Aug. 18, 1959 P. H. WISE 2,899,756

ARITHMETIC TUTORING DEVICE

Filed Aug. 13, 1956 3 Sheets-Sheet 1

Fig. 1

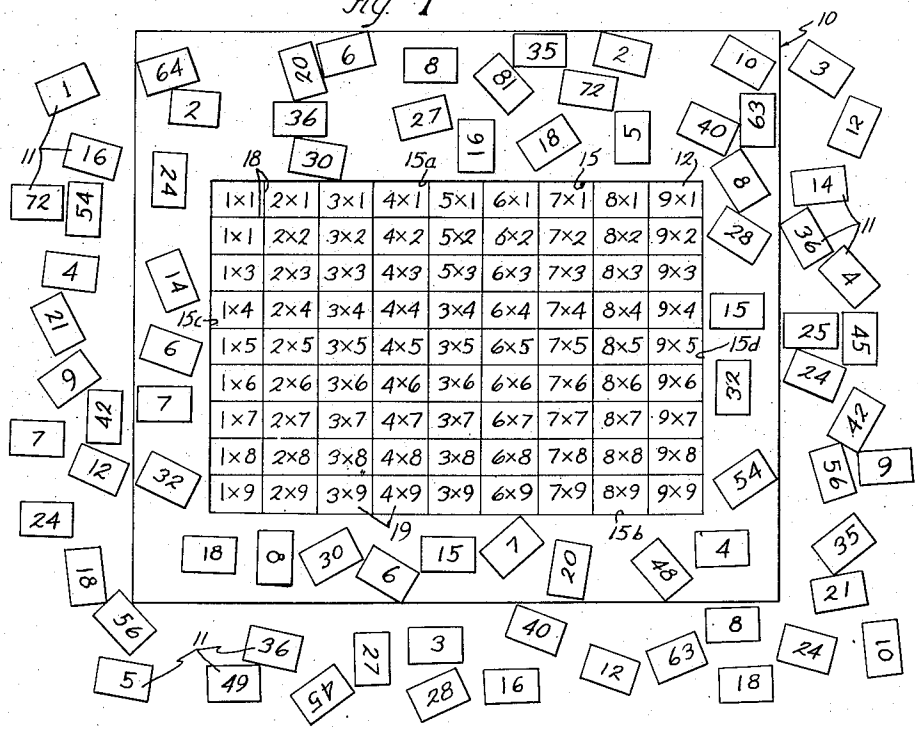
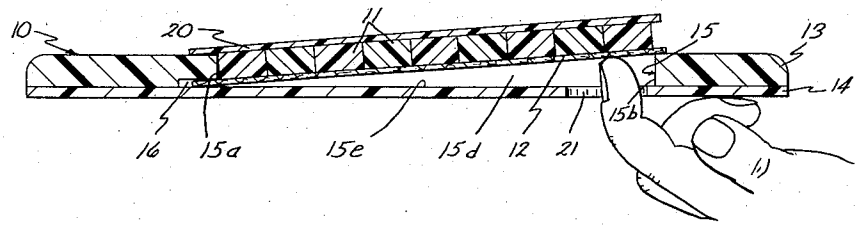


