

UNITED STATES PATENT OFFICE.

SAMUEL S. YOUNG, OF EATON, OHIO.

ARITHMETICAL PROOF-RULE.

Specification of Letters Patent No. 21,921, dated October 26, 1858.

To all whom it may concern:

Be it known that I, SAMUEL S. YOUNG, of Eaton, in the county of Preble, in the State of Ohio, have invented a new and useful
5 Machine for the purpose of proving mechanically the result of all arithmetical calculations, whether of addition, subtraction, multiplication, or division.

My invention consists of an instrument of
10 wood, or any other suitable material, and of the manner of using said instrument, or machine, to accomplish the purpose intended; and I do hereby declare that the following is a full and exact description of my said invention,—reference being had to the accom-
15 panying drawings, and to the letters and figures of reference marked thereon.

To enable others skilled in art to make and use my invention, I will proceed to describe
20 the construction and operation.

I construct my proof rule of wood or any other suitable material, with a base, as A, B, C, D, Figure 1, of the accompanying drawings, in said base, there are four grooves,
25 and in each groove a slide, each slide containing eighteen holes equi-distant from each other, and having one half of its length colored, as in Fig. 2, which shows a slide detached;—to confine the slides in their
30 grooves, and to regulate their movements, there is a cap or cover, on the face of the machine, as A, D, *d*, *a*, and B, C, *c*, *b*, Fig. 1, leaving part of the face uncovered, as *a*, *b*, *c*, *d*, Fig. 1. The slides are numbered 1st,
35 2nd, 3rd, 4th, as shown by the figures 1, 2, 3, 4, on the right hand cap B, C, *c*, *b*,—the ends of the grooves in the machine are covered, as A, D, and B, C, Fig. 1, the bars between the slides are numbered from right to
40 left, with the numbers from 1 to 8, inclusive, and on the lower marginal bar, the figures are inverted, and the figures increase from left to right; the figures are so placed as to stand directly opposite the holes in the slides,
45 all of which is shown, on the face of the machine, in the recess, *a b c d*, Fig. 1.

The figures on the bars, are called index figures, and the mode of using the machine is to move the slides to the right and left; to
50 the right, when the index figure is opposite the white part of the slide, and to the left when it is opposite the colored part of the slide, except when the inverted marginal index is used, in which case the movements
55 are reversed.

To use the machine, place the slides all in

their proper position, as slides 1, and 4, Fig. 1, so that the union of the white and colored parts of the slides shall correspond with the index figure 8. Then, to prove addition; 60 work off all the figures of each line in the column that has been added, on slide No. 1; and the figures of the amount, or sum, on slide No. 2; then, if the slides are equally advanced, the addition is correct, but if not, it 65 is incorrect.

To prove subtraction work off all the figures of the minuend on slide No. 1, and all the figures of the subtrahend and remainder, on slide No. 2; and if the slides are equally 70 advanced the work is right; but if not, it is wrong.

To prove multiplication, work off all the figures of the multiplicand, on slide No. 1, and all the figures of the multiplier, on slide 75 No. 2; note what index figure the blue of each slide points to, or with which, the union of the blue and white of each slide corresponds,—multiply those two figures together, and work off the figures of their prod- 80 uct, on slide No. 3; then work off all the figures of the grand product, on slide No. 4; and if the position of the slides 3, and 4, is the same, the work is correct,—if not, it is incorrect. 85

To prove division, work off all the figures of the divisor, on slide No. 1, and the figures of the quotient on slide No. 2; note the index figures, to which the union of the blue and white of these slides points, then multiply 90 one figure by the other, (as in multiplication) and work off the figure, or figures of their product, on the 3rd slide; next work off the figures of the dividend, on the fourth slide; and if there is a remainder, turn the 95 instrument around, and work the figures of the remainder from the inverted marginal index, pushing the slide to the right when the index figure is opposite the blue, and to the left, when it is opposite the white; then 100 if the blue on the 3rd and 4th slides, is equally advanced, the division is correct, and if not it is incorrect.

Note 1st.—In all operations with the “proof rule,” pass without notice all ciphers 105 and nines.

Note 2nd.—In all operations with the rule, the work may be shortened, by taking the figures which express the sum, of any line, instead of the figures of that line; *e. g.* 110 75382, the sum of the figures of which equal 25, the sum of the figures of which, again

equal 7, and therefore a single move for the figure 7, is all that is necessary, in place of the figures of the number 75382;—and so, of any and every other number.

5 *Note 3rd.*—In multiplication, if either of the slides 1, or 2, is in its original position, when the multiplicand and multiplier have been worked off; move the other to its original position, and then, when the product is
10 worked on either the 3rd or 4th slide, (for but one of them is in that case required,) and that slide is, at the end of the work, in its original position, the multiplication is correct, otherwise it is incorrect.

15 I do not desire to claim the inventions heretofore patented by me, July 24th 1849,

for adding numbers; and September 2nd 1851, for calculating interest; as these differ from the above described instrument, both in their construction, and in the ends effected; 20 but

What I do claim, and desire to secure by Letters Patent, is—

The above described instrument,—for proving the result of arithmetical calcula- 25 tions, when constructed and operated substantially in the manner and for the purposes set forth.

SAMUEL S. YOUNG.

Witnesses:

SAML. L. CLEMENT,
ISAAC TOWNSEND.