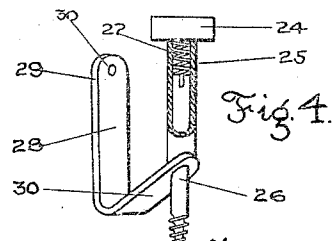
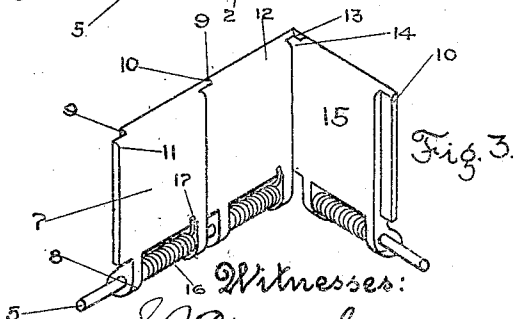
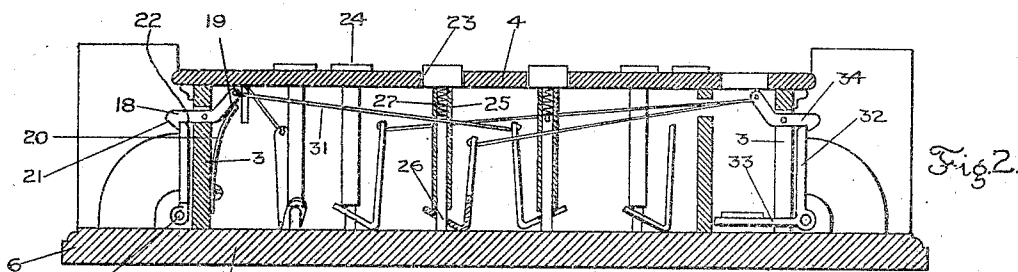
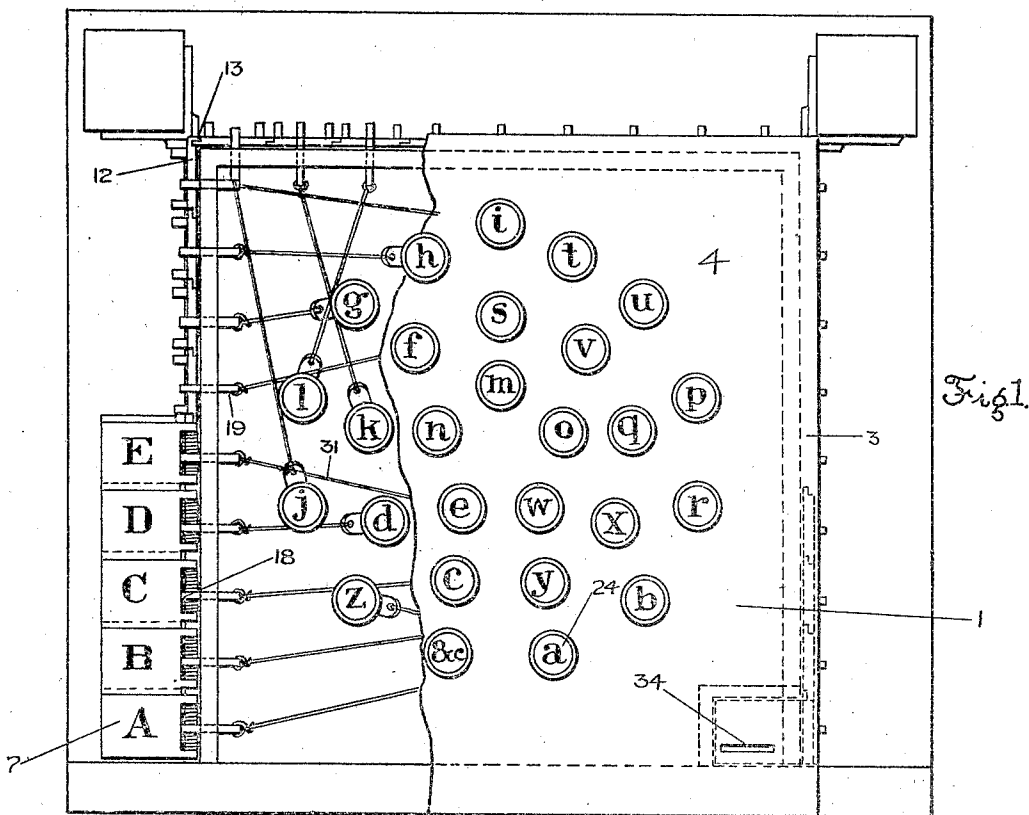


J. SPENCER.
EDUCATIONAL APPLIANCE.
APPLICATION FILED JAN. 9, 1909.

958,781.