Fig. 4



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ARITHMETIC TUTORING DEVICE

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Fig. 2

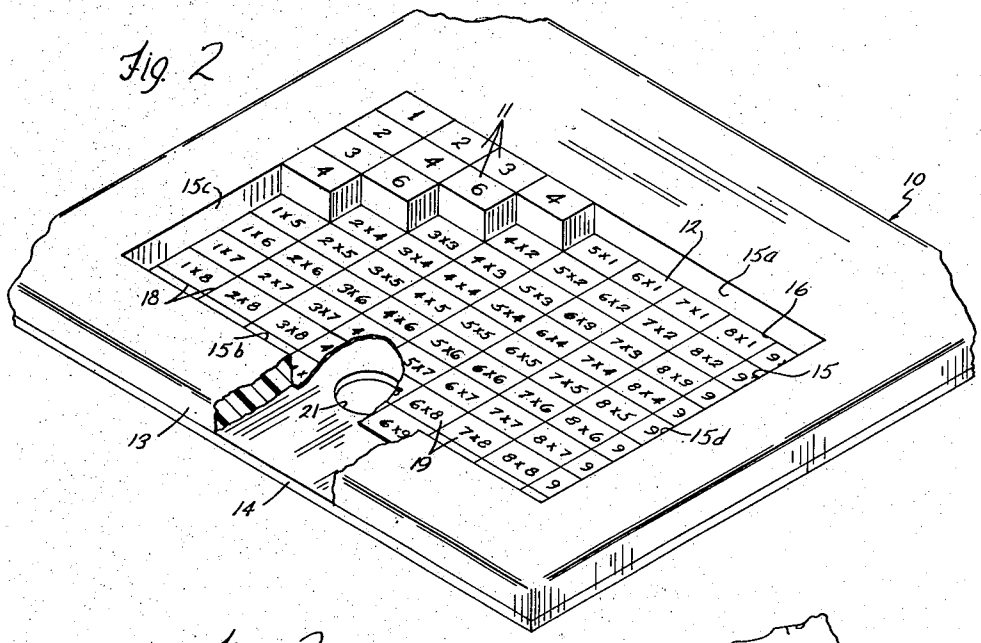
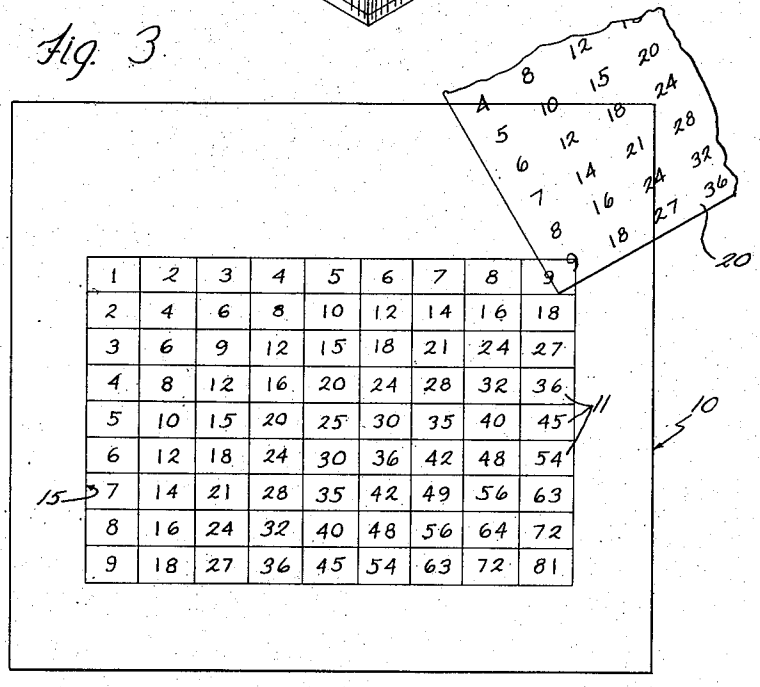


Fig. 3



1	2	3	4	5	6	7	8	9
2	4	6	8	10	12	14	16	18
3	6	9	12	15	18	21	24	27
4	8	12	16	20	24	28	32	36
5	10	15	20	25	30	35	40	45
6	12	18	24	30	36	42	48	54
7	14	21	28	35	42	49	56	63
8	16	24	32	40	48	56	64	72
9	18	27	36	45	54	63	72	81

