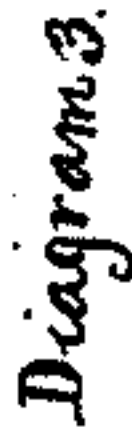


*Patented Mar. 8, 1859.*



Lansing



# UNITED STATES PATENT OFFICE.

I. B. BLAIR, OF PHILADELPHIA, PENNSYLVANIA.

## ATTACHMENT TO RULING-MACHINES.

Specification forming part of Letters Patent No. 23,152, dated March 8, 1859.

*To all whom it may concern:*

Be it known that I, I. B. BLAIR, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Auxiliary Attachment to Ruling-Machines for Ruling Paper; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Diagram 1 is an illustration of the principle in one of its simplest forms of application. Diagrams 2 and 3 are illustrations of the principle in other forms of application; and Figure 1 is a perspective view of a machine constructed on one of these plans, and Fig. 2 is a longitudinal elevation of the same.

In Diagram 1 Q is the large cylinder or "pen-roller" of a common ruling-machine, over which the cloth *tt* carries the paper *v* in the direction of the arrow. Immediately over the roller Q are the pens *x*, sustained by the clamp and beam *y*. W is a weight for the purpose of forcing the pens down on the paper. L is a lever for the purpose of raising the pens from the paper, and this operation is usually done by hand. The principles of the ruling-machine as thus far described in this diagram are old and well known, and I therefore disclaim them; but my invention will be manifest by a further description of the diagram, as follows:

Instead of moving the pens in the usual way, I place an electro-magnet near the lever L and on the lever fasten the armature A. A circuit-brake, *r d*, is placed in a suitable position for the paper *v* to strike as it passes in the direction of the arrow. The magnet is connected with the battery Z by a circuit, which passes through the circuit-brake *r d*. In this position the circuit is closed and the magnet holds the end of the lever L down, and the pens are consequently held off the paper; but when the paper *v* shall strike the lower point of *r* it will force the top from the point of *d*, thus breaking the circuit, and the magnet will let go the lever, permitting the pens to fall upon the paper.

Diagram 2 shows the magnet not applied directly to the lever, but made to revolve by means of a pulley, P, to the cylinder Q, by a cord or band. The poles of the magnet are seen at M M. A cam, C, with an armature at-

tached, is hung upon the same shaft with the pulley and magnet, but left free to move or be at rest. Upon this cam the lever L rests. A short electrical circuit is made from the battery Z to the circuit-brake *r d*, and thence back to the battery. Another circuit is made, involving the magnet, which makes the latter circuit the longest. By a well-known law of electricity the fluid will pass through the shortest circuit, avoiding the longer one. It can now be seen that when the ruling-machine is in motion the magnet will continually revolve, and when the paper shall break the short circuit at the circuit-brake *r d* the magnet will be actuated, and seizing hold of the cam will cause it to revolve with it, and thus operate the lever L in accordance with the pattern of the cam, a variety of which can be kept on hand or one can be made adjustable to any particular form or style of ruling.

Diagram 3 exhibits the cam C hung loosely upon the journal of the cylinder Q. The magnet, which is not shown in the drawings, is embedded in the end of the cylinder, with the poles in proximity to the cam C, upon which the lever L rests. The magnet revolving with the cylinder will seize hold of or release the cam in accordance with the breaking or closing of the electrical circuit by the paper.

I will now proceed to describe Figs. 1 and 2, which represent a machine constructed on the plan of Diagram 2.

F F is a frame supporting the works, and to be secured onto the frame of the ruling-machine by the screws *uu*. M M M is an electro-magnet. S S is a shaft on which the magnet revolves. P is a pulley into which the poles of the magnet are inserted. A is the armature of the magnet, made in the form of a disk and of soft iron. It is hung on the shaft S S, and is free to revolve concentrically with the pulley P.

H H is a hub, serving to keep the armature in a steady position, and also to sustain one or more cams.

C is a cam, which is kept in its place against a shoulder on the hub by the set-nut *n'*, and the armature, with hub and cam, is kept in place by the set-nut *n''*.

W is a weight attached to the armature to bring and keep it in a position with the catch against the spring K.

B is a bar supporting the circuit-brake *r d*,



and, as the connection between the circuit-brake and the main apparatus needs only be a conducting-wire, the bar may be either directly attached to the apparatus or to any part of the ruling-machine that will permit the circuit *r d* to reach a position for the paper to act upon it. In attaching the apparatus to the ruling-machine these two conditions, in reference to position, must be followed, first, whether placed on the horizontal rail or on the upright post of the frame R R, as seen in Diagram 2, the position must be such that the pulley can have connection by a cord with one of the rollers of the ruling-machine; secondly, it must be practicable to extend a level from the pen-beam to the cam. Having made the attachment and placed the circuit-brake at the proper place for the paper to strike, the electrical connection will be made as follows: The wire from one pole of the battery must be attached to the screw-post *l*, which is insulated and reaches through to the insulated metallic band I. Upon this band one end of the helix presses and plays around upon it as the magnet revolves. The other end of the helix is in connection with the magnet, making the apparatus itself a part of the cir-

cuit. The other pole of the battery must be connected to the screw-post *e*, thus completing the magnet-circuit. Another will be made from the battery through the circuit-brake, when the whole will be ready for operation in the following manner: The machine being in motion, and the magnet revolving the paper is fed in the usual manner into the machine, and when it is carried up so as to strike against the brake *r*, the circuit will be broken and the magnet will seize the armature A, which will immediately revolve, carrying the cam with it, and thus operating the lever and pen-beam.

What I claim as my invention is—

The application of one or more magnets (electro-magnets) to any ruling-machine for ruling paper in such manner that the magnets shall, either directly or indirectly, be made to control the operations of the pens through the agency of the paper in breaking, closing, or changing the circuit of electricity.

I. B. BLAIR.

Witnesses:

WM. H. HAGNER,  
H. H. DASH.