

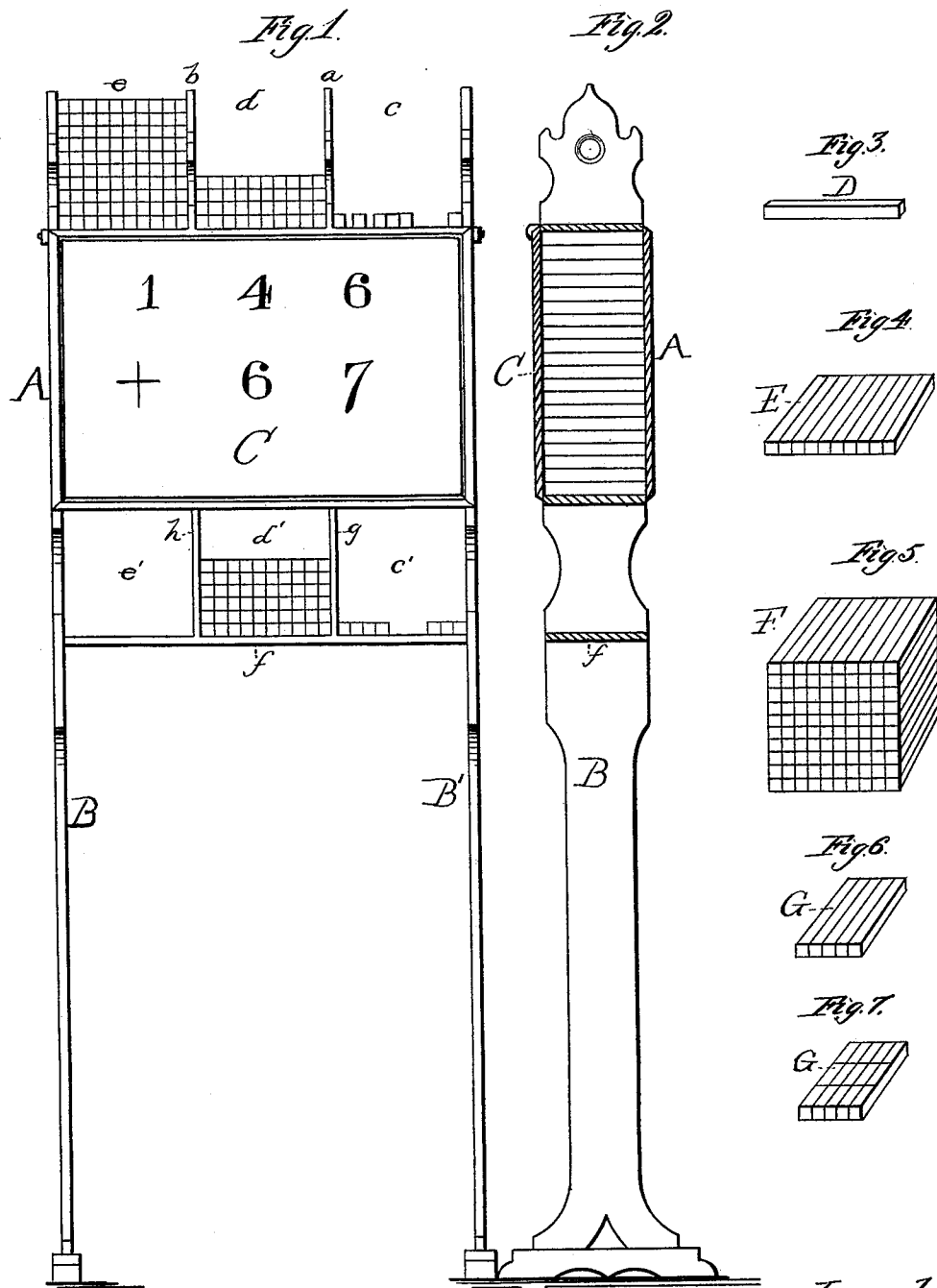
(No Model.)

A. CLASSEN.

Apparatus for Teaching Arithmetic.

No. 234,247.

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Witnesses

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AUGUST CLASSEN, OF CHICAGO, ILLINOIS.

APPARATUS FOR TEACHING ARITHMETIC.

SPECIFICATION forming part of Letters Patent No. 234,247, dated November 9, 1880.

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To all whom it may concern:

Be it known that I, AUGUST CLASSEN, of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Apparatus for Teaching Arithmetic, of which the following is a specification.

