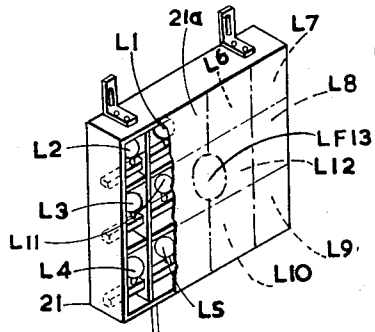
March 6, 1962 W. ALTON 3,024,020

APPARATUS FOR TESTING AGILITY AND POWERS OF CO-ORDINATION

Filed June 27, 1958 2 Sheets-Sheet 1



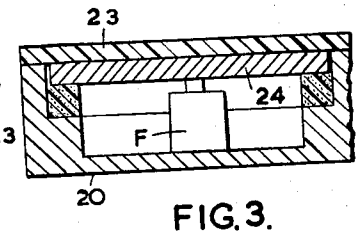


FIG. 3.

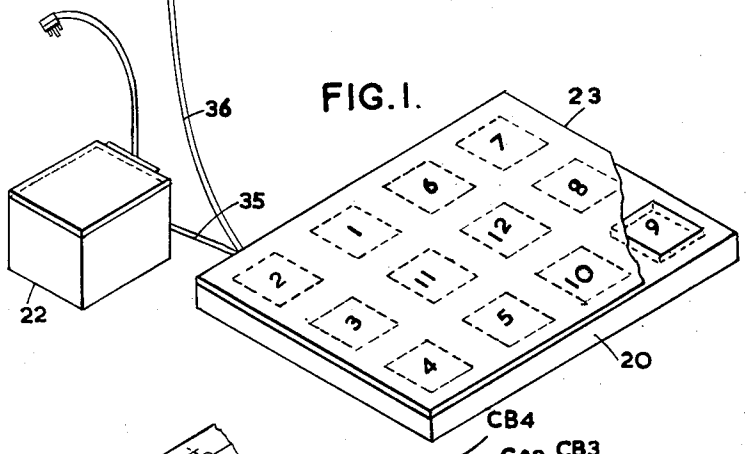


FIG. 1.

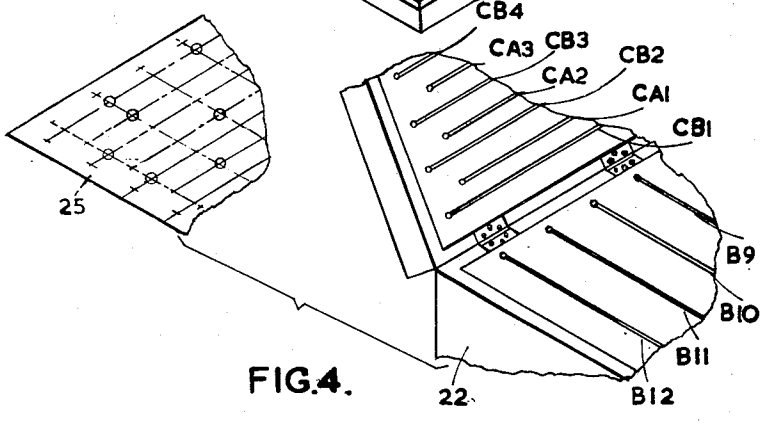


FIG. 4.

