Sept. 9, 1941. A. J. WATLING 2,255,521

EDUCATIONAL APPARATUS

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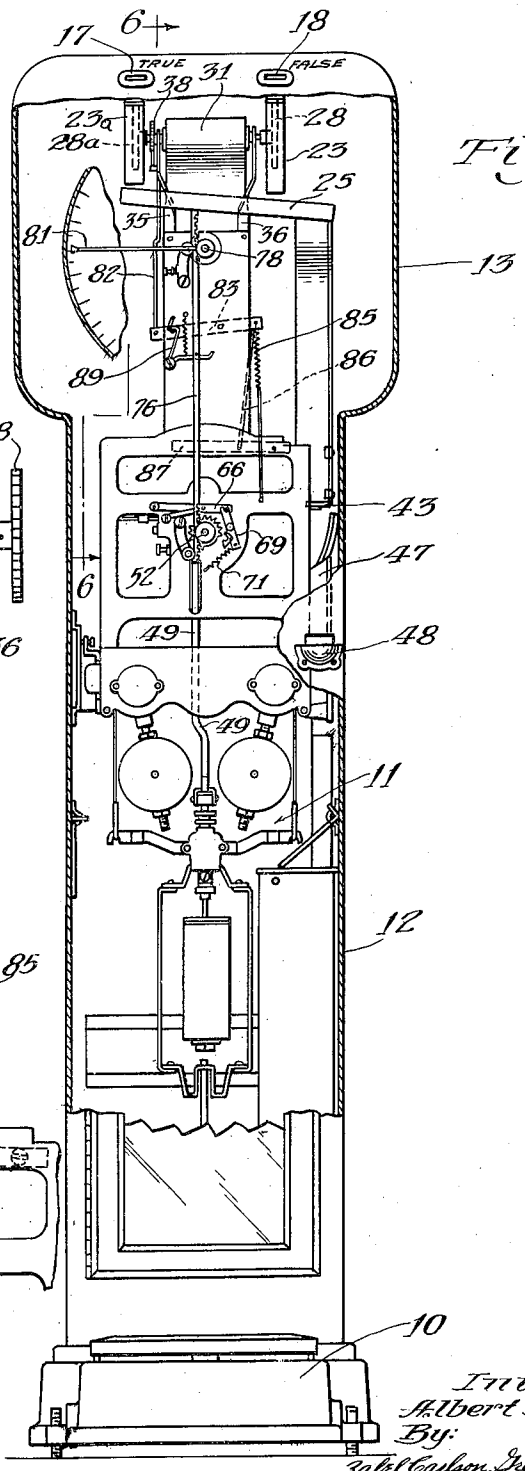


Fig. 1.

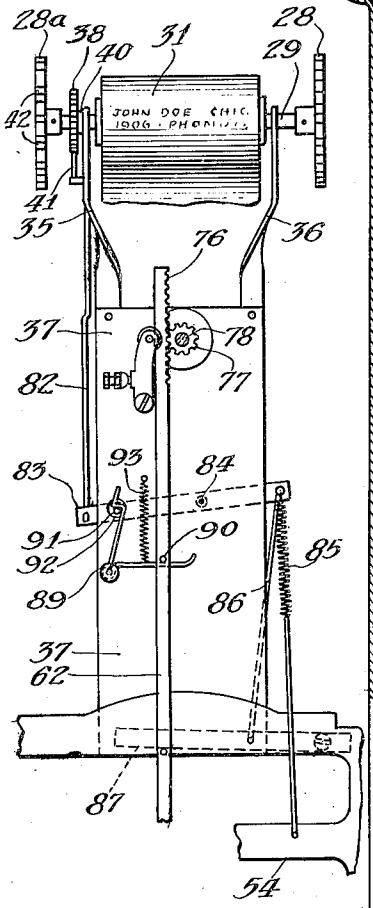


Fig. 2.

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Fig. 3.