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ARITHMETIC TUTORING DEVICE

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Fig. 5

SUBTRACTION						
2-1	3-1	4-1	5-1	6-1	7-1	8-1
3-1	6-2	9-3	12-4	15-5	18-6	21-7
4-1	8-2	12-3	16-4	20-5	24-6	28-7
5-1	10-2	15-3	20-4	25-5	30-6	35-7
6-1	12-2	18-3	24-4	30-5	36-6	42-7
7-1	14-2	21-3	28-4	35-5	42-6	49-7
8-1	16-2	24-3	32-4	40-5	48-6	56-7
9-1	18-2	27-3	36-4	45-5	54-6	63-7
10-1	20-2	30-3	40-4	50-5	60-6	70-7

Fig. 6

MIXED MULTIPLICATION						
7×5	6×7	5×9	4×2	3×4	2×6	1×8
6×6	5×8	4×1	3×3	2×5	1×7	9×9
5×7	4×9	3×2	2×4	1×6	9×8	8×1
4×8	3×1	2×3	1×5	9×7	8×9	7×2
3×9	2×2	1×4	9×6	8×8	7×1	6×3
2×1	1×3	9×5	8×7	7×9	6×2	5×4
1×2	9×4	8×6	7×8	6×1	5×3	4×5
9×3	8×5	7×7	6×9	5×2	4×4	3×6
8×4	7×6	6×8	5×1	4×3	3×5	2×7

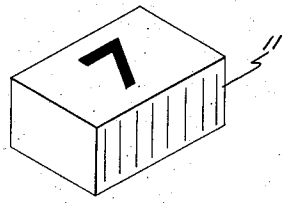
Fig. 7

ADDITION-SUBTRACTION-MULTIP						
81÷9	13+11	7×5	7×6	30+15	64÷8	24÷2
4×4	14+14	6×6	80÷2	16÷4	3×3	60÷6
31-10	90÷3	40-5	4×9	36÷6	16÷2	12÷2
48÷2	60÷2	35-3	18÷6	18÷3	25÷5	7×9
100÷4	17+11	34-7	20÷5	36÷9	23+31	8×8
12+12	8+3	16÷8	9÷3	41+4	65-9	33+30
11+10	72÷4	18÷9	12×3	6×8	7×8	24÷4
32÷2	9÷9	18+9	20+20	7×7	25+29	20÷2
27÷3	9+9	8×4	21+21	36+12	15÷3	48÷4

Fig. 8

MULTIPLICATION & DIVISION						
$7\div\frac{1}{5}$	$7\div\frac{1}{6}$	$15\div\frac{1}{3}$	$32\times\frac{1}{4}$	$16\times\frac{3}{4}$	$4\div\frac{1}{3}$	$12\times\frac{2}{3}$
$12\div\frac{1}{3}$	$50\times\frac{4}{5}$	$12\times\frac{1}{3}$	$1\div\frac{1}{9}$	$15\times\frac{2}{3}$	$21\times\frac{1}{3}$	$9\div\frac{1}{9}$
$5\div\frac{1}{7}$	$4\frac{1}{2}\div\frac{1}{8}$	$16\times\frac{3}{8}$	$16\times\frac{1}{2}$	$18\times\frac{1}{3}$	$9\div\frac{1}{8}$	$12\div\frac{1}{12}$
$8\div\frac{1}{4}$	$9\times\frac{1}{3}$	$4+\frac{2}{3}$	$20\times\frac{1}{4}$	$9\div\frac{1}{7}$	$18\div\frac{1}{4}$	$7\div\frac{1}{2}$
$9\div\frac{1}{3}$	$16\times\frac{1}{4}$	$12\times\frac{1}{3}$	$18\div\frac{1}{3}$	$16\div\frac{1}{4}$	$28\times\frac{1}{4}$	$3\div\frac{1}{6}$
$\frac{1}{2}\div\frac{1}{4}$	$2\div\frac{2}{3}$	$5\div\frac{1}{9}$	$14\div\frac{1}{4}$	$7\div\frac{1}{9}$	$8\div\frac{2}{3}$	$6\times3\frac{1}{3}$
$3\div1\frac{1}{2}$	$12\div\frac{1}{3}$	$12\div\frac{1}{4}$	$7\div\frac{1}{8}$	$\frac{1}{2}\div\frac{1}{12}$	$25\div\frac{3}{5}$	$15\times1\frac{1}{3}$
$3\div\frac{1}{9}$	$10\div\frac{1}{4}$	$7\div\frac{1}{7}$	$9\div\frac{1}{6}$	$25\times\frac{2}{3}$	$2\div\frac{1}{8}$	$3\div\frac{1}{6}$
$4\div\frac{1}{8}$	$21\div\frac{1}{2}$	$64\times\frac{3}{4}$	$15\times\frac{1}{3}$	$18\times\frac{2}{3}$	$3\div\frac{1}{5}$	$2\div\frac{1}{7}$