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APPARATUS FOR TESTING AGILITY AND POWERS OF CO-ORDINATION

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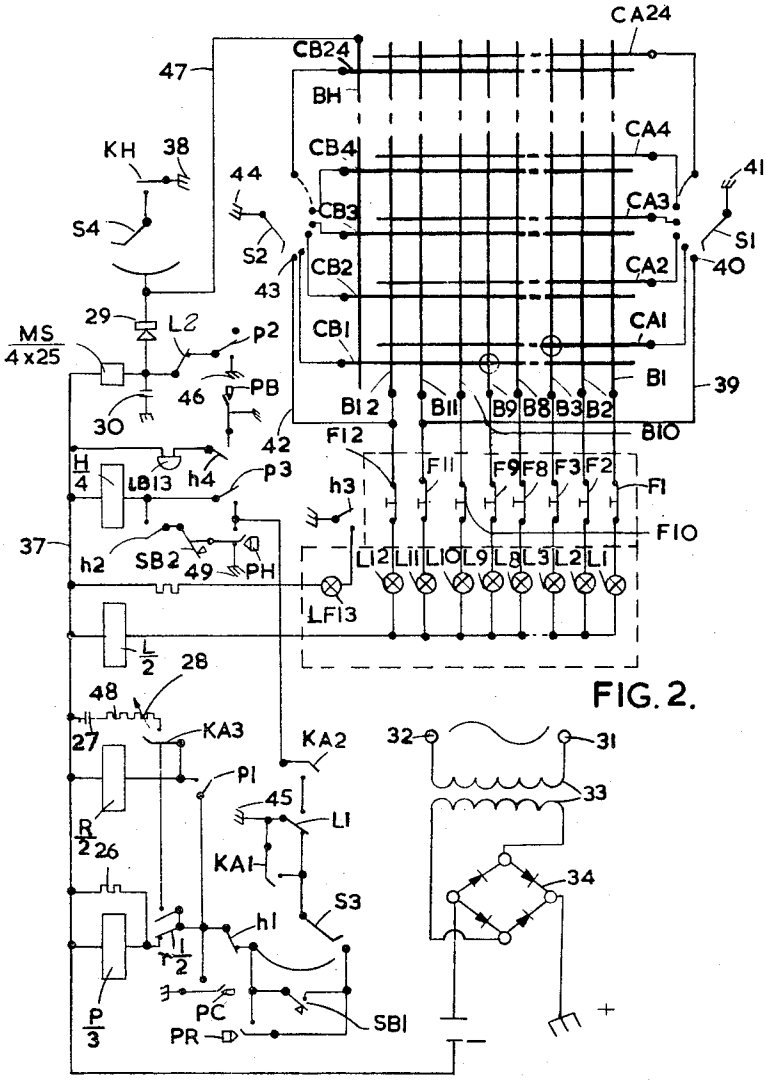


FIG. 2.

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3,024,020

APPARATUS FOR TESTING AGILITY AND POWERS OF CO-ORDINATION

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Claims priority, application Great Britain Aug. 3, 1957
7 Claims. (Cl. 272—57)

The invention relates to apparatus for testing agility and powers of co-ordination, and has for its object to test or improve the pedal or manual agility of a user, or his powers of co-ordinating pedal and/or manual movements, for providing, for example, remedial exercises or a means for athletic training.

The improvement or modification according to the present invention involves effecting the selection of the steps of an exercise to be performed by the insertion of a punched card of insulating material between two planar banks of conductive bars, the bars of each bank being parallel to each other and at right angles to the bars of the other bank, the bars of one bank being included in respective circuits which each contain an indicator and a normally-closed switch adapted to be operated to an open-circuit condition by an actuation of an associated movable member, the bars of the other bank being for selective connection in a circuit under the control of a selector mechanism, and the bars of the respective banks being adapted to contact each other, where they cross, through holes of the punched card so as to be electrically interconnected, whereby the selected bar of said other bank will energise at least one indicator through a corresponding hole of the card until the associated movable member is actuated to open its normally-closed switch to de-energise the said indicator.

According to a further feature the selector mechanism is of a kind which is driven automatically to select the bars of the said other bank in timed sequence. In such a case means can be provided for varying the speed of operation of the selector mechanism whereby to enable the time factor of the timed sequence to be adjusted.

According to a still further feature optionally-operable means are provided for actuating the selector mechanism to its zero position.

While according to yet another feature the said other bank is duplicated, each duplicate set of bars being associated with synchronised selector mechanisms and serving half the bars of the said one bank, and the duplicate sets being relatively laterally displaced for the bars of each set to coact with separate series of holes in the punched card for effecting electrical interconnection with the bars of the said one bank.