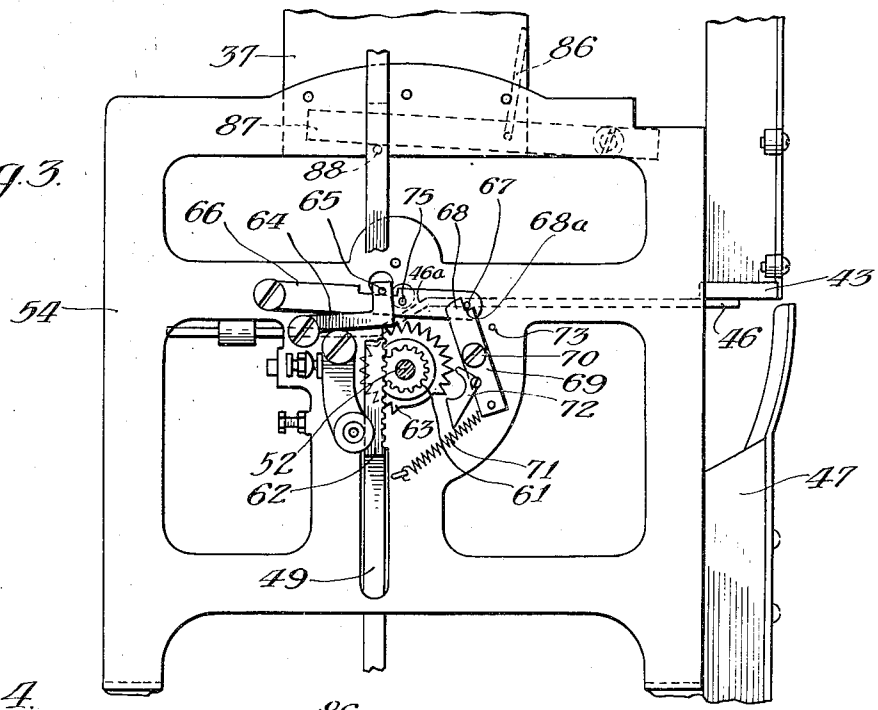


Fig. 4.

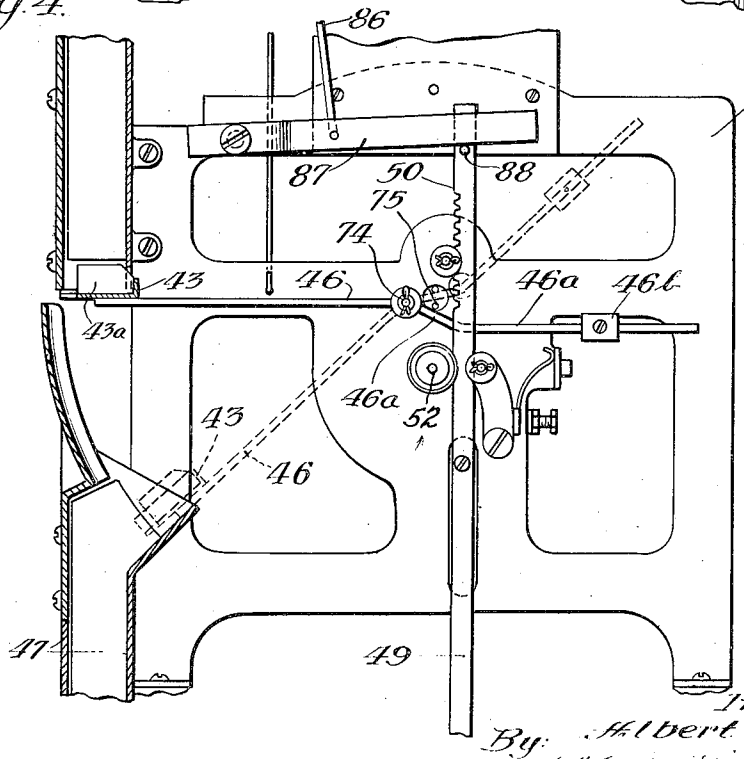
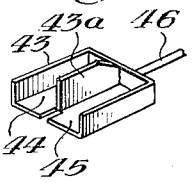


Fig. 5.



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Fig. 6.