Patented May 24, 1910.



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EDUCATIONAL APPLIANCE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JERVIS SPENCER, a citizen of the United States of America, residing at Garrison, county of Baltimore, State of Maryland, have invented certain new and useful Improvements in Educational Appliances, of which the following is a specification.

This invention relates to educational appliances and has as an object the production of an automatic machine for use in studying the alphabet or the order or sequence of any group or series of characters.

This device as herein shown and described consists of a plurality of members which will be termed carriers, each bearing one character of the series to be studied, a keyboard, a key of which corresponds to each carrier, each key preferably marked with the character borne by the corresponding carrier, and a seat or receptacle to hold a reward for the student, the latter normally locked but released when the keys have been pressed in the order in which the characters borne thereby occur in the series being studied. Each carrier is mounted to move between two predetermined positions, in one of which the character thereon is preferably concealed and in the other of which it is displayed, and actuating means is provided for moving each carrier from the former to the latter named position. A suitable tripping device holds each carrier in position with the character thereon concealed and the trip controlling each carrier is connected to the corresponding key so that when a key bearing any letter is punched, the catch which restrains the carrier bearing the same character is released. The trips are controlled by resilient means which tend to maintain them in operative position so that when the carriers are moved to concealed position, they are engaged and held each by its tripping mechanism. In addition to this, the carriers which are placed in the order in which the characters they bear are to be learned, and, therefore, in which they occur in the series, are so related that when they are in concealed position, each locks the one next succeeding so that they can only be released in the order in which the characters occur in the series. The receptacle for the reward is locked by the last carrier and when the latter is released and moves to the position in which the char-

acter thereon is displayed, the reward becomes accessible to the student. This receptacle may be actuated as are the carriers and controlled by a key. When the carriers are moved to concealed position and the receptacle for the reward closed, in order to open the receptacle it is necessary to press all the keys in the order in which the characters borne thereby occur in the series to be learned.

The accompanying drawings illustrate an embodiment of my invention.

Figure 1 is a plan view of the machine, part of the cover being broken away to disclose the underlying parts. Fig. 2 is a vertical transverse section. Fig. 3 is a perspective of a number of carriers showing their form and relation to each other. Fig. 4 shows a key and a portion of the tripping mechanism by which it is connected to the catches.

The machine consists of a casing or box 1 which is shown as square in horizontal cross-section and shallow in proportion to its area. The base or bottom 2 of the casing extends beyond the uprights 3 on three sides, the right, left and rear, forming a support 6 for the carriers, and the top or cover 4 of the box forms a keyboard. The front of the machine, *i. e.*, the side toward the operator, is not provided with such a support. Horizontal shafts 5 are mounted on the casing, externally placed and extending along each of three sides, the left, right and rear, just above the support 6. These shafts are preferably non-rotatable and each is spaced from the adjacent upright by a short interval. The carriers 7, in the form of elongated rectangular plates, are provided each with two lugs 8 projecting from one of the narrower sides. These lugs are pierced to receive the shaft 5 and the carriers are placed on the three shafts 5 as shown, with the long sides of each in contact with those next to it. The carriers, as thus mounted, are adapted to swing freely from horizontal position in which they rest on the support 6 to vertical position adjacent the upright 3. Each carrier is marked on its face, which is uppermost in the horizontal position of the carrier, with a character of the series, the characters preferably reading around the casing in right-handed rotation, the first character being placed on the first character at the front end of the line on the left

side of the machine. Each longitudinal edge of each carrier, with the exception of those on the end of each line, is provided with a groove 9, shown as right-triangular and which receives a corresponding tongue formed by a similar oppositely disposed groove in the adjacent side of the next carrier. The grooves on the opposite edges of each carrier are oppositely disposed, as is evident from the above description, so that each carrier has a forward or outer tongue 10 on its forward edge and an inner or rear tongue 11 on its rear or opposite edge. As the carriers are arranged on the shafts, the forward tongue 10 of each carrier is beneath the inner tongue of the carrier next following when the carriers are in their horizontal positions, and when the carriers are in their upright positions, the forward tongue of each carrier is outside of and rests against the rear tongue 11 of the next carrier. The first carrier A is not provided with an inner tongue 11.

