April 3, 1928. 1,664,808

A. COOPER

TEACHING DEVICE

Filed Oct. 18, 1926

Fig. 1.

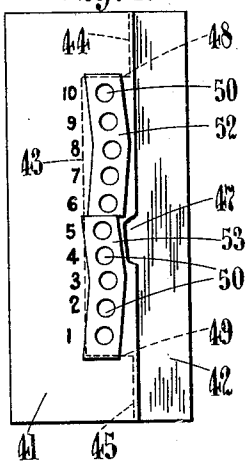


Fig. 3.

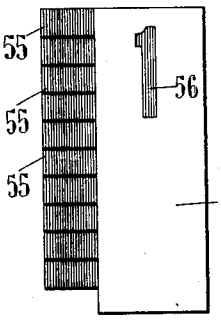


Fig. 4.



Fig. 5.

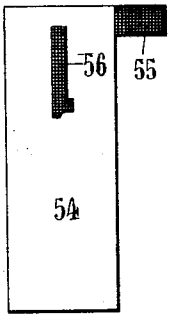


Fig. 2.

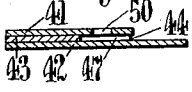


Fig. 7.

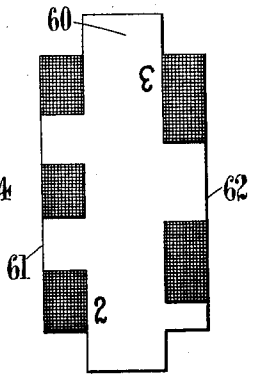
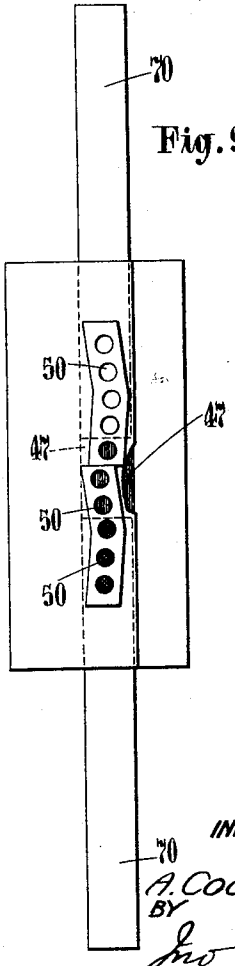


Fig. 9.



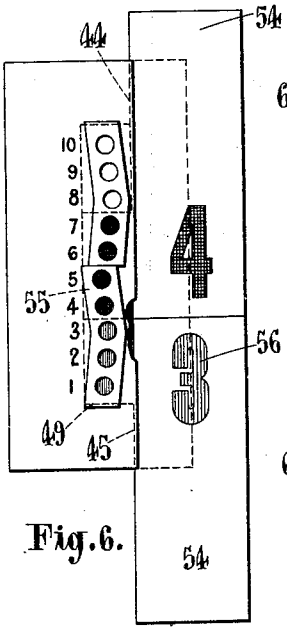
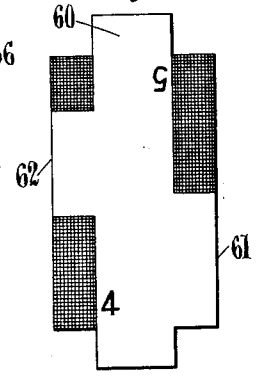


Fig. 6.

Fig. 8.



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UNITED STATES PATENT OFFICE.

ALFRED COOPER, OF STOWMARKET, ENGLAND.

TEACHING DEVICE.

Application filed October 18, 1926, Serial No. 142,463, and in Great Britain October 31, 1925.

This invention relates to appliances for teaching arithmetic and has for its object an improved device offering increased psychological advantages whereby the pupil is enabled to visualize the quantities denominated by numbers.

The improved device further enables a pupil to visualize the concrete processes involved in addition and subtraction, and further serves to imprint on the pupil's mind a vivid visualization of the mental processes involved in the operations and so impress the pupil that he can readily bring the same to mind whenever required and employ them readily in solving problems based on numbers 1 to 10.