Fig. 9



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United States Patent Office

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ARITHMETIC TUTORING DEVICE

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Application August 13, 1956, Serial No. 603,518

3 Claims. (Cl. 35—31)

The present invention relates to improvements in educational devices, and more particularly to arithmetic tutoring devices.

It is the principal purpose of the invention to provide a device for teaching arithmetic relations to students which is usable by the student individually to test and familiarize himself with arithmetic relations.

A further purpose of the invention is to provide an arithmetic tutoring device usable by the student to test and familiarize himself with various types of arithmetic relations with the same equipment.

A still further purpose of the invention is to provide such a device having the characteristics of a game or puzzle whereby to hold the student's attention and attract him to utilization of the device.

More specifically it is the purpose of the invention to provide an arithmetic tutoring device including a board having a recessed portion therein, a plurality of cards each proportioned to fit into the recess, and a plurality of numbered blocks adapted to be placed in the recess upon a card filled therein, the cards each having indicia thereon indicating the proper order in which the blocks should be placed in the recess, the indicia being in the form of arithmetical problems to which the numbers on blocks form solutions.

The nature and advantages of the invention will appear more clearly from the following description and the accompanying drawings, wherein a preferred form of the invention is shown. It should be understood, however, that the description and drawings are illustrative only, and are not intended to limit the invention, except insofar as it is limited by the claims.

In the drawings:

Figure 1 is a plan view illustrating the device with the elements thereof arranged for use by the student;

Figure 2 is a perspective view of the device showing part of an arithmetic exercise completed;

Figure 3 is a plan view similar to Figure 1, but showing the several numbered blocks in place as when an arithmetic exercise is completed, and an answer card being slid over the blocks;

Figure 4 is a vertical sectional view of the device taken substantially on the line 4—4 of Figure 1, but showing the method by which the numbered blocks and problem cards are removed;

Figures 5, 6, 7 and 8 are fragmentary plan views of problem cards used with the device; and

Figure 9 is an enlarged perspective view of one of the numbered blocks.

Referring now to the drawings, and to Figures 1 to 4 in particular, the invention is shown as embodied in a rectangular playing board **10**, together with a plurality of numbered blocks **11** and problem cards **12**, and a check card all adapted to be used with the board **10** as hereinafter described.

The board **10**, as best shown in Figures 2 and 4, is composed of two sheets **13** and **14** bonded together. The sheets **13** and **14** are preferably made of plastic, but

any other suitable material such as wood or metal may be used. The board **10** has a rectangular recess **15** therein, formed by providing a rectangular aperture in the upper, thickest, sheet **13**, which aperture is closed by the lower sheet **14**. With this construction the upper sheet **13** provides the end walls **15***a* and **15***b* and the side walls **15***c* and **15***d* of the recess **15**, while the lower sheet **14** provides the bottom wall **15***e*. The end wall **15***a* of the recess **15** is notched adjacent the bottom wall **15***e* as shown at **16** in Figure 4.

