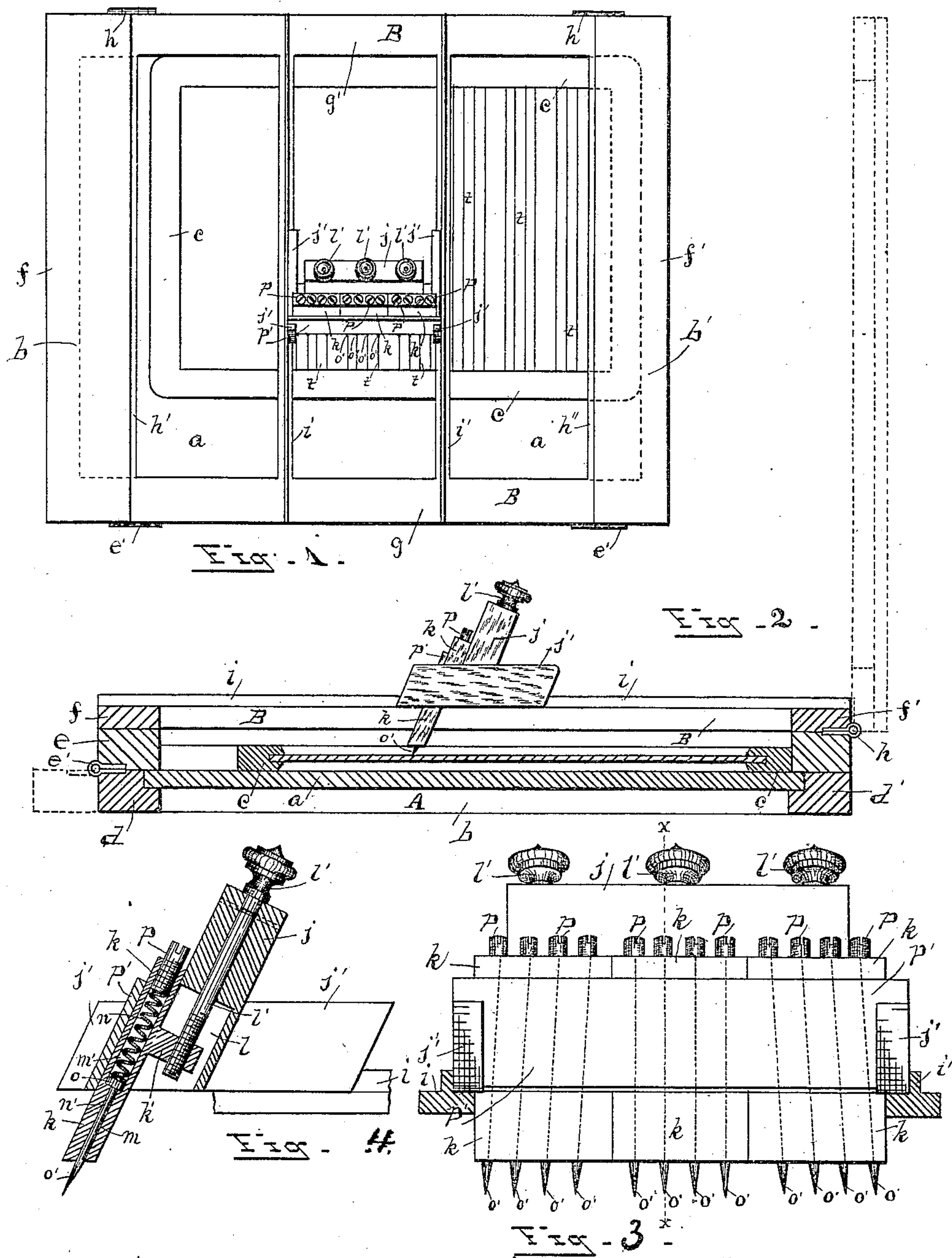


(No Model.)

L. O. BROADWELL.  
SLATE RULING MACHINE.

No. 435,390.

Patented Sept. 2, 1890.



ATTEST -

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By  
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# UNITED STATES PATENT OFFICE.

LOUIS O. BROADWELL, OF BAY CITY, MICHIGAN.

## SLATE-RULING MACHINE.

SPECIFICATION forming part of Letters Patent No. 435,390, dated September 2, 1890.