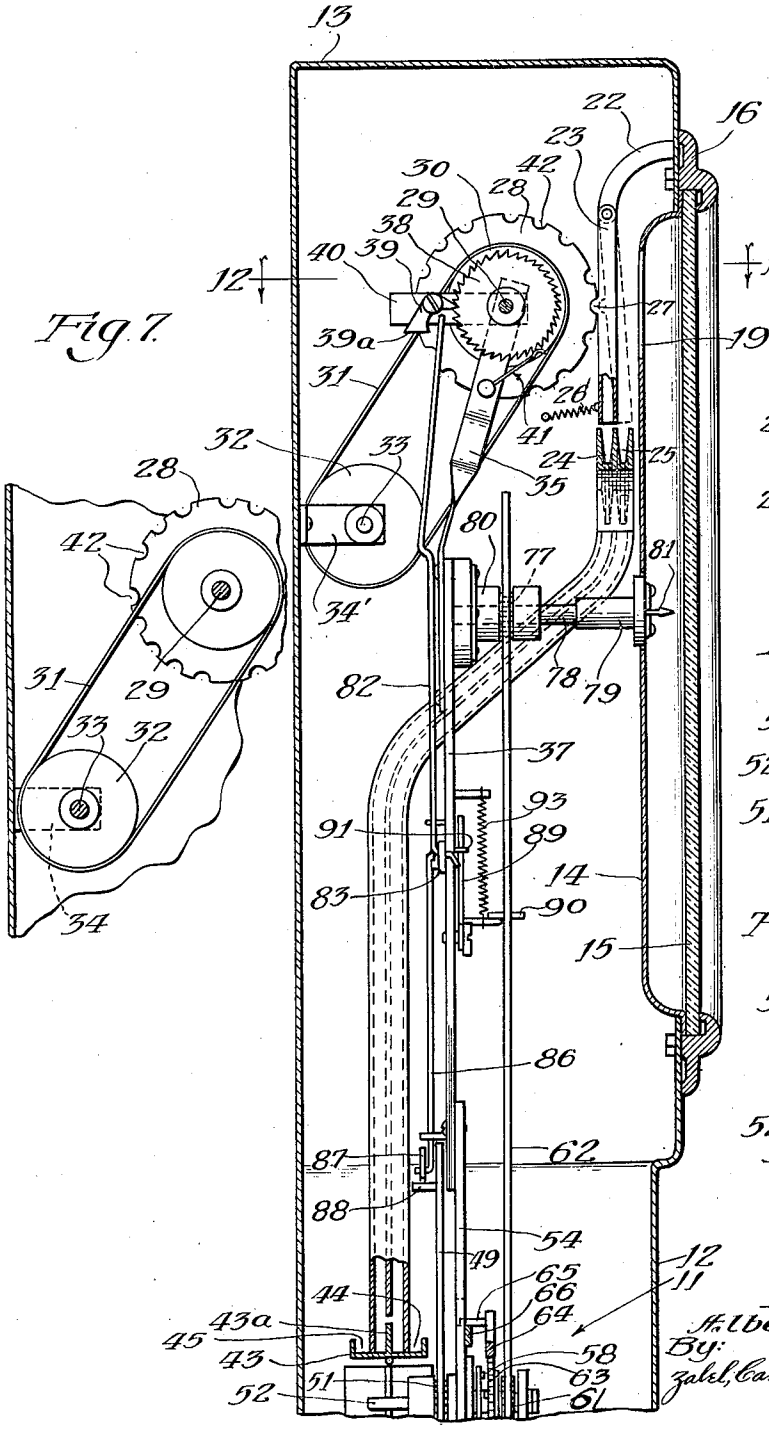


Fig. 7.

Fig. 8.

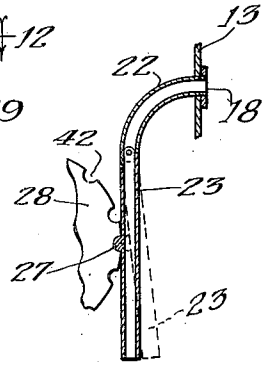


Fig. 10.

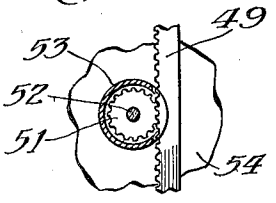
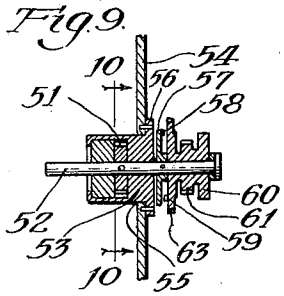


Fig. 9.



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EDUCATIONAL APPARATUS

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Fig. 11.

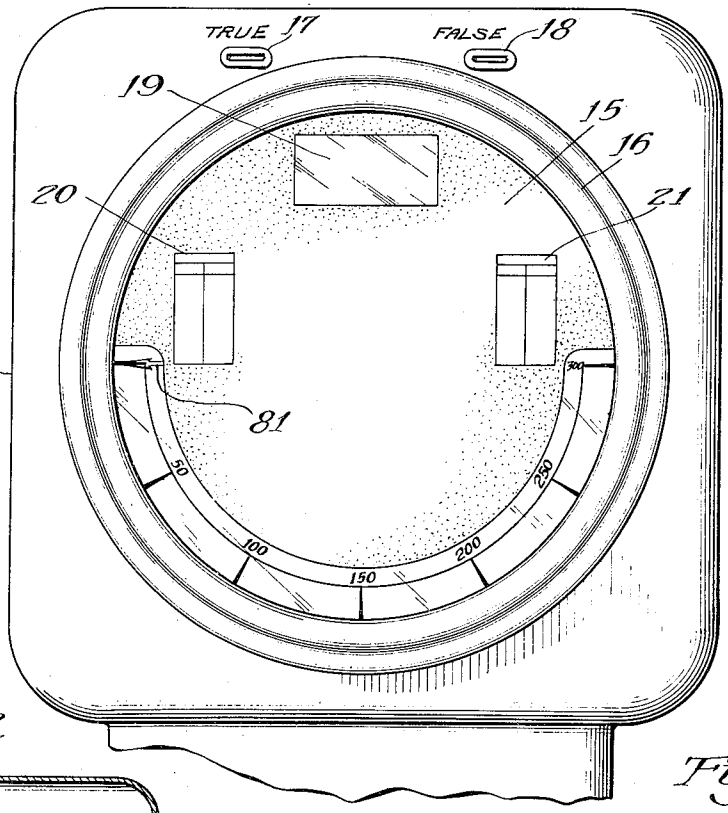


Fig. 12.

