(No Model.)

E. F. COWAN.

DEVICE FOR TEACHING COMBINATIONS OF NUMBERS.

No. 462,376. Patented Nov. 3, 1891.

Fig. 1.

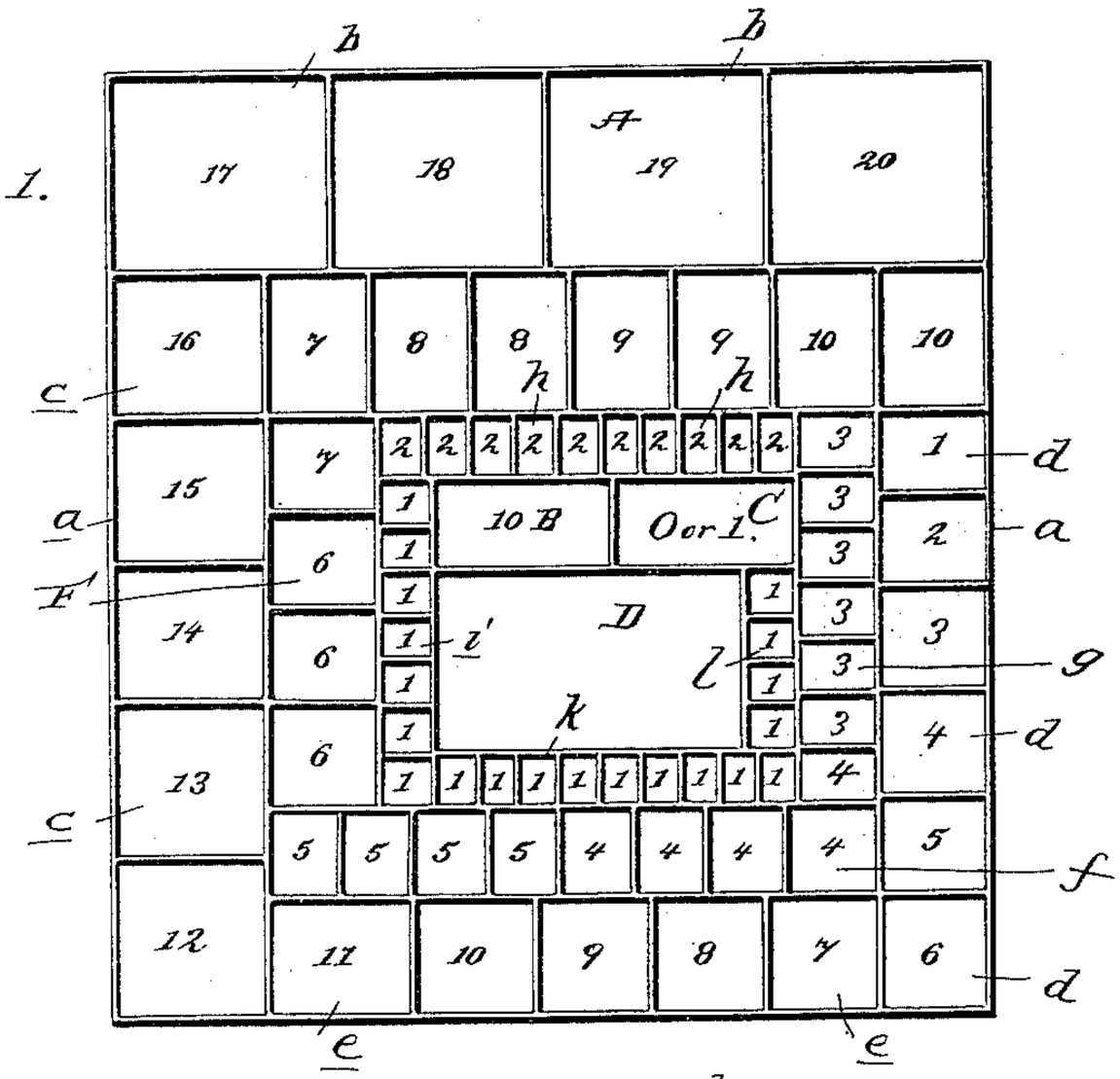


Fig. 2.