It is apparent that the carriers in each line, *i. e.*, those carried by a single shaft, are thus made to interlock and when they are placed in upright position, no carrier can be swung downward to horizontal position until that preceding it is released and allowed to move to such position. The end carrier 12 on the left side of the machine, it will be noted, is provided with a rectangular groove 13 which receives and incloses the end tongue 14 of the end carrier 15 of the rear line. A similar arrangement of the tongue and groove occurs where the line of carriers at the right of the machine joins the line at the rear.

Between the lugs 8 of each carrier, a helical spring 16 encircles the shaft 5. Each of these springs is secured at one end to the shaft, the other end 17 rests against the inner or upper side of the carrier, tending to maintain it in horizontal position and to rotate it from vertical to horizontal position.

Pivotally mounted on the uprights 3 above each carrier, to swing in a vertical plane, is a hook lever 18 which will hereinafter be termed a catch, having an upturned arm 19 on the opposite side of the pivot from the hook. Each of these hooks is adapted to engage the corresponding carrier and hold it in upright position. A leaf spring 20 secured to the casing, engages the arm 19 of each hook, giving it a tendency to left-handed rotation. The aperture in the casing is so formed that it acts as a stop to maintain the hook arm of the lever normally in horizontal position from which it swings upward against the tension of the spring. The lower surface 21 of the outer end of each lever is inclined downward and inward, and the corresponding surface 22 of each carrier is upwardly and outwardly inclined so that as the carriers are thrown up to vertical position, the inclined surfaces of the car-

riers engage the inclined surfaces of the hooks and the latter are rotated, each against the tension of the spring, and moved out of the path of the carriers. As the carriers reach their vertical position, the inclined surfaces pass out of contact and each hook swings downward and engages its carrier, holding it in vertical position. In order to place and hold all the carriers in upright position, which is hereinafter referred to as the position in which the characters are concealed, it is necessary that the carriers at the front end of the line on the right-hand side of the machine be first raised, and that this operation be continued around the machine in left-handed rotation. Of course the carriers must be raised till engaged by the hooks.

The keyboard 4 is provided with apertures 23 arranged in any manner, preferably so as not to indicate the sequence of the characters. Each aperture receives a disk-shaped key 24; each key corresponds to a carrier and bears a character similar to that borne by its carrier. Each disk 24 is provided with a depending sleeve 25 secured to the lower surface of the disk. Each sleeve incloses and receives in sliding engagement an upright pin 26 which is embedded in the base 1 of the casing. The pin and sleeve may be of the same length and the two are preferably so proportioned that when the key is in normal position with its upper surface slightly above the keyboard, there is an appreciable space in the tube above the pin and also between the lower extremity of the sleeve and the base 1. The space between the pin and the closed end of the sleeve is filled by a spiral spring 27 which bears against the end of the pin and maintains the key in normal position. It is apparent that the keys yield to pressure determined by the strength of their springs and that the sleeve of each key will slide downward along its pin when the corresponding key is pressed.

An elbow lever 28 having a long arm 29 and a short arm 30, the arms at an acute angle, is provided in connection with each key. The short arm of each elbow lever is apertured to receive a pin 26 and the levers are placed each with its long arm upright, the elbow bend bearing on the base and the short arm traversed by a pin 26 and resting against the lower extremity of the sleeve 25 inclosing the pin. Each key 24 operates the catch or hook lever 18 of the corresponding carrier, *i. e.*, that bearing the same character, by means of a flexible connection 31. The upper extremity of each long arm 29 is pierced at 30 and the flexible connection 31 is passed through this hole and secured to the lever, the other extremity of the cord being attached to the outer end of the upright arm 19 of the hook lever 18 of the carrier.