The problem cards **12** are constructed of plastic or cardboard and are adapted to be fitted into the recess **15** in the board **10**. The cards **12** are each equal in width to the width of the recess **15** and are equal in length to the length of the recess **15** from the end wall **15***b* to the end of the notch **16** in the end wall **15***a*. The cards **12** are fitted into the recess **15** by sliding the top of the card **12** into the notch **16** and then dropping the card **12** into the recess **15**. Each card **12**, as shown in the drawings, has an identification space **17** at the top, and has transverse and longitudinal grid lines **18** thereon dividing the balance of the card **12** into a plurality of equal rectangular spaces **19**. The grid lines **18** cover an area of the card **12** equal to the area of the recess **15**, the identification space **17** of the card **12** being positioned in the notch **16** when the card **12** is in place. Arithmetical problems are marked in the several spaces **19** of each card **12**.

The blocks **11**, best shown in Figure 9, are rectangular blocks of plastic or other suitable material. The blocks **11** are formed so that their upper and lower surfaces are equal in size to the spaces **19** formed by the grid lines **18** on the cards **12**, and so their height is substantially equal to the depth of the recess **15** in the board **10**. There are in all, a number of blocks **11** equal to the number of spaces **19** in each card **12**, this number being uniform in all the cards **12**. The blocks **11** each have a number marked on the upper and lower surfaces, the numbers on each surface being the same. The numbers on the blocks **11** constitute solutions or answers to the problems marked in the spaces **19** of the cards **12**.

The particular device illustrated in the drawings includes eighty one blocks **11**, there being eighty one spaces **19** on each card **12**. The numbers marked on the blocks **11** represent the products of a multiplication table from one to nine. As shown in Figures 1 and 2, one of the cards **12** has thereon the multiplicands and multipliers for a one to nine multiplication table. Another of the cards **12** (see Figure 5) has subtraction problems thereon, the correct answers to which correspond to the numbers on the several blocks **11**. Other cards **12** (not shown) are marked with addition and division problems which correspond to the numbers on the blocks **11**.

Additional cards **12'** such as those shown in Figures 6, 7 and 8, are provided with mixed problems thereon to provide more difficult exercises for the student.

In using the arithmetic tutoring device, the student selects a card **12**, fits it into the recess **15** of the board **10** and arranges the several blocks **11** in random positions around the board **10**, as shown in Figure 1. Then, starting at one corner, as shown in Figure 2, he reads the problem in the space **19** of the card **12**, selects a block **11** having a number corresponding to the correct solution and places it in the recess **15** on the space **19** in which the problem is marked. For example with the multiplication card shown in Figure 1, the first problem is "1×1." The student should select the block **11** having the number "1" marked thereon and place it in the recess **15** over the space **19** containing the problem "1×1." The student progresses in a like manner to solve each problem until the recess **15** is filled with the blocks **11**, as shown in Figure 3.

To check the accuracy of the student's solution, a transparent check or answer card **20** is provided. The answer card **20** is of the same size as the problem cards **12** and has numbers marked thereon in the arrangement that the blocks **11** should be in for a correct solution to the problem cards **12**. The answer card **20** is placed on the board **10** and aligned over the blocks **11** as shown in Figures 3 and 4. If the blocks **11** are in their proper order, the numbers thereon will be aligned beneath identical numbers on the answer card **20**. If not, then the improper numbers will be visible through the transparent card **20**. It will be understood that a single answer card **20** will suffice for several problem cards **12**, since the problems on, for example, the addition, subtraction, multiplication and division cards, may all be arranged so that a correct solution to each produces a uniform arrangement of the blocks **11**. The more difficult problem cards **12'**, such as those shown in Figures 6, 7 and 8, may also be arranged so that a single answer card **20** will suffice for all. In this event, two answer cards **20** will serve for the entire array of problem cards **12** and **12'**. Since the answer cards **20** are equal in size to the problem cards **12**, one of them may be fitted into the recess **15** to adjust the board **10** for a simple number matching exercise for pre-school age children.