Application filed June 28, 1889. Serial No. 315,859. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS O. BROADWELL, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Slate-Ruling Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in slate-ruling machines, and is designed more especially for ruling lines with suitable spaces between upon the surface of the slates for the use of pupils in the primary department of schools, as an aid in acquiring the proper formation of letters and figures with an ordinary slate-pencil; and my invention consists in a frame for holding the slate and provided with suitable guideways extending across above the slate, a frame sliding upon the said guideways and provided with adjustable blocks carrying a series of spring-supported steel points arranged to stand obliquely to and with their points impinging upon the slate, and devices for adjusting the blocks to adapt the points to various slates.

The invention further consists in the combination and arrangement of the several devices which I use in the construction of my improved machine, as I shall hereinafter proceed to minutely describe, and distinctly point out in the claims of this specification.

The objects of this invention are to provide a machine by means of which a person unskilled in the art may evenly and quickly provide a number of slates with true and accurate parallel lines having even and correct spaces between, whereby the entire number of slates in the room will be provided with lines and spaces of the same character and size, so that the pupils will be enabled to practice the formation of letters of the same dimension and appearance throughout the department. I attain these objects by means of the devices illustrated in the accompanying drawings, in which will be found similar let-

ters of reference designating the same parts or elements throughout the several views.

Figure 1 represents a plan view of my improved apparatus having a slate in position and partly ruled. Fig. 2 is a transverse section of the slate and slate-holding frame, with a side view in elevation of the ruling device in position for operation. Fig. 3 is a front view in elevation and enlarged of my improved machine with a partial section of the slate-holding frame. Fig. 4 is a vertical section of the same, taken at  $x x$ .

$a$  represents the bottom of a rectangular slate-holding frame A.

$b b'$  are end pieces, and  $d$  and  $d'$  are the lateral side pieces of the frame projecting above the bottom  $a$  somewhat more than the thickness of an ordinary slate-frame  $c$ , the side  $d'$ , however, being divided horizontally and its upper portion  $e$  hinged at  $e'$  to the lower portion, so that it may be turned outwardly.

$f f'$  are end pieces, and  $g g'$  are the side pieces, of a rectangular frame B, which are of the same outside dimension as the slate-holding frame A, upon which it is placed and secured in position by hinges  $h$ . The end pieces  $g$  and  $g'$  project over the inner edges of the pieces  $b$  and  $b'$ , and are provided on their inner edges with supporting-guides  $h'$  and  $h''$ , projecting outwardly from their lower portions, the top of the guide being coincident with the top of the side pieces  $g g'$ , the thickness of which are considerably less than the thickness of the end pieces, so that the portion above the supporting-guide forms a lateral guide, and  $i$  and  $i'$  are supporting guide-pieces placed across the frame and secured by their ends to the side pieces  $g$  and  $g'$ , the spaces between the guides  $i$  and  $i'$  and the end guides  $h'$  and  $h''$  being equal.

$j$  is a holder or block provided on each end with oblique transverse slides  $j'$ , which extend beyond the sides of the block and rest with their lower edges upon the supporting-guides, and on the front side of the holder  $j$  and between the slides are placed the blocks  $k$ . These blocks are provided with a rearwardly-projecting lug  $k'$ , having a screw-threaded opening, and the holder  $j$  is provided with a chamber  $l$  to receive each lug and al-



low a vertical movement thereof, and  $l'$  are adjusting-screws passed downwardly through the upper portion of the holder  $j$  and through the lugs  $k'$  for retaining the blocks and adjusting them to a proper position, as will be presently explained.

Each of the blocks  $k$  are provided on their lower portions with a series of longitudinal openings  $m$ , while above the openings  $m$  are arranged the chambers  $m'$ , containing coiled springs  $n$ .

$n'$  are tracing-pins placed within the openings  $m$ , with the head portions  $o$  within the chambers  $m'$  and against the spring  $n$ , and are provided on their lower ends with the points  $o'$ , which project below the lower edges of the supporting-blocks, but which, however, may recede within the blocks whenever sufficient pressure is applied thereon to overcome the power of the springs  $n$ , which operate to press downwardly upon the heads  $o$  of the pins, and are retained in position and the tension thereof regulated by the screw-plugs  $P$ , which are passed into the upper end of the chambers  $m'$ .

$P'$  is a plate placed across in front of and against the supporting-blocks  $k$ , and is held in position by its ends resting in grooves or being otherwise secured to the slides  $j'$ , and this plate operates to retain the supporting-blocks firmly in position, yet allows a vertical adjustment of the blocks to be had by means of the screws  $l'$  to adapt the points  $o'$  to operate upon slates of different thickness.

In practice the upper rectangular frame  $B$  is raised, as shown by the dotted lines in Fig. 2, and the slate  $c'$  is placed in position upon the bottom of the frame  $A$ , with its side and end against one side piece  $d$  and one end piece  $b$  of the frame, and the upper frame  $B$  is then closed over the slate. The holder  $j$  is then placed in position upon one of the spaces between the transverse guides, with its slides  $j'$  resting upon the guides and with its rear side toward the side piece  $d$ , which sustains the slate against a lateral movement, the tracing-points  $o'$  resting upon the surface of the slate  $c$  at the edge opposite the piece  $d$ , the supporting-blocks  $k$ , however, being adjusted by the screws  $l'$  to a position that when the slides  $j'$  are resting firmly upon the guides the points will be slightly receded against the springs  $n$ , and the block  $j$  is then pushed along the guides toward the piece  $d$ , and the points  $o'$  thus carried across the slate-surface cut into and form a series of lines  $t$  thereon, the distance between the points being of course properly arranged to produce the desired spaces between the lines. The proper form of ruling slates for this purpose being, as herein illustrated, four lines with equal spaces, then a space equal to two of the smaller spaces, then four lines again, then a wider space, and so on; and it will be noticed that the guides  $i$  and  $i'$  are so arranged as to be over the wider spaces so that when the

tracing device is passed over the first space between the guides for ruling the end portion of the slate-surface, the operation is repeated over the next space between the guides, and the space between the adjacent lines formed by two operations will be equal to the wider spaces before mentioned; and to attain this result the pins  $n'$ , carried by the two outer supporting-blocks, are arranged so that their points diverge outwardly or away from the center block, so that a sufficient width of the guide-pieces  $i$  and  $i'$  may be had to insure proper stiffness and rigidity thereof. It will be noticed that as slates are of various sizes and dimensions the frame  $c$  will not always allow all of the points to impinge upon the slate-surface as the block is passed over the last space between the guides, and in that event one or more of the blocks  $k$  is raised by means of the adjusting-screws to permit a portion of the points to pass above the frame, while the spring  $n$  permits each of the points to recede or move outward to compensate for any unevenness of surface or for slight variations in thickness of slates or slate-frames.

It will be seen that a great saving in time and labor is obtained by my improvement besides a uniform and complete system of ruling upon the slates throughout the several departments in a school-building, so that all of the younger pupils may acquire alike the art of forming with a slate-pencil letters of the same dimension and appearance.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a slate-ruling machine, the combination, with a supporting-holder provided with a central chamber, of the series of ruling-pins with one end passed through the holder and into the chamber and with their opposite pointed ends projecting beyond the holder, and the springs within the chamber for pressing the said pins outwardly, substantially as set forth.

2. The combination, in a slate-ruling machine, of the series of ruling-pins and the springs for impinging the said pins upon the slate-surface, of a supporting-holder for carrying the said series of pins and provided with a chamber inclosing the springs, and devices, as described, for retaining the said series of pins in a position oblique to the surface of the slate, substantially as set forth.

3. The combination, in a slate-ruling machine, of the holder provided on its lateral sides with slides having their lower edges standing oblique to the front side of the holder, and the supporting-blocks adjustably secured to the front side of the said holder and carrying a series of spring-pressed ruling-pins, substantially as set forth.

4. The combination, in a slate-ruling machine, of a slate-holding frame provided with an upper section having transverse guides extending across above the slate, with a holder having on its lateral sides supporting-slides



adapted to run in said guides on the frame-section, and the supporting-blocks adjustably secured to the front side of the holder and carrying a series of spring-pressed ruling-pins having their points projecting below the said guides, substantially as set forth.

5 5. In a slate-ruling machine, the combination of the slate-holding frame having an upper section provided with a series of transverse guides arranged in pairs and extending across above the slate, and the holder *j*, having its front side inclined and supported by slides resting on the said guides, the supporting-blocks secured to the front side of the said holder and provided with a series of chambers in their upper portions and with a series of openings from the said chambers to the lower edge of the block, a series of ruling-pins within the said openings with their head portions within the chambers and their points projecting below the lower edge of the block, and a series of springs within the chambers

and bearing against the heads of the pins, substantially as set forth.

6. The combination, in a slate-ruling machine, of the holder provided on its lateral sides with the slides *j'*, and having in the lower portion of its front side the chamber *l*, with the supporting-blocks *k* resting on the front side of the block, and provided with the lugs *k'* within the chamber *l*, and having in their upper portions the chambers *m'*, carrying the springs *n*, and on their lower portions with the openings *m*, carrying the ruling-pins *n'*, and the adjusting-screws *l'* passing through the upper portion of the holder and tapped into the said lugs *k'*, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LOUIS O. BROADWELL.

Witnesses:

J. R. GOODFELLOW,  
CHESLEY WHEELER.