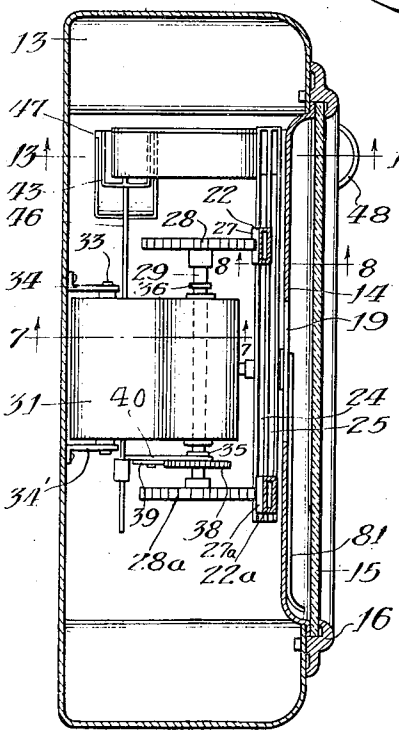


Fig. 13.

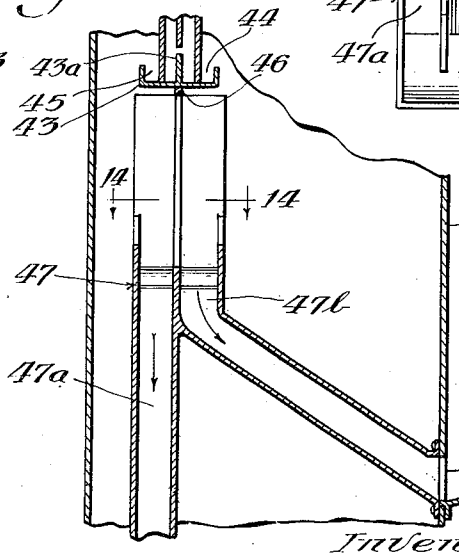
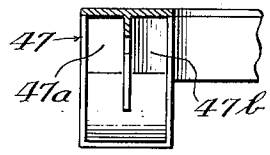


Fig. 14.



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UNITED STATES PATENT OFFICE

2,255,521

EDUCATIONAL APPARATUS

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Application January 2, 1940, Serial No. 312,014

8 Claims. (Cl. 35—48)

The present invention relates to educational devices of the right and wrong question and answer type which are adapted to be operated in connection with weighing scales wherein the user of the device utilizes a coin for the actuation of the weighing mechanism, and for the deposit of the coin obtains a reading of his weight upon an indicator dial.

The primary object of the present invention is to provide a device wherein the operator may, in depositing his coin in one of a plurality of slots, indicate whether or not a statement displayed to him by the machine is true or false, and wherein dependent upon the correctness of his answer the device will deliver the coin deposited in one or the other of a plurality of compartments.

More specifically the present invention contemplates a device of this character wherein a legend carrying unit which is adapted to carry and display a legend or character is interconnected with a coin slot controlling mechanism in such manner that for each character or legend displayed the coin slots are opened to different receptacles and in which an intermediate mechanism actuated by the change of the character or legend controls the directing of the coins in order that either slot may empty into either coin receptacle depending upon the changes made by the intermediate mechanism. The intermediate mechanism may reverse the connections of the coin slots to the receptacles or maintain them the same for changes of character or legend and variations may be made by simple changes in the intermediate mechanism.

One form of the invention is shown in connection with a weighing scale wherein the user inserts a coin and receives for his coin an indication of his weight. The mechanism comprising the present invention is attached to the weighing mechanism in such a way that the actuation of the weighing mechanism by a person stepping upon the platform, and the insertion of a coin, which is necessary to obtain a reading of the weight, cooperate to release the motive force for actuating the educational device.

The educational device itself forming the subject matter of the invention operates automatically after the insertion of the coin to indicate whether or not the operator has inserted the coin in the correct slot. This indication, however, is not made by a change of the legend or character until the operator steps off the scales and allows the weighing mechanism to reset itself.

The features and advantages of the invention will appear more fully from the following description, reference being had to the accompanying drawings, wherein a preferred form of the invention is shown.

In the drawings,

Fig. 1 is a view in front elevation, with parts of the casing broken away, of the weighing scale embodying my invention;

Fig. 2 is an enlarged fragmentary view in front elevation of the mechanism shown in the upper part of Fig. 1;

Fig. 3 is an enlarged view in front elevation of that portion of the mechanism shown in the upper center of Fig. 1;

Fig. 4 is a fragmentary sectional view taken from the opposite side to the showing of Fig. 3 and illustrating certain parts of the same mechanism;

Fig. 5 is a perspective view of a coin-receiving tray which is part of the mechanism;

Fig. 6 is an enlarged fragmentary sectional view taken on the line 6—6 of Fig. 1;

Fig. 7 is a detail view showing part of the mechanism in the upper part of Fig. 6, being partly in section as shown at the line 7—7 of Fig. 12;

Fig. 8 is a fragmentary sectional view taken substantially at the line 8—8 of Fig. 12 and illustrating a portion of the coin-directing mechanism;

Fig. 9 is an enlarged vertical sectional view illustrating the shaft and its associated parts as shown at the bottom portion of Fig. 6;

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 9;

Fig. 11 is a face view of the indicating head of the weighing scales where the coin slots, the legend display and the weight indications are found;

Fig. 12 is a sectional view taken on the line 12—12 of Fig. 6;

Fig. 13 is a sectional view on the line 13—13 of Fig. 12; and

Fig. 14 is a sectional view on the line 14—14 of Fig. 13.