When the student has completed a given exercise and wishes to attempt another, he merely lifts the blocks **11** and card **12** from the recess **15** and begins anew with a different card. To facilitate removal of the blocks **11** and card **12**, a small aperture **21** is provided in the lower plate **14** of the board **10**, as shown in Figures 2 and 4. By inserting a finger in the aperture **21** and pushing upwardly, the student may remove both blocks and card with ease.

It should be apparent from the foregoing that my invention provides an extremely simple and useful arithmetic tutoring device, usable by the student to test and familiarize himself with arithmetic relations in a pleasant and entertaining manner and without the aid of an instructor. It should be understood that while the device illustrated in the drawings utilizes only eighty one blocks, similar devices using more blocks are contemplated and may be provided without departing from the spirit of the invention. It is also contemplated that different sets of blocks and problem cards be provided having numbers thereon suited for solving algebraic problems or problems having solutions involving fractions or decimals. Problem cards and blocks may be provided for tutoring students in other fields. For example, cards containing the names of the several mineral elements may be provided, together with blocks containing the abbreviations therefor.

Also while the blocks **11** shown in the drawings are rectangular and have the numbers repeated on two sides, it is contemplated that they be provided as cubes with the numbers repeated on all six sides, the problem cards **12** and recess **15** being proportioned accordingly.

It is believed that the nature and advantages of the invention appear clearly from the foregoing.

Having thus described my invention, I claim:

1. An educational device comprising a board having a rectangular recess in one surface thereof, said recess having end and side walls and a bottom wall, a notch in one of said end walls adjacent the bottom wall and extending parallel to the bottom wall, a card having longitudinal and transverse grid lines thereon dividing the card surface into a plurality of uniform spaces, said card having an identification space at one edge thereof, the card being received in the recess and having the identification space received in the notch whereby to expose in the recess that portion of the card having the grid lines thereon, a plurality of rectangular blocks received in the recess above the card, each of said blocks having identification indicia thereon, indicia marked in the spaces of said card indicating the proper positions of the blocks, and an aperture in said board extending from the opposite surface of said board into said recess whereby to permit lifting engagement with the card for removing the card and the blocks from the recess.

2. An educational device comprising a board having a rectangular recess in one surface thereof defined by end walls and side walls transverse to said surface and a bottom wall substantially parallel to said surface, one of said end walls having a notch undercut therein flush with the bottom wall, a card having side edges seatable in said recess along the side walls thereof, and having end edges, one end edge seating in said notch and the other edge seating against the other end wall of said recess, the card having longitudinal and transverse grid lines thereon dividing the card surface exposed in said recess into a plurality of rectangular spaces, a plurality of rectangular blocks seatable in the recess and matching said rectangular spaces on the card, each of said blocks having identification indicia thereon, each of said rectangular spaces on the card carrying indicia indicating the proper positions of the blocks, and a transparent check card adapted to cover the entire area of said recess and having indicia thereon arranged to coincide with the indicia on the blocks when the blocks are properly positioned on the first named card, the board having an aperture extending from the bottom surface of the recess through the board to the opposite surface of the board adjacent to the end wall of said recess opposite the notch and providing access to the under surface of the first named card for lifting the card and any blocks thereon free of said last named end wall for removal from said notch.

3. An educational device comprising a board having a rectangular recess in one surface thereof defined by end walls and side walls transverse to said surface and a bottom wall substantially parallel to said surface, one of said end walls having a notch undercut therein flush with the bottom wall, a card seatable in said recess having longitudinal and transverse grid lines thereon dividing the card surface exposed in said recess into a plurality of rectangular spaces, a plurality of rectangular blocks seatable in the recess and each matching one of said rectangular spaces on the card, each of said blocks having identification indicia thereon, each of said rectangular spaces on the card carrying indicia indicating the proper positions of the blocks, and a transparent check card adapted to cover the entire area of said recess and having indicia thereon arranged to coincide with the indicia on the blocks only when the blocks are properly positioned on the first named card.

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