One embodiment of the present invention is diagrammatically illustrated in the accompanying drawings, in which:

FIGURE 1 is a diagrammatic perspective view of the apparatus, showing a platform on which an exercise is to be performed, an associated indicator board, and a selector box;

FIGURE 2 is a circuit diagram presented in the detached manner commonly accepted in telephony practice (i.e., the various components are shown in such positions as will permit the clearest arrangement of the various circuits);

FIGURE 3 is a fragmentary view illustrating the disposition of one of the micro-switches in a compartment of the platform; and

FIGURE 4 is an exploded fragmentary view showing the coaction of a selector card with selector bars.

The object of the apparatus is to enable foot and leg exercises to be performed in certain predetermined sequences, for which purpose a trainee has to place his

feet on successive pairs of the numbered areas of the platform in order to extinguish electric lamps in the corresponding areas of the indicator board. As each pair of lamps is extinguished a fresh pair lights up, and so on until the end of the exercise.

It is arranged for the pairs of lamps to be illuminated in a predetermined sequence by the use of an insulating card punched with holes which enable resilient contacts electrically to interconnect selected bars, which are parallel with each other, of one set with bars of a second set at right angles, these latter bars being in respective circuits which each contain one of the lamps. For extinguishing the latter it is necessary for the trainee to place one of his feet on the corresponding area of the platform to depress it and thereby to open a normally-closed switch in the associated lamp circuit.

The selection of the pairs of lamps to be illuminated is made by a rotary selector mechanism and means are provided for this selector mechanism to be actuated for selecting a pair of lamps to be lit, by the action of the trainee in extinguishing a previous pair, or by a trainer, or automatically in a timed sequence; and in this last-mentioned case means are provided for varying the timing of the selection to suit the trainee, and for terminating an exercise before it has been finished.

FIGURE 1 shows the platform at **20**, the indicator board at **21** and the selector box at **22**. The platform has a top covering **23** of sheet rubber arranged above twelve compartments, and the areas of the covering above these compartments are marked **1** to **12**, although other symbols could be used. Each compartment contains a normally-closed micro-switch, and these switches are marked F1 to F12 in FIGURE 2 (although for the sake of clearness switches F4 to F7, inclusive, are not shown). It will be seen from FIGURE 3 that a rigid member **24** is secured to the underside of the covering **23** above each compartment and serves to operate the associated micro-switch.

The indicator board has twelve lamps which are arranged, in compartments behind a translucent front **21***a*, in the same relative positions as the areas of the platform and these lamps are designated L1 to L12 in FIGURE 2, each lamp being series connected with the micro-switch having the same suffix number (i.e., lamp L3 with switch F3). In the centre of the indicator board is an additional lamp LF13 which is preferably behind a red translucency and the purpose of which will be described later.

Contained within the selector box are a relay P which operates three normally open contacts *p*1, *p*2 and *p*3; a relay R which operates a pair of mechanically-interconnected, change-over contacts *r*½; a relay L which operates two normally-closed contacts *l*1 and *l*2; and a relay H which operates a normally closed contact *h*1 and three normally open contacts *h*2, *h*3 and *h*4. Beneath the letter indicating each of these relays is indicated, in accordance with telephone practice, the number of the contacts it operates. Also contained within the selector box is a telephone-type, four-bank self-cycling rotary selector S with a reverse drive (i.e., it operates under spring bias when the circuit of an associated electro-magnet MS, also within the selector box, is opened), the four wiper arms of which are marked S1, S2, S3 and S4 in FIGURE 2 and coact with separate series of twenty-five contacts in the respective banks as hereinafter described. To indicate this in accordance with telephone practice the figures "4 x 25" are shown beneath the legend "M" in FIGURE 2.

The selector box has a hinged lid to the inner surface of which is secured, in an insulated manner, a plurality of parallel selector bars B. These bars are series connected respectively with the series connected micro-

switches and lamps, and they are marked in FIGURE 2 with corresponding suffixes.