The invention is illustrated in the accompanying drawing in which

Figs. 1 and 2 illustrate a guide in front elevation and sectional end view,

Figs. 3 and 4 illustrate in front and end view a set of ten laminar devices adapted for use with the guide shown in Figs. 1 and 2,

Fig. 5 being a view of the obverse side of the upper laminar device of Fig. 3,

Fig. 6 illustrating the said guide with two of the said devices inserted therein.

Figs. 7 and 8 illustrate front and back views of a further laminar device for use with the guide of Figs. 1 and 2, and

Fig. 9 illustrates a modification of the guide.

Referring now to the drawing, the guide, Figs. 1 and 2 comprises a front plate 41 and a back plate 42 the latter extending at one side laterally beyond the front plate 41 as clearly shown.

In the form illustrated, the guide is formed of composite parts, the front and back plates 41, 42 being separated by a spacing strip 43 having extensions 44, 45 at its ends adapted when the parts are assembled as illustrated in Fig. 2 to leave an open slot 47 between the front and back plates terminated by stops 48, 49 at its upper and lower ends.

That part of the front plate 41 which lies over the slot 47 is pierced with ten holes 50 as clearly shown in Fig. 1, the holes being divided into two groups of five and each group of five being arranged on the arms of an obtuse angle of nearly 180 degrees, the middle hole of the five being at the angle and the other holes lying on the arms thereof. The angle is that which approximates the angle on which lie the imprint of the five fingers of the hand of a child when the finger ends are arranged lightly to touch. Each group of holes is surrounded by an imprinted frame-like border 52, 53, of which the vertical sides are parallel to the arms of the obtuse angle, the top and bottom sides being horizontal and forming angles with the vertical sides. The two groups of five holes contained in the borders are slightly stepped relatively to each other for distinctiveness. The holes are marked with numerals 1 to 10 also arranged at an obtuse angle to each other as shown.

For use with the frame I provide a series of ten laminar devices or tablets, Figs. 3 and 4, each comprising a holding strip 54 and a laterally-projecting tongue 55. The holding strip 54 is marked with a numeral 56 and the projecting tongue 55 of each tablet of the set has a depth corresponding to the denomination on the numeral 56 marked on the holding strip, for example the upper holding strip 54 of Fig. 3 is marked with numeral 1 and its lateral projecting tongue 55 has a depth approximately equal to one-tenth the height of the slot 47 of Figs. 1 and 2. The laminar tablet marked with an enlarged numeral 2 has a projecting tongue whose depth corresponds to two-tenths the height of the slot 47 and so on, as will be readily appreciated by reference to Fig. 4 of the drawings. The numeral is marked on both sides of a tablet and on each side the numeral and projecting tongue are coloured in the same colour different from the rest of the tablet, the colour used to mark the numeral and the projecting tongue on the front of the tablet being different from that used to mark them on the back of the tablet, the numeral also being printed in inverted positions on the two sides as clearly shown in Figs. 3 and 5.

The length of the projecting tongues 55 is approximately equal to the lateral extent of the slot 47 so that one or two tablets can be arranged as illustrated in Fig. 6 with the edge of the holding strip 54 abutting against one of the stops 44, 45, in which circum-

stance the projecting tongue 55 will lie snugly within the slot 47 and engage the rear wall thereof.

The device hitherto described is used as follows:—

To teach the concrete value of a number, the tablet marked with a numeral, for example 3, is inserted with its projecting tongue in the slot 47 and drawn downwards in Fig. 6, until the strip abuts against the horizontal edge 49 of the lower stop, whereupon the three lower holes of the series of ten will display a colour visible therethrough, namely the colour of the projecting tongue 55 of tablet No. 3. Thus, the value of all digits up to 10 is readily taught and visualized, the pupil also learning to allot in the design a fixed position for each digit in the series of ten, in a manner which enables him to appreciate their concrete values. Further, if numbers have already been taught by rule of thumb method, the use of the apparatus in this manner is so psychologically designed as to ensure that the child's appreciation of his teaching is psychologically correct.