A plate 32, one edge of which is tongued and grooved to be locked by the last carrier of the series and which is provided with lugs 8 and a spring 16 similar to the carriers has a shelf 33 which extends back into the interior of the machine when the plate 32 is in upright position. The shelf 33 serves as a support for the reward which is to be released when the keys have been punched in the proper order. The plate 32 is held in upright position by means of a catch 34 similar to the catch 18 which holds the carriers and this catch is connected to a suitable key which corresponds to the keys which are connected to the carriers. The catch and key may, however, be omitted as the shelf and plate are held in closed position by the last carrier. It will be apparent that when all the carriers are released, the plate 32 may also be released and its spring will rotate the plate and the shelf right-handed by the shaft, whereby the reward will be ejected from the machine.

As previously stated, the release of the reward receptacle may be performed either by the operation of the last carrier or by the pressing of a suitable key after the last carrier has been released. It will be apparent from the description that the carriers are first to be placed in upright position and the characters thereon concealed, and that no character is displayed until all those preceding it in the series have been displayed. In order to do this, the keys must be punched in order, or at least no character on the carriers is displayed until its key has been punched after all the preceding characters in the series have been displayed. The reward may be placed on the shelf 33, being passed through the slot 34. If this reward is released and ejected only when the last carrier has been released; *i. e.*, when all the keys have been punched in the proper order, it is apparent that in order to operate the machine and secure the reward, with despatch, the order of the characters must be learned, and after the machine has been operated a few times the order of the characters in the series will necessarily become known to the operator.

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

1. In a machine for use in learning the order of characters in a series, a set of carriers, each bearing one of the characters, the carriers arranged in the order in which the characters thereon occur in the series, actuating means for moving each carrier into a position in which the character thereon is displayed, a series of keys, each of which corresponds to one of the carriers and each of which bears the same character as the corresponding carrier, the keys so arranged as not to indicate the order of the charac-

ters in the series, controlling means for each carrier connected to the corresponding key, and locking means for each carrier controlling the carrier next following, whereby the travel of the carrier bearing each character to display position is restrained until the carriers bearing all the preceding characters in the series have been moved to display position.

2. In a machine for use in studying the order of characters in a series, a set of carriers, each bearing a character of the series, actuating means for moving each carrier into position in which the character thereon is displayed, a series of keys, one corresponding to each carrier, each key bearing the same character as that borne by the corresponding carrier, controlling means for each carrier connected to the corresponding key, a receptacle for a reward, means for locking the receptacle, and means controlled by the carriers for releasing the receptacle.

3. In a machine for studying the order of characters in a series, a set of carriers, each bearing a character of the series, actuating means for moving each carrier into position in which the character thereon is displayed, a series of keys, one corresponding to each carrier, each key bearing the same character as that borne by the corresponding carrier, controlling means for each carrier connected to the corresponding key, locking means for each carrier, locking the carrier bearing the next character in the series, a receptacle for a reward, means for locking the receptacle, and means controlled by the movement of the carriers for releasing the receptacle.

4. In an educational appliance for use in studying the order of characters in a series, a set of carriers each marked with a character of the series, means for supporting the carriers in position with the characters thereon displayed, means for supporting them in position with the characters concealed, a key corresponding to each carrier and marked with the same character, a latch to hold each carrier in concealed position, means connecting each key to the latch of the corresponding carrier, whereby each carrier is released when its key is pressed, and locking means, controlled by each carrier, engaging the carrier marked with the next character in the series, whereby release of the carriers otherwise than in the order of the characters in the series is prevented.

5. In an educational appliance for use in studying the order of characters in a series, a set of carriers each marked with a character of the series, means for supporting the carriers in position with the characters thereon displayed, means for supporting them in position with the characters concealed, a key corresponding to each carrier and marked with the same character, a latch

to hold each carrier in concealed position, means connecting each key to the latch of the corresponding carrier, whereby each carrier is released when its key is pressed, locking means controlled by each carrier, engaging the carrier marked with the next character in the series, whereby release of the carriers otherwise than in the order of the characters in the series is prevented, a receptacle for a reward, and means for locking the receptacle, the lock of the receptacle controlled by one of the carriers.

6. In an educational appliance for use in studying the order of characters in a series, a set of carriers each marked with a character of the series, means for supporting the carriers in position with the characters thereon displayed, means for supporting them in position with the characters concealed, a key corresponding to each carrier and marked with the same character, a latch to hold each carrier in concealed position, means connecting each key to the latch of the corresponding carrier, whereby each carrier is released when its key is pressed, locking means controlled by each carrier, engaging the carrier marked with the next character in the series, whereby release of the carriers otherwise than in the order of the characters in the series is prevented, a receptacle for a reward, means for locking the receptacle, the lock connected to one of the carriers, to be released thereby when the carrier moves to display position.