The object I have in view is to produce a device to be used in teaching children the fundamental principles of arithmetic, which will represent much more clearly than can be done with the devices heretofore employed the changes from units of one order to those of a higher or lower order, and will give a more perspicuous idea of the relative values of the units of the different orders, and will also give, in connection with the objects representing the figures of a number, the figures themselves in the same relative positions as the objects, all by simple and convenient means.

My invention consists in the peculiar combination and arrangement of the parts composing my apparatus, as fully hereinafter explained, and pointed out by the claims.

In the accompanying drawings, forming a part hereof, Figure 1 is a front elevation of the apparatus; Fig. 2, a vertical section of the same with the blocks all within the box. Figs. 3, 4, and 5 are blocks representing, respectively, units of the first, second, and third orders; and Figs. 6 and 7 are blocks representing fractions.

The apparatus is composed of a box, A, which contains the objects, and is supported by standards B B'. The hinged cover C, that closes the front of the box, is a board or tablet adapted to be marked upon by chalk or slate-pencil. The standards B B' extend above the box A, and the space between such standards on top of the box is divided, by partitions *a b*, into three spaces, *c d e*, of equal size. Below the box A the standards are connected by a board, *f*, from which two partitions, *g h*, rise to the box A, forming three spaces, *c' d' e'*, similar to the spaces *c d e*, and in line with the same.

A unit of the first order is represented by a block, D, which is square in cross-section, and is of the same length as the depth of the box A—say five-eighths ($\frac{5}{8}$) of an inch square by five (5) inches long.

A unit of the second order is represented by a board, E, of the same thickness as the block D, but ten (10) times as wide, and filling laterally any one of the object-spaces. This board E is marked off as shown to plainly represent ten (10) of the blocks D.

A unit of the third order forms a parallelepiped, F, ten (10) times as large as the board E, and on which are plainly marked ten (10) units of the second order and one hundred (100) units of the first order.

The interior space of the box A corresponds in width with the length of a unit of any order, while its height is twice that of a unit of the third order. The box may contain two units of the third order, twenty of the second, and a corresponding number of the first. The extent of the whole apparatus depends upon the thickness of a block or unit of the first order.

In explaining fractions boards G are used, which are composed of two or more blocks, D, joined together to represent a whole, of which a single block, D, would be a fractional part of a value corresponding with the number of blocks joined to form the integer. Such boards G may be crossed by lines, as shown in Fig. 7.

In illustrating operations in the fundamental rules of arithmetic the following course may be pursued with my apparatus: The teacher may write a number upon the tablet—for instance, 146—placing the figures in line with the corresponding object-spaces. To represent the number by objects he takes out of the box six blocks or units of the first order, and places them above the figure 6 on the tablet in space *c*. Then he puts four units of the second order in space *d* and one unit of the third order in space *e*. To add another number—say 67—to the number 146, the same is marked on the tablet, as shown, and represented by objects placed in the lower spaces, *c' d'*. The objects in the lower spaces are then added to those in the upper spaces, and a lucid explanation can be given, with the assistance of the objects, of the reason for carrying units of one order to the space of the next higher order of units. The sum 213 may be marked on the tablet, and will be shown by objects in the spaces *c d e*.

To illustrate operations in subtraction the teacher may write upon the tablet the num-

bers $\frac{213}{146}$, the number 213 being shown by objects in the spaces $c d e$, while the lower spaces, $c' d' e'$, are empty. He will then perform the operation in all its details of taking from the
 5 spaces $c d e$ objects representing 146, and placing them in the lower spaces, $c' d' e'$, leaving the remainder, 67, in the upper spaces, $c d e$.

My apparatus will likewise prove useful in illustrating operations in multiplication and
 10 division. Since two or more joined blocks, D, may be considered a whole, as before described, it is evident that each block is in proportion to such a whole, and therefore a block forms, according to the number of blocks contained
 15 by the integer, one-half, one-third, one-fourth, one-fifth, &c., down to one-tenth. Conversely, improper fractions can be explained, and their difference from proper fractions shown; and,

further, since each block forms a certain part of every number represented by the apparatus, various operations in fractions can be illustrated.

What I claim as my invention is—

1. In apparatus for teaching arithmetic, the combination, with the tablet C, of object-spaces
 25 both above and below the same, substantially as described and shown.

2. The apparatus for teaching arithmetic described, consisting of tablet C, object-spaces
 30 $c d e c' d' e'$, and objects D E F G, all constructed and arranged substantially as described and shown.

AUGUST CLASSEN.

Witnesses:

ARNOLD HEAP,
 WILLIAM VOCKE.