Referring now to the drawings, the present invention is shown as embodied in a weighing scale having a platform 10 and suitable control mechanism indicated generally by the numeral 11, this control mechanism being located in an upright portion 12 of the casing for the scale. The upright portion of the casing terminates in a display head 13, which has therein a dial 14 (see Figs. 6, 11 and 12). The dial 14 is covered by a transparent shield 15 which may be held in

place in the usual fashion by a rim 16. The head 13 is provided with a plurality of coin slots 17 and 18, there being two shown in the present instance. The head is also provided with an opening 19 through the dial 14, the purpose of this opening being to display certain legends, characters and the like, as will be presently explained. I have also indicated at 20 and 21 the usual charts which accompany scales of this character to indicate the correct weights for certain heights.

The coin slots 17 and 18 are substantially the same. The slot 18 connects with a tube 22 which has a hinged lower portion 23 (see Fig. 6), the hinged lower portion being so arranged that it can be directed over either of a plurality of channels 24 and 25. A spring 26 normally tends to hold the hinged portion 23 of the tube over the channel 24. This tube, however, has a projection 27 thereon, which is adapted to engage a control wheel 28. The slot 17 connects with corresponding tubes 22*a* and 23*a*, the latter of which has a projection 27*a* normally held by a spring 26*a* in engagement with a control wheel 28*a*.

The control wheels 28 and 28*a* are carried by a shaft 29 (see Figs. 6 and 12), the shaft 29 being in turn provided with a drum 30, over which an endless belt 31 is mounted. The belt 31 is adapted to carry any desirable legend or character or display design which will convey a message to the operator of the scales. Although the details thereof are not shown, the endless conveyor 31 may be suitably arranged so as to permit the ready changing of the legends or displays carried thereby. A second drum 32 is mounted on a shaft 33 which is supported by two brackets 34 and 34′ from the rear wall of the casing head 13. The shaft 29 is supported upon two upwardly extending bars 35 and 36 which are fastened to a central panel 37 within the casing 12.

Suitable means are provided whereby to rotate the shaft 29 and its control wheels 28 and 28*a*. This means comprises a ratchet wheel 38 fixed on the shaft 29, a pawl 39 engaging the ratchet wheel, and a pawl arm 40 pivoted on the shaft 29 and adapted to move the gravity operated pawl 39. A spring 41 is fixed on the arm 35 and is adapted to ride on the ratchet wheel 38 to prevent overrunning thereof. It will be understood that if the arm 40 is moved up and down, the upward movement of the arm will cause the pawl 39 to swing over a tooth of the ratchet wheel against the weight of the heel 39*a* of the pawl, but on the downstroke of the arm 40, the pawl will turn the ratchet wheel 38 with it. In this manner, the control wheels 28 and 28*a* may be turned a step at a time.

The control wheels 28 and 28*a* have depressions 42 in the periphery thereof, these depressions being spaced in such manner as the control desired shall dictate. In the present instance, the depressions 42 are so arranged on the respective wheels 28 and 28*a* as to cause the hinged portions 23 and 23*a* of the coin tubes to always occupy opposite positions with respect to the channels 24 and 25. It may require two or more steps of rotation of the wheels 28 and 28*a* to work a change in the position of the coin tubes with respect to the channels 24 and 25. However by arranging the depressions in the control wheels in accordance with a predetermined pattern, depending upon the message or legends upon the endless conveyor 31, it is possible to provide a multitude of changes from one channel to the other for each of the coin tubes, thus giving a wide variety of interest in the legends or statements that can be put upon the conveyor 31, requiring a selection of one out of two possible responses by the operator. The manner in which the operator responds to the information displayed to him from the conveyor 31 is by choosing which one of the coin slots 17 and 18 will receive his coin. For example, a statement may be shown through the opening 19, and the coin slots may carry the indications, "True" for the slot 17, and "False" for the slot 18. The operator, who desires to obtain his weight, inserts the coin, which he must insert to obtain his weight, in the slot which he believes gives the correct analysis of the statement displayed. One of the slots will direct his money to the tube 23, and the other to the tube 23*a*. Depending upon the position of these movable tubes, the operator's coin will go into channel 24 or 25. These channels deliver the coin to a receiving tray 43 (see Fig. 6). The receiving tray 43 is shown in perspective in Fig. 5 as being provided with a partition 43*a*, so that the coin received thereby will go in pocket 45 if it is received from the channel 24, and will go in pocket 44 if it is received from the channel 25. The tray 43 is carried by an arm 46 and is adapted to deliver its contents into a split chute 47. One section 47*a* of the chute 47 extends directly downward to a coin box as shown in Fig. 1, while the other section 47*b* extends outwardly to a return tray 48 at one side of the casing 12.

The mechanism by which the weighing operation takes place and controls the rotation of the control wheels 28 and 28*a* will now be described.