7. In an educational appliance for use in studying the order of characters in a series, a set of carriers each marked with a character of the series, means for supporting the carriers in position with the characters thereon displayed, means for supporting them in position with the characters concealed, a key corresponding to each carrier and marked with the same character, a latch to hold each carrier in concealed position, means connecting each key to the latch of the corresponding carrier, whereby each carrier is released when its key is pressed, locking means controlled by each carrier, engaging the carrier marked with the next character in the series, whereby release of the carriers otherwise than in the order of the characters in the series is prevented, a receptacle for a reward, a lock for said receptacle, the lock connected to one of the carriers to be operated thereby, actuating means tending to throw the receptacle open, a key corresponding to the receptacle, means for holding the receptacle closed and tripping means connected to the key to be operated thereby to place said means in inoperative position.

8. In an educational appliance for use in studying the order of characters in a series, a set of carriers each bearing a character of the series, means for maintaining the carriers in position with the characters thereon

displayed, means for maintaining them in position with the characters thereon concealed, a key corresponding to each carrier and marked with the same character, a catch for holding each carrier in concealed position, tripping means connecting each key to the catch of the corresponding carrier, whereby each carrier is released when its key is punched, a receptacle for a reward, a catch to hold the receptacle closed, a key corresponding to the receptacle, and means connected to the key to be operated thereby to release the catch which holds the receptacle closed.

9. In an educational appliance for use in studying the order of characters in a series, a set of carriers each marked with a character of the series, means for supporting the carriers in position with the characters thereon displayed, means for supporting them in position with the characters concealed, means for moving each carrier from one position to the other and normally tending to maintain it in display position, a key corresponding to each carrier and marked with the same character, a catch for each carrier tending to hold it in concealed position when so placed, means connecting each key to the catch of the corresponding carrier, whereby the catch of each carrier is released when its key is punched, a receptacle for a reward, a catch to hold the receptacle closed, means tending to throw the receptacle open, and means for releasing the catch.

10. In an educational appliance for use in studying the order of characters in a series, a set of carriers each marked with a character of the series, means for supporting the carriers in position with the characters thereon displayed, means for supporting them in position with the characters concealed, means for moving each carrier from one position to the other and normally tending to maintain it in display position, a key corresponding to each carrier and marked with the same character, a catch for each carrier tending to hold it in concealed position when so placed, means connecting each key to the catch of the corresponding carrier, whereby the catch of each carrier is released when its key is punched, a lock carried by each carrier engaging the carrier marked with the next character in the series, whereby display of the characters otherwise than in the order of the series is prevented, a receptacle for a reward, a lock for the receptacle, the lock connected to a carrier of the series to be released thereby when it moves to display position, a catch to hold the receptacle closed, means tending to throw the receptacle open, and means for releasing the catch.

11. In an educational appliance for use in studying the order of characters in a series, a plurality of carriers, each bearing a char-

acter of the series, the carriers arranged in the order in which the characters borne thereby appear in the series and mounted to move between two predetermined positions, 5 in one of which the characters are displayed, locking means connected to each carrier to unlock when the carrier moves to display position, the locks of each carrier controlling the carrier bearing the next character of the 10 series to prevent its movement to display position till unlocked, means for restraining the movement of each carrier to display position, and means bearing the same characters as those borne by the carriers whereby 15 the latter restraining means may be rendered inoperative when the latter named character-bearing means are manipulated.

12. In an educational appliance, a set of carriers, each bearing a character of a series,

the carriers arranged in the order in which 20 the characters thereon occur in the series, means tending to actuate the carriers so that they normally tend to move into display position, a series of keys, one to each carrier 25 and each bearing the same character as that borne by the corresponding carrier, means for locking each carrier so it will not move to display position until those preceding it in the series are displayed and controlling 30 means for each carrier connected to the corresponding key.

Signed by me at Baltimore, Maryland,
this 5th day of January 1909.

JERVIS SPENCER.

Witnesses:

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S. RALPH WARNKEN.