In order to teach addition, a second tablet for example 4, is taken and inverted, its projecting tongue being inserted in the slot and the tablet being then pushed down as far as it will go; the pupil then sees the three lower holes presenting the colour of the obverse side of the tablet 3 and the four next holes presenting the different colour of the reverse side of tablet 4 and by reading off the figure 7 marked on the front plate 41 of the guide sees that the addition of 3 and 4 is 7, further realizing the concrete values which make up the sum.

Subtraction on the other hand may be taught by inserting a tablet, for example number 7, in the guide so that seven holes are displayed and then covering up with the fingers, for example, two holes which are counted out, the pupil being then asked to read off the number of holes through which the colour is displayed.

It should here be mentioned that when the tablets are withdrawn the colour displayed through the holes in the upper guide is required to be a different colour from that on either the obverse or reverse of the tongues 55, although it may be the same colour as the general colour of the guide or not as found most convenient.

To teach the rudiments of division, I further provide for use with the guide, the tablet illustrated in Figs. 7 and 8 having a holding strip 60 and projecting tongues 61, 62 extending at each side thereof. The size of each tongue 62, 61 agrees with the size of the slot 47 and each tongue is printed in two colours appearing in alternate bands which are of equal depth on any given tongue, but are of different depths as between one tongue and another. In the form shown, the two faces of the two tongues permit of bands being used which have a depth of two, three, four, and five-tenths of the height of slot 47 and the holding strip 60 is marked with numerals 2, 3, 4 and 5 adjoining the appropriate markings. Thus, if the left hand tongue of Fig. 7 is inserted into the slot 47, the alternate colours will be displayed through adjacent equal groups of two of the holes in plate 41, five such bands appearing, thus showing that there are five groups of 2 in numeral 10. One of the colours of the bands may be that of the holding strip 60 so that only one printing impression requires to be taken on the tablet of Figs. 7 and 8, although both colours are preferably different from the colour of the upper face of the number plate 42 displayed through the holes 41.

Turning now to Fig. 9, I here illustrate a modification of the guide in which the stops 44, 45 are dispensed with so that the slot 47 runs the whole length of the guide. For use with this device, I provide two strips 70, 71 equal in width to the width of the slot. In this case it is important that the upper face of bottom plate 42 should be separately coloured with a colour, for example green, which is different from the neutral or insignificant colour of the general get-up of the guide and strip 70 is also coloured, for example red, differently from the colour green normally displayed by the empty guide. Strip 71, however, bears the neutral or insignificant colour of the general get-up of the guide.

To teach the value of numbers, the red strip 70 is placed in the guide, and the pupil is asked to show 2, 3, 5, etc., red spots. With this strip in position strip 71 with its neutral colour is inserted downwardly in the upper part of slot 47 and pushed downwardly until, for example, three green spots are left uncovered, the student can then appreciate that 3 and 4 make 7.

Subtraction may be taught as in the former case by showing seven red spots with strip 70, covering up two with the fingers and asking for the remainder to be named. Alternatively, strip 71 may be used to cover up three green spots, thus leaving seven displayed. The red strip 70 is then used to change two green spots into red, and the number of green spots left is the answer to the subtraction.

It will be appreciated that the guide and its accessories exercise and interest all the pupil's mental faculties and that by seeing, feeling, grasping, handling and manipulating the same he is enabled to visualize the concrete values of the processes he performs, impressing them on his memory in an indelible and vivid manner such as will enable him to readily recall with a minimum amount

of difficulty all that has been committed to his memory in case of need.

It is to be understood that the forms shown where the holes are confined to 10 are illustrative and not limitative of the invention, and that other forms may be employed wherein the two sets of ten holes are combined together in one guide, so that additions whose sum exceeds 10 may be carried out, and it is to be understood that the following claims are to be interpreted in the light of such variations as properly fall within their defining ambit.

It is further remarked that whilst the guides illustrated are understood to be made up of separate members 41, 42, 43 constructed of paper, board or the like the invention is not limited to that form of construction; for example, a guide may be formed or moulded in a single piece provided that the front plate and back plate are laterally of unequal widths as illustrated.