Referring to Figs. 1 to 4 inclusive, the weighing mechanism 11 is connected to a vertically extending rack-bar 49. This rack-bar has teeth 50 thereon which are adapted to engage the teeth of a pinion 51 which is keyed to a shaft 52. The shaft 52 is rotatably journalled in a bearing block 53 that is mounted on a cross-frame 54 which also carries the panel 37. The cross-frame 54 has an opening 55 therein (see Fig. 9), and the bearing block 53 has a flange 56 which is riveted to the frame 54, the block 53 extending through the opening, as shown clearly in Fig. 9.

The shaft 52 has a disk 57 fixed thereto on the side of the frame 54 opposite the pinion 51. The disk 57 has a projection 58 thereon which is adapted to engage a projection 59 on a member 60, which is rotatably mounted on the shaft 52. The member 60 includes a pinion 61 which is engaged by a second rack-bar 62. The member 60 includes a ratchet-wheel 63, and the projection 59 is on the ratchet-wheel part of the member 60.

From the foregoing description, it will be evident that the rack-bar 49, when drawn down by a weight being placed on the platform 10, will rotate the pinion 51 and the shaft 52. This will also rotate the disk 57, and at the end of the downward motion of the rack-bar 49, the disk 57 will be stopped in a certain position, so that its projection 58 will act as a limiting stop for the projection 59 on the member 60 when this member is rotated in the same direction as the shaft 52 is rotated, as is hereinafter described. It will be understood, of course, that the projections 58 and 59 are arranged to engage each other, so that the projection 58 may act as a limiting stop for the projection 59. The ratchet wheel 63 forming part of the member 60 is normally prevented from rotating by a pawl 64 (see Fig. 3). The pawl 64 naturally falls by gravity into engagement with the teeth of the ratchet-wheel 63. It has a pin 65 which

rides on a pivoted arm 66. The arm 66 in turn has a pin 67 at its free end, the pin 67 being adapted to engage one end 68 of a pivoted lever 69. The lever 69 is pivoted on the cross-frame 54 by a pivot screw 70. A spring 71 normally urges the lever 69 to turn in a clockwise direction. A pawl 72 is pivoted on the lower part of the lever 69 and is adapted to engage the ratchet-wheel 63 to prevent rotation thereof when the lever 69 is moved from the position shown in Fig. 3 in a clockwise direction. It will be evident that if the arm 66 is lifted to move the pin 67 up out of the notch 68*a* in the adjacent end of the lever 69, this lever can turn in a clockwise direction until it strikes a stop pin 73. This will bring the pawl 72 into engagement with the ratchet-wheel 63. The arm 66 is adapted to be actuated by the tilting of the coin tray 43. As shown, the coin tray 43 is carried by the rod or arm 46. This rod extends parallel to the cross-frame and is pivoted thereto by a pivot pin 74. The bar 66 carries a pin 75 which rides upon the portion 46*a* of the rod 46 extending toward the right in Fig. 4. The coin tray 43 is so counterbalanced by a weight 46*b* on the extension 46*a* that, when a coin is received in the tray, the weight of the coin causes the tray to swing from the full line position shown in Fig. 4 to the dotted line position shown. This swinging movement will lift the pin 75 and with it the arm 66 to release the lever 69. The first operation is, of course, to release the pawl 64, and this permits the weight of the rack-bar 62 to turn the member 60 until the projection 59 thereon strikes the projection 58.

The bar 62, in its downward movement, is adapted to operate the pawl arm 40. The mechanism by which this operation is carried out is shown best in Figs. 2 and 6. The upper end of the rack-bar 62 has teeth 76 which engage the teeth of a pinion 77 on a shaft 78. The shaft 78 is journalled in a bearing 79 on the dial 14, and in a bearing 80 on the upper end of the panel 37. The free end of the shaft 78 extends into the dial 14 and carries a weight-indicating pointer 81.

A link 82 extends downwardly from the pawl operating arm 40 and is pivoted to a lever 83 which is pivotally mounted by a pivot screw 84 on the panel 37. The lever 83 is urged to turn in a clockwise direction by a spring link connection 85 which connects the end of the lever opposite the link 82 to the cross-frame 54. A link 86 also connects this end of the lever 83 to a pivoted arm 87, the arm 87 being pivoted on the cross-frame 54. The rack-bar 49 has a pin 88 extending underneath the arm 87 so as to raise this arm when the rack-bar 49 moves upwardly at the end of a weighing operation.

On the panel 37, there is pivoted a trip lever 89, one end of which extends horizontally and engages beneath a pin 90 on the rack-bar 62. The other end of the lever 89 extends upwardly and hooks over a pin 91 that is mounted on the lever arm 83. A slot 92 is cut in the panel 37 to receive the pin 91. The trip lever 89 is normally urged in a counterclockwise direction by a spring 93.