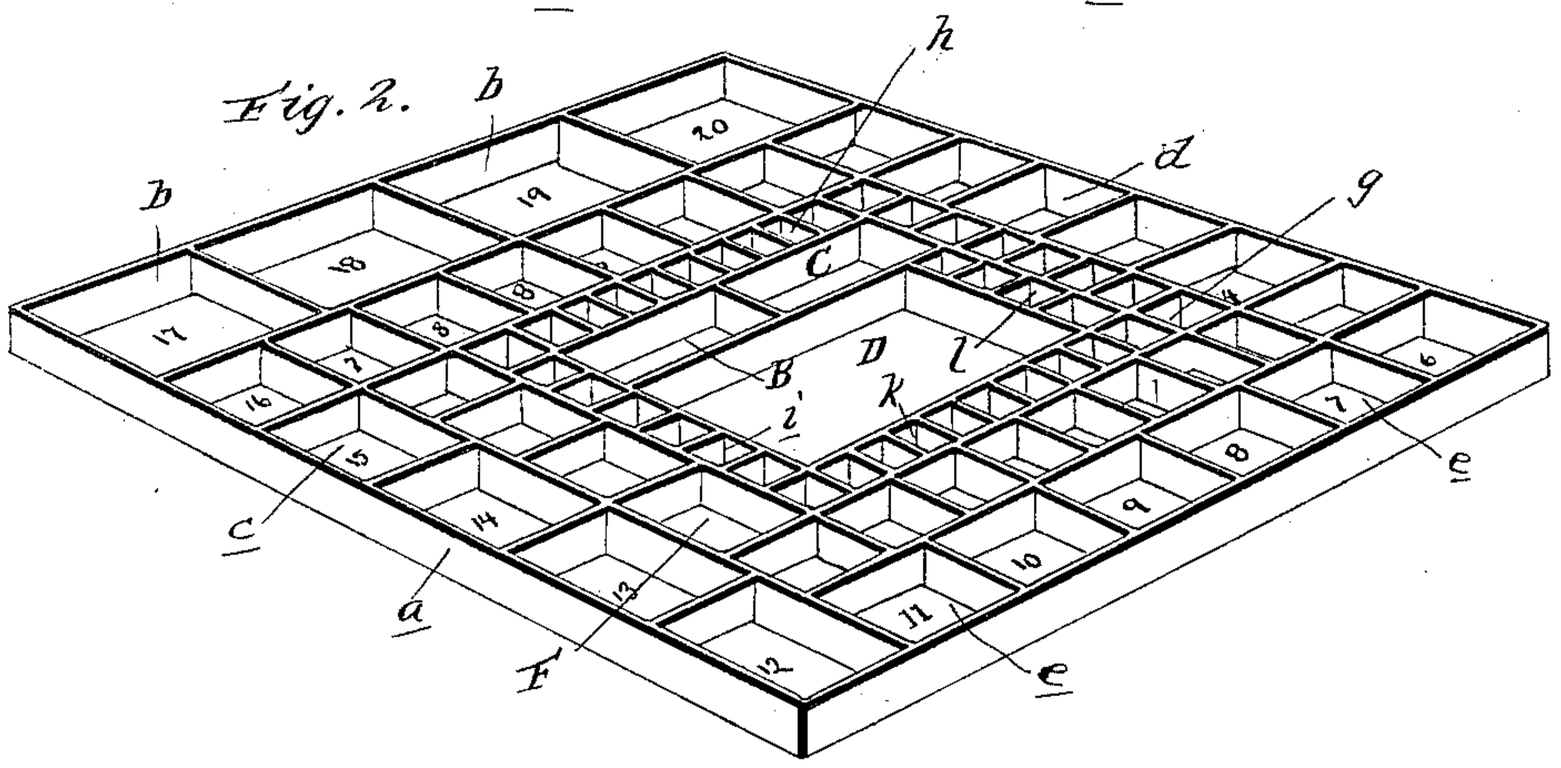
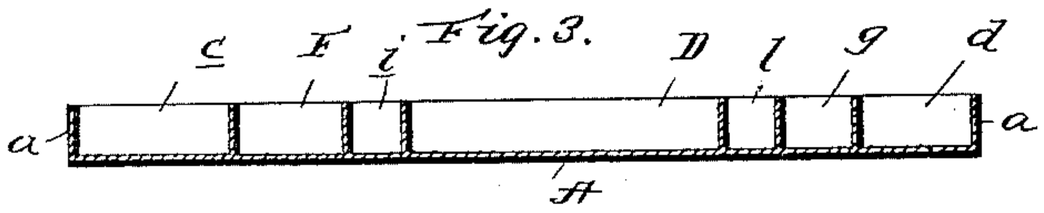


Fig. 3.



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UNITED STATES PATENT OFFICE.

ELLA F. COWAN, OF IOLA, KANSAS.

DEVICE FOR TEACHING COMBINATIONS OF NUMBERS.

SPECIFICATION forming part of Letters Patent No. 462,376, dated November 3, 1891.

Application filed February 27, 1891. Serial No. 383,085. (No model.)

To all whom it may concern:

Be it known that I, ELLA F. COWAN, a citizen of the United States, residing at Iola, in the county of Allen and State of Kansas, have invented certain new and useful Improvements in Devices for Teaching Combinations of Numbers; 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.

This invention has relation to educational devices; and it has for its object to provide at a minimum expense a device by which the rudiments of arithmetic may be taught to children and primary scholars.