I claim:—

1. Appliance for teaching arithmetic comprising a guide having a front plate, a rear plate extending at one side laterally beyond the front plate, a spacing strip between said front and rear plates arranged to leave a slot between the two plates, 10 holes pierced in said front plate over said slot said holes being arranged in two groups of 5, the holes of each group being arranged on an obtuse angle, and the two groups being stepped laterally relatively to each other.

2. Appliance for teaching arithmetic comprising a guide having a front plate, a rear plate extending at one side laterally beyond the front plate, a spacing strip between said front and rear plates arranged to leave a slot between the two plates, 10 holes pierced in said front plate over said slot said holes being arranged in two groups of 5, the holes of each group being arranged on an obtuse angle and surrounded by a marked border having lines parallel to the arms of the obtuse angle.

3. Appliance for teaching arithmetic comprising a guide having a front plate, a rear plate extending at one side laterally beyond the front plate, a spacing strip between said front and rear plates arranged to leave a slot between the two plates, an upper and a lower stop to said slot, 10 holes pierced in said front plate over said slot, said holes being arranged in two groups of 5, the holes of each group being arranged on an obtuse angle.

4. Appliance for teaching arithmetic comprising a guide having a front plate, a rear plate extending at one side laterally beyond the front plate, a spacing strip between said front and rear plates arranged to leave a slot between the two plates, 10 holes pierced in said front plate over said slot, and a set of laminar devices, each device marked with a number and having a coloured laterally projecting part, the devices of said set being selectively inserted in said slot for display of a colour through as many holes of said front plate as are denominated by said number in each case.

5. For use in apparatus as claimed in claim 7 a laminar device displaying numbers on its back and front, said numbers and its laterally projecting part being differently coloured on the back from on the front.

6. An appliance for teaching arithmetic comprising a guide having a front plate, a rear plate extending at one side laterally beyond the front plate, a spacing strip between said front and rear plates arranged to leave a slot between the two plates, ten holes pierced in said front plate over said slot, a laminar device insertible in said slot for display through said pierced front, said device having the four faces of its two longitudinal edge margins coloured in bands of alternate colourings, each band being adapted to display alternative colours through adjacent equal groups of said holes, the groups for each of the four faces being numerically different.

7. Appliance for teaching arithmetic having 5 similar characters arranged on the arms of an obtuse angle of nearly 180° corresponding to the angle of the imprint of the finger-tips.

8. Appliance for teaching arithmetic having two groups of 5 similar characters arranged on the arms of an obtuse angle of nearly 180° corresponding to the angle of the imprint of the finger-tips the groups being stepped laterally relatively to each other.

9. In an appliance for teaching arithmetic, a guide member comprising a front plate, a rear plate having one edge extended beyond the similar edge of the front plate, a spacing strip between the plates to define a slot between the plates, the front plate being formed with ten holes over the slot, and a laminar device adapted to be supported on the extended portion of the rear plate and having a colored margin for insertion in said slot to display a color through the holes therein overlying said margin.

10. In an appliance for teaching arithmetic, a guide member comprising a front plate, a rear plate having one edge extended beyond the similar edge of the front plate, a spacing strip between the plates to define a slot between the plates, the front plate being formed with ten holes over the slot, and a laminar device adapted to be supported on the extended portion of the rear plate and having a colored margin for insertion in said slot to display a color through the holes therein overlying said margin, that portion of the laminar device

bearing on the rear plate having a number corresponding to the number of openings in the front plate through which the color of the margin of the laminar device is visible.

11. In an appliance for teaching arithmetic, a guide having a front plate, a rear plate extending at one side beyond the front plate, a spacing strip between said front and rear plates to thereby provide a slot between the plates, holes pierced in said front plate over the slot, and a laminar device having either edge margin of a face insertible in said slot for display through said front plate, each edge margin being adapted to display different colors through the holes, the colored portion of one margin differing in length from the colored portion of the other margin.

In testimony whereof I affix my signature.

ALFRED COOPER.