In order that the operation of the device may be fully understood, the action of the several parts will now be described in connection with a complete cycle of operations occasioned by a customer stepping upon the platform 10. The first reaction to the weight of the customer upon the platform is the depression of the rack-bar 49. This depression causes the teeth 50 of the rack-bar to rotate the pinion 51 and the shaft 52. Since the projections 58 and 59 are left in contact at the end of a weighing operation, the degree of rotation of the shaft 52 will be measured by the angular distance between the projections when the customer steps upon the platform 10. It will be remembered that at this time the pawl 64 is in engagement with the teeth of the ratchet-wheel 63 so as to hold the member 60 stationary. It will also be remembered that the endless conveyor 31 is in such position that a statement is displayed through the opening 19 in the dial 14. The customer at this time, in order to determine the reading of his weight, must insert a coin which in turn will pass down to the coin tray 43 and depress the coin tray so as to cause the rod 46 to lift the arm 66 and the pawl 64. The wheels 28 and 28*a* control the coin tubes 23 and 23*a*, and one of the coin tubes will be over the channel 24, while the other will be over the channel 25. The customer reads the statement displayed in the opening 19 and decides which one of the coin slots he will place his coin in. Assuming that the statement can be said to be true or false and that the slots 17 and 18 are labeled "true" and "false," it will be seen that the customer may test his knowledge by inserting the coin in the proper slot. If he is correct in his analysis of the statement, the wheels 28 and 28*a* will return his coin into the channel which leads to the return tray 48.

The turning of the coin tray rod 46 results in the release of the pawl 64, and the weight of the rack-bar 62 turns the member 60 until the projection 59 catches up with the projection 58, whereupon the downward movement of the rack-bar 62 will stop. The rack-bar 62 in this movement turns the pointer 81 by rotating the shaft 78 and thus indicates the weight of the customer on the dial 14. The downward movement of the rack-bar 62 turns the trip lever 89 in a clockwise direction so as to release the pin 91 and allow the lever 83 to turn in a clockwise direction. The spring 85 will, of course, cause the lever 83 to turn. This will lift the link 82 and with it the pawl arm 40 so as to cause the pawl 39 to step over one tooth of the ratchet-wheel 38.

Now, when the customer steps off the platform 10, the rack-bar 49, of course, moves back upward to its original position under the influence of the counterbalancing means of the weighing apparatus. In this upward movement, the rack-bar rotates the pinion 51 and the shaft 52, and because of the position of the projections 58 and 59 together, it also rotates the member 60 and lifts the rack-bar 62, thereby returning the pointer 81 to zero position. The upward movement of the rack-bar 49 causes the pin 88 to move the arm 87 upwardly. This in turn causes the link 86 to rotate the lever 83 in a counterclockwise direction, as shown in Fig. 2, against the force of the spring 85. The link 82 will thus be pulled down so as to pull down on the pawl arm 40 and cause the pawl 39 to rotate the ratchet-wheel 38 one step to bring a new legend or statement into view in the opening 19 and to cause the wheels 28 and 28*a* to reset their corresponding coin tubes 23 and 23*a* with respect to the channels 24 and 25. The spring 92 will move the trip lever 89 back into engagement with the pin 91, as will be readily understood. The mechanism is thus returned to operative position.

The coin tray 43, of course, returns immedi-

ately to its full line position, as shown in Fig. 4, after it has discharged the coin. This return movement allows the pin 75 and the arm 66 to drop down so that the pin 67 can again engage in the notch 68a. The shape of the pawl 72 is such that upon the reverse rotation of the ratchet-wheel 63, this pawl forces the lever 69 to turn in a counter-clockwise direction in order to bring the notch 68a under the pin 67.

From the foregoing description, it is believed that the construction and operation of this device will be readily apparent to those skilled in this art. Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an educational device of the right and wrong question and answer type, the combination of a casing, two tubes opening through the wall of the casing for the deposit of coins in the tubes, coin distributing means located below said tubes providing two separate channels for carrying coins to two different points, means for directing coins from said deposit tubes to said distributing means comprising two movably tubular members each communicating at its upper end with one of said deposit tubes for taking a coin therefrom and movable from one operative position to another for delivering the coin alternately into either of the two channels of said distributing means, and control means for moving said tubular members in unison adapted to position one of said tubular members for delivering to one of said channels and at the same time to position the other of said tubular members for delivering to the other channel.

2. In an educational device of the right and wrong question and answer type, the combination of a casing, two tubes opening through the wall of the casing for the deposit of coins in the tubes, coin distributing means located in downwardly spaced relation to said deposit tubes and comprising downwardly extending tubes providing two separate ducts for carrying coins to different points, tubular members pivotally mounted below said first-named tubes so as to communicate with said first-named tubes for taking coins therefrom and movable into position to deliver coins alternatively to either of said second-named tubes, and control means for moving said pivotally mounted tubular members in unison in opposite directions so as to position one of said tubular members for delivering to one of said second-named tubes and at the same time to position the other of said tubular members for delivering to the other of said second-named tubes.

3. In an educational device of the right and wrong question and answer type, the combination of a casing, two tubes opening through the wall of the casing for the deposit of coins in the tubes, coin distributing means located in downwardly spaced relation to said deposit tubes and comprising downwardly extending tubes providing two separate ducts for carrying coins to different points, tubular members pivotally mounted below said first-named tubes so as to communicate with said first-named tubes for taking coins therefrom and movable into position to deliver coins alternatively to either of said second-named tubes, and control means comprising notched rotary members adapted by a camming engagement with said tubular members to swing the tubular members in unison in opposite directions so as to position one of said tubular members for delivering to one of said second-named tubes and at the same time to position the other of said tubular members for delivering to the other of said second-named tubes.