The object of the invention is to provide a series of cells, pockets, or receptacles and number the same in such a manner as to show by the placing of balls the various combinations of numbers and the association of each number with its figure, so as to illustrate the units of different orders. This object I accomplish by the means shown and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of my improved device. Fig. 2 is a perspective view of the same, and Fig. 3 is a cross-sectional view.

In carrying out my invention I take a suitable board or base A, of pasteboard, wood, or other suitable material, and provide the same with a marginal vertical wall *a*, of a sufficient height to confine balls thereon. Along one side and on the top of this base I provide a series of pockets, receptacles, or compartments *b*, which are numbered 17 18 19 20, respectively. I then provide in the two opposite upper sides extending from the receptacle *b* smaller pockets or receptacles *c* and *d*. The pockets *c* are numbered 12 13 14 15 16 and the pockets *d* are numbered 6 5 4 3 2 1 10, respectively. I further provide the remaining upper marginal side of the base with pockets *e*, which are numbered 7 8 9 10 11, respectively. It will be observed that the pockets indicated by *b* are usually of a greater capacity than the other pockets referred to, as they are designed to receive a greater number of balls.

Arranged upon the base on the inner side of the pockets *e* is a similar series of pockets *f*, bearing the numbers 4 and 5, as shown. On the inner side of the pockets *d* are a series of pockets *g*, which, with the exception of one, are numbered 3 and the remaining one numbered 4. At right angles and extending from one end of the series of pockets *g* is a series of smaller pockets *h*, which are, respectively, numbered 2. From the opposite end of the series numbered 2, and of a corresponding size, is a series of pockets numbered 1, and extending from the opposite end of this latter series and at right angles thereto is another series of corresponding size, which is also numbered 1, and a further series 1 of pockets numbered 1 extends at right angles and inwardly from the end of the series *k*.

B indicates an elongated pocket or receptacle numbered 10, and C indicates a receptacle of corresponding shape numbered 0 or 1. These elongated pockets or receptacles are so arranged upon the base that the inner wall thereof, together with the inner walls of the series of pockets *i k l*, form a central main pocket or receptacle D for all of the balls when not in use.

Arranged on the outer side and parallel with the receptacles or pockets *h* is a series of larger pockets, (marked 8, 9, and 10, respectively,) and on the outer side and parallel with the pockets *i* is a series of larger pockets F, which are marked 6 and 7, respectively.

This device may be very cheaply manufactured from wood or other suitable material, and the partition-walls as well as the marginal walls are arranged vertically, and the size of the pockets or receptacles are proportionate to the number of units contained in the number marked on the pockets.

With a device of this character a child will become interested, and the learning will be found a pleasure rather than a drudgery as practiced by the common methods of teaching arithmetic to primary scholars.

To illustrate the use of my device, I will say that in teaching the combinations in 4, for instance, a pupil is asked to count out four balls and place them in the pockets marked 4. The number of balls is thus associated with the figure 4 of the pockets which represents them. Another pupil is then asked to take away one and place it in a pocket 1, after which he is told to place the remainder where they belong, which of course will be pocket 3. The one and the three are thus

associated with the appropriate figures. The class is then shown that 4 less 1 are 3. A pupil is then asked to return one ball to the 3 pocket, which places the sum in the 4 pocket, when the class is told that 3 plus 1 are 4. A pupil is then asked to take away two, placing the number withdrawn and the remainder in their proper pockets, thus telling that 4 less 2 are 2, after which the sum of two and two are placed in the pocket 4 and the class is shown that 2 plus 2 are 4. Three may be then taken away and returned in the same manner, then four.

After addition and subtraction are taught, multiplication and division may be taught as follows: A pupil is asked to find the 1's in 4. After distributing the balls in the 1 pockets he finds that there are four 1's in 4, and the 2's are found in a similar manner. In finding the 3's, it is discovered that there is one 3 in 4 and 1 over. Taking four 1's they are placed in the 4 pocket, showing that four 1's equal 4. Two 2's are shown to be 4 in like manner, and four 1's are seen to equal 4. It is obvious that as the board is arranged all the numbers from 1 to 20 may be taught in the same manner.

When the combinations from 1 to 10 have been taught, the idea of a second order of units is developed by means of the divisions representing one or zero and ten. Ten balls are placed in the 10 pocket and the pupils are told that this is a 1 composed of ten units. If the space or pocket C is vacant, the number is 10; if said pocket contains one, then the number is 11; if it contains two, it is 12, and so on.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

The educational device described, comprising a base having a central receptacle adapted to contain balls, and pockets marked 10 and 0 or 1, respectively, a series of small pockets exterior thereto and marked 1 and 2, respectively, and two series of pockets arranged parallel in pairs on opposite sides of the central receptacle and bearing numbers, respectively, from 3 to 20, the pockets in the two latter series being of various sizes in accordance with the number of units contained in the various numbers they bear, substantially as and for the purpose set forth.

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