On the top of the selector box, under the lid, are two series of parallel cross-bars which are insulated from each other. The cross-bars of one of these series are designated CA, and those of the other CB, the CA bars being laterally off-set with respect to the CB bars. The number of cross-bars in the two series is the same, and that number limits the total number of steps of which an exercise can be composed. In the present instance it is assumed that the maximum number of such steps is twenty-four, and the cross-bars bear their step numbers as suffixes. For clearness of illustration cross-bars CA5 to CA23, and CB5 to CB23 have been omitted from FIGURE 2. The CA cross-bars are respectively connected to the selector contacts associated with wiper arm S1, and the CB cross-bars with those associated with wiper arm S2.

The selector bars B are normally adapted to effect electrical contact with the cross-bars CA and CB where they cross them (e.g., there can be spring-pressed contact balls at the cross-over points) but only in selected positions are these contacts permitted to occur. This selection of positions is effected by a card 25 of insulating material which is punched with holes in selected positions. It is arranged that the holes are so disposed in the card that each CA bar makes contact with only one B bar, and that each CB bar makes contact with only one B bar, the arrangement being such that each pair of CA and CB bars (e.g., CA2 and CB2) select two lamps.

Mounted on or within the selector box is a starting, press-button switch having a normally-open contact SB1 and a normally-closed contact SB2; a switch PR for enabling an exercise automatically to be repeated; a switch PH which is to be operated manually when it is desired to stop automatic action of the apparatus when, for example, the trainee proves to be too slow to keep pace with an exercise which is arranged to be sequenced automatically; and a switch KH which is to be used for homing the selector wipers before the start of an exercise. There is also a switch having three normally-open contacts KA1, KA2 and KA3. All of these switches but KH are of a kind to remain in a position to which they have been operated until operated to the reverse position.

In addition to these components, the selector box contains a fixed non-inductive resistance 26 connected in shunt across relay P; a condenser 27 and a variable non-inductive resistance 28 associated with relay R and switch contact KA3; and self-interrupter contact 29 associated with electro-magnet MS and a condenser 30.

The apparatus is fed from mains 31, 32, through a transformer 33 which is connected across a rectifying bridge 34 of which the intermediate bridge points are connected to the positive and negative lines of the apparatus. A lead 35, with multi-pin plugs at its ends effects the connections between the micro-switches of the platform and the bars B in the selector box, and a further lead 36 with multi-pin plugs effects the connections with the lamps of the indicator board.

The purposes of these switches, and the other components, together with their interrelationship will be apparent from the following descriptions of the several functions of the apparatus.

Re-setting the selector to zero.—If before, or on insertion of the perforated card, any of bars B1 to B12 should have been permitted to make electrical contact with any of the cross-bars CA or CB, the selector may have stepped off the zero position and must be re-set by a short operation of the switch KH. Closing this switch establishes a circuit from the negative line 37, through electro-magnet MS, self-interrupter 29, wiper arm S4 (which will be off zero), and switch KH to the positive line 38. The effect of this is to cause the magnet MS to become energised, and then de-energised by self-interrupter 29, repeatedly until all of the wipers S1, S2, S3 and S4 reach their zero contacts. In those conditions wiper S4 opens the circuit of the electro-magnet MS, lamps L10 and L11 light up and the apparatus is then ready for the commencement of an exercise dictated by the positioning of the holes in a pre-selected perforated card previously placed in position between bars B and cross-bars CA and CB. It is arranged for each exercise to commence with lights L11 and L12 illuminated as this means that the trainee must commence with his feet side by side on the areas 11 and 12 of the platform. The circuit of lamp L11 is from the negative line 37, through relay coil L and the lamp, through normaly-closed micro-switch F11 and a line 39, which by-passes bar B11, to the zero contact 40 of the wiper arm S1, thence through the wiper arm itself and to the positive line 41. The circuit of lamp L12 is from the negative line 37, through relay coil L, the lamp, normally-closed micro-switch F12, a line 42 which by-passes bar B12, and to the zero contact 43 of wiper arm S2, thence through the wiper arm itself and to positive line 44.

Standard exercise controlled by the agility of the trainee.—When the trainee correctly steps on to areas 11 and 12 of the platform, normally-closed micro-switches F11 and F12 are operated to their open positions and the circuits of lamps L11 and L12, and of relay L, are opened. An instructor can now start the exercise, dictated by the card, by shortly depressing the starting button SB1 to energise relay P. This is effected by a circuit from negative line 37, the coil of relay P, contacts $r\frac{1}{2}$, normally-closed relay contacts $h1$, switch contact SB1, the zero contact of wiper S3, and normally-closed relay contact L1 to positive line 45. This energising of relay P closes normally-open contact $p2$ and establishes a circuit from negative line 37, through the coil of electro-magnet MS, and normally-closed contact $l2$ to positive line 46. The energising of relay P also closes contact $p1$ and energises relay R by a circuit from negative line 37, the coil of relay R, contacts $p1$ and $h1$, contact SB1, the zero contact of wiper arm S3, and contact $l1$ to positive line 45.

This energisation of relay R changes over the position of contacts $r\frac{1}{2}$ and opens the circuit of relay P which causes contact $p2$ to open the circuit of the electro-magnet MS, whereafter all four selector wipers S1, S2, S3 and S4 are advanced one step by their biassing means. This, in the example given, causes lamps L3 and L9 to light up and relay L to be re-operated as follows: A circuit is established from negative line 37, through the coil of relay L, lamp L3, normally-closed micro-switch F3, bar B3, cross-bar CA1, and wiper arm S1 to positive line 41, and another circuit is completed from negative line 37, lamp L9, normally-closed micro-switch F9, bar B9, cross-bar CB1, and wiper arm S2 to positive line 44. Meanwhile, as relay P has been de-energised, contact $p1$ opens to de-energise relay R.

When the trainee now steps on to areas 3 and 9, the lamps and relay L will be open-circuited by micro-switches F3 and F9, and this immediately starts another cycle of the relay P/relay R combination and electro-magnet MS operation, only now through wiper arm S3, which will have been moved off its zero contact, instead of through starter button contact SB1. This will cause two other lamps to light up in accordance with the perforations in the card, and relay L again operates, and so on until the selector wipers again reach their zero contacts (the selector contacts being arranged in respective circles), where relay P cannot function unless the starter button contact SB1 is closed.

Two versions of this kind of exercise are provided for as follows:

One version is in the form of a short exercise consisting, say, of only twelve steps. The exercise will consist in the use of only half of the perforation positions in the card when the latter is designed for a twenty-four

step exercise. The card will have a series of holes, for the last twelve steps (not to be used in the exercise), which are displaced laterally with respect to the operative holes for the first twelve steps, and these laterally displaced holes are for coaction with an additional selector bar BH which is connected through line 47 with the contacts for wiper S4. The additional holes in the card connect bar BH to cross bars CB13 to CB24, and this makes the wiper arms S1, S2, S3 and S4 home through the last twelve steps. The circuit for effecting this is from negative line 37, electro-magnet MS, self-interrupter 29, line 47, bar BH, cross bars CB13 to CB24, and wiper arm S2 to positive line 44.

The second version provides an automatic repetition of the complete exercise provided by the card. This is effected by operating switch PR to its closed condition, and this by-passes the start button contact SB1 and immediately re-starts the relay P/relay R combination cycle when the wiper arms S1, S2, S3 and S4 reach their zero contacts at the end of the first performance of the exercise prescribed by the card.

Timed progress.—In this case the progress of the exercise is not controlled by the working of the trainee, no matter how slow this may be, but is imposed on him by the P/R relay combination which is made to be self-cycling. For this purpose the contacts KA1, KA2, KA3 and PH are operated to their closed conditions and the operation is as follows:

A short operation of starter button SB1 energises relay P through a circuit extending from negative line 37, the coil of relay P, contact *r*½