4. In an educational device of the right and wrong question and answer type, the combination of a casing, two tubes opening through the wall of the casing for the deposit of coins in the tubes, coin distributing means located in downwardly spaced relation to said deposit tubes and comprising downwardly extending tubes providing two separate ducts for carrying coins to different points, tubular members pivotally mounted below said first-named tubes so as to communicate with said first-named tubes for taking coins therefrom and movable into position to deliver coins alternatively to either of said second-named tubes, yielding means normally holding said pivotally mounted tubular members in position for delivering to the same one of said second-named tubes, notched control wheels rotatably mounted opposite to said pivotally mounted tubular members respectively with the notches in one wheel staggered with respect to the notches in the other wheel, and projections on said tubular members adapted by engagement with the circular portions of the control wheels between said notches to hold the tubular members displaced against the action of said yielding means for delivering to the other of said second-named tubes.

5. In an educational device of the right and wrong question and answer type, the combination of a casing having a window, a legend or statement carrying device movably mounted in said casing and movable to different positions so as to display the legends or statements one at a time through said window, two tubes opening through the wall of the casing for the deposit of coins in the tubes, coin distributing means located below said tubes providing two separate channels for carrying coins to two different points, means for directing coins from said deposit tubes to said distributing means comprising two movably mounted tubular members each communicating at its upper end with one of said deposit tubes for taking a coin therefrom and movable from one operative position to another for delivering the coin alternatively into either of the two channels of said distributing means, control means for moving said tubular members in unison adapted to position one member for delivering to one of said channels and at the same time to position the other member for delivering to the other channel, and means for giving said display device and said control means for said tubular members effective movements in timed relation to each other.

6. In an educational device of the right and wrong question and answer type, the combination of a casing having a window, a legend or statement carrying device movably mounted in said casing and movable to different positions so as to display the legends or statements one at a time through said window, two tubes opening through the wall of the casing for the deposit of coins in the tubes, coin distributing means located below said tubes providing two separate channels for carrying coins to two different points, means for directing coins from said deposit tubes to said distributing means comprising two movably mounted tubular members each communicating at its upper end with one of said deposit tubes for taking a coin therefrom and movable from one operative position to another for delivering the coin alternatively into either of the two

channels of said distributing means, rotary actuating means for moving said tubular members in unison and adapted upon each actuation of said members to position one of said tubular members for delivering to one of said channels and at the same time to position the other of said tubular members for delivering to the other channel, means for moving said rotary actuating means, and means for driving said display device from said rotary actuating means.

7. In an educational device of the right and wrong question and answer type, the combination of a casing having a window, a device carrying a series of statements, some of which are true and some of which are false, movably mounted in said casing and movable to different positions so as to display the legends or statements one at a time through said window, two tubes opening through the wall of the casing for the deposit of coins in the tubes, coin distributing means located below said tubes providing two separate channels for carrying coins to two different points, means for directing coins from said deposit tubes to said distributing means comprising two movably mounted tubular members each communicating at its upper end with one of said deposit tubes for taking a coin therefrom and movable from one operative position to another for delivering the coin alternatively into either of the two channels of said distributing means, rotary actuating means for moving said tubular members in unison and adapted upon each actuation of said members to position one of said tubular members for delivering to one of said channels and at the same time to position the other of said tubular members for delivering to the other channel, and means for giving said display device and said rotary actuating means effective movements in timed relation to each other, said movable tubular members and said rotary actuating means being so arranged as to cause an operative movement of said tubular members in every instance when there is a change from true to false or from false to true in the successive statements at the critical point between the statement displayed at the window and the next succeeding statement.

8. In an educational device of the right and wrong question and answer type, the combination of a casing having a window, a device carrying a series of statements, some of which are true and some of which are false, movably mounted in said casing and movable to different positions so as to display the legends or statements one at a time through said window, two tubes opening through the wall of the casing for the deposit of coins in the tubes, coin distributing means located below said tubes providing two separate channels for carrying coins to two different points, means for directing coins from said deposit tubes to said distributing means comprising two movably mounted tubular members each communicating at its upper end with one of said deposit tubes for taking a coin therefrom and movable from one operative position to another for delivering the coin alternatively into either of the two channels of said distributing means, control means comprising notched rotary members adapted by a camming engagement with said tubular members to move them in unison so as to position one of said tubular members for delivering to one of said second-named tubes and at the same time to position the other of said tubular members for delivering to the other of said second-named tubes, and means for giving said display device and said control means for said tubular members effective movements in timed relation to each other, the notches on said notched rotary members being so spaced as to cause an operative movement of said tubular members in every instance when there is a change from true to false or from false to true in the successive statements at the critical point between the statement displayed at the window and the next succeeding statement.

ALBERT J. WATLING.