patent No. **144,064**, dated October 28, 1873; application filed
July 31, 1873.

To all whom it may concern:

Be it known that we, HORATIO T. CLIFF and JOHN E. MARTIN, of Detroit, in the county of Wayne and State of Michigan, have invented an Automatic Striker and Pen-Lifting Attachment for Paper-Ruling Machines, of which the following is a specification:

This invention has for its object to provide a pen-lifting attachment to ruling-machines, which can be so adjusted as to automatically lift and drop the pens from and to the blanks on the cloth at the proper intervals, and with a striker which will prevent the blank from moving along to the pens with the cloth until the preceding blank has passed, at the same time depressing a roller upon the blank, which will compel it to feed forward, thereby insuring accurate register, doubling the work of the machine, and making it easier to operate. The invention consists in the peculiar construction and arrangement of the attachments, as more fully hereinafter set forth.

Figure 1 is a plan view of a ruling-machine with our devices attached. Fig. 2 is a side elevation. Fig. 3 is an enlarged cross-section on the line *xx* in Fig. 2. Fig. 4 is a perspective of one of the expanding cams. Fig. 5 is a cross-section of the striker rock-shaft.

Like letters refer to like parts in the several figures.

In the drawing, A represents the frame of a ruling-machine, in the front end of which are journaled the end rollers, which are geared together by the spur-wheels B B', in the usual way. The upper roller is provided with the crank C, which the operator turns to the left to carry forward the endless belt or cloth D, on which the blank sheets are laid and brought under the ruling-pens. E is the pen-cylinder under the cloth. F is the pen-beam, journaled in standards at the sides of the frame, and carries the ruling-pens *a*, in the usual manner. It is also fitted with the ordinary pen-rest *b*, by which the pens can be raised by hand whenever necessary.

All the parts above described are employed in ruling-machines, the usual method of operating which is to have a girl lay the blank

sheets upon the cloth between the end rollers, while the ruler turns the crank with the left hand, while with the right he raises and lowers the pen-rest at the proper times to rule the required lines upon the blanks as they pass under the pens. The feeder leaves a considerable space on the cloth between the successive blanks, and the ruler has to proceed carefully in order to secure accurate register, the whole process being slow and laborious, which objections we overcome by the use of the following attachments:

G is a pendent bracket or hanger, from the inner side of the upper part of the frame, having a stud, *c*, on its lower part, on which is sleeved a pinion, H, driven by the spur-wheel B'. To the face of the pinion is bolted a flat ring, *d*, fitted with numerous bolt-holes. To this ring is bolted a segment, I, of any desired length to serve as a cam. J are fan-like leaves, of the form shown in Fig. 4, radially secured to the wheel-hub, and by means of a set-screw inserted through the slots of two or more of these leaves into the ring *d*, they are converted into an adjustable or expanding cam. K is a lever secured to the back edge and end of the pen-beam, and to its end is pivoted a connecting-rod, L, whose lower end is pivoted to one end of a lever, M, pivoted to stud on the bracket G, its inner end lying in the path of the cams J. A spring, *e*, spirally coiled about the stud, acting upon the lever M, tends to keep the pens depressed to the cloth.

It will be readily seen that in the rotation of the pinion, whenever a leaf, J, or a cluster of them, forming a cam, passes under the lever M, the free end of the latter will be lifted and raise the pens from the cloth, and as often as a group of cam-leaves passes under it. These cams may be timed to lift the pens as often and as long as the nature of the job being ruled may require.

N is a rock-shaft journaled across the top of the frame in standards *f*. To one end is secured an arm, O, and to the latter is pivoted a connecting-rod, P, whose lower end is pivoted to a lever, Q, pivoted to a stud projecting from the bracket G. A spring, *e'*, spirally coiled

about the stud, acting upon the lever Q, throws down its inner end in the path of the cam-segment I, so that in the rotation of the pinion the segment will lift the lever Q and oscillate the rock-shaft N, on which are secured, by set-screws, two strikers, R, whose stops R' are longitudinally adjustable by means of the screw-nut g on the shank of each, raising them from the cloth and allowing the arrested blank sheet to pass on to the pens. At the same time a frame, S, secured to the rock-shaft and carrying the press-roller T, is depressed, the roller bearing upon the paper and compelling it to move forward with the cloth. This arrangement allows the feeder to place the sheets on the cloth close together, while the stops lifting automatically at the proper moment allows the arrested blank to move squarely forward, while the press-roller compels it to move with its side parallel with those of the cloth. The labor of the ruler is

less arduous than with the ordinary method while double the work is done, and with much greater accuracy.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The bracket G, stud c, pinion H, ring d, adjustable cams J, lever K, rod L, and lever M, constructed and arranged with relation to the frame A and spur-wheel B' to operate the pen-beam F, substantially as described and shown.

2. The rock-shaft N, frame S, roller T, arm O, rod P, and lever Q, operated by the segment I on the pinion H, substantially as and for the purpose set forth.

HORATIO T. CLIFF.

J. E. MARTIN.

Witnesses:

H. S. SPRAGUE,
THEO. KUHN.