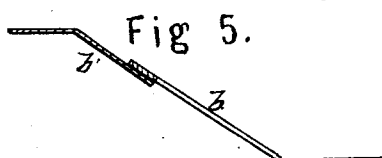
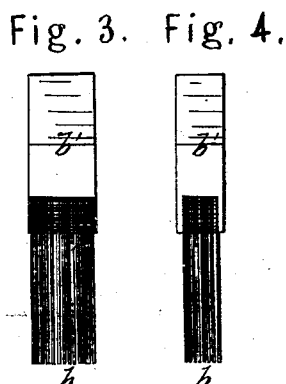
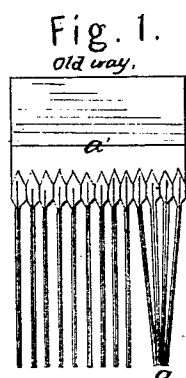


W. O. Hickok.
 Ruling Mach.
 N^o 107,046. Patented Sept 6, 1870.



Witnesses

W. O. Hickok
 S. Schriver

Inventor

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WILLIAM O. HICKOK, OF HARRISBURG, PENNSYLVANIA.

Letters Patent No. 107,046, dated September 6, 1870.

IMPROVEMENT IN PENS FOR RULING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

I, WILLIAM O. HICKOK, of Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented a new and useful Improvement in Pens for Paper-ruling Machines, of which the following is a specification.

Nature and Objects of the Invention.

My invention relates to the construction of the pens in groups, in such a manner that all the pens in each group shall be parallel with each other, and, at the same time, in whatever closer arrangement, side by side, of each other that may be required for ruling close lines, the object being to afford greater facility and accuracy in ruling such parallel lines.

Description of the Accompanying Drawing.

Figure 1 represents the upper side of a group of pens, as hitherto made, and with the points of four of them brought more closely together, as required when used for closer lines.

Figures 2, 3, and 4 represent, respectively, three qualities or sizes of my improved pens; and

Figure 5, a vertical longitudinal section of either one of the said sizes.

General Description.

The old method of producing the groups of pens for paper-ruling machines, it is well known, consists in transversely slitting about two-thirds of the width of a strip of thin sheet metal into narrow divisions, and folding the two side edges of each division together, as represented in fig. 1; consequently, the distance between the parallel sides of any two of said pens cannot be less than the width of the particular division of which each pen is formed, and this distance not being small enough for closer ruling, either an upper and a lower set of pens have to be arranged, so that the points of the pens of the upper will rule lines between those ruled by the lower set; or, several, more or less, of the pens bent so as to bring their points nearer together, as represented at *a*, fig. 1.

The objections to the first-named arrangement are, that it requires the adjustment of two distinct sets of pens, and the keeping of both sets supplied with the ink, and, moreover, that it is not capable of ruling lines with less spaces between them that will equal half the spaces between the lines ruled by the pens of the lower set; and the objection to the second arrangement, see fig. 1, is that the oblique pens, in consequence of their obliquity, cannot be caused to produce lines of equal width and uniformity with the lines produced by the central or direct pen.

In order to overcome all these difficulties, and pro-

duce groups of single pens that will rule clean, uniform lines, with the narrowest spaces that can be required between them, I make each pen, *b b*, separate from the usual head part of the plate *a'*, and then solder their upper ends fast to the requisite plate *b'*, and to each other, side by side, and parallel, at the requisite distance apart, to rule the close lines desired, substantially as represented in figs. 2, 3, 4, and 5.

It will be seen that, by constructing pens for paper-ruling machines in the manner described, the closest lines can be ruled thereby with as much facility, accuracy, and uniformity, as the furthest separated lines are ruled by the old style of groups of pens.

I am aware that a group of pens, consisting of a series of five pen-pointed channels, produced by crimping a single piece of thin sheet metal in such a manner as to afford five channels parallel with each other, connected along their sides, and pressed close enough together to afford a group of pens for the purpose of marking, simultaneously, on paper, the usual five close lines required for writing music upon, and then the upper end of said group inserted and secured in a suitable wooden head, which serves as a handle in using the pen in ruling by hand; but such groups of pens cannot be practically applied to the ruling-machines in use, for several reasons, among which may be mentioned the fact that, as the group is in a single piece of sheet metal, there cannot be that independent elasticity in the several pens or channels which is absolutely necessary to mark an unbroken line by any one of said group when it passes over a slight depression in the paper, nor will any one of said groups allow the other pens of the group to remain in marking contact with the paper when it (the pen) passes over a slightly elevated spot in the same paper.

Therefore, I do not desire to claim, broadly, a group of ruling-machine pens, arranged and secured closely together, parallel with each other, upon a handle or distinct head-plate; but

I claim as my invention—

A series or group of paper-ruling-machine pens, having each pen of the group made separate and distinct from the others, and from the usual head-plate, and then their upper ends secured, by soldering or otherwise, to the head-plate, so as to afford a group of independently elastic pens, parallel to each other, and as near together as the close line ruling desired may require, substantially as described and set forth herein.

Witnesses:

E. H. HICKOK,
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W. O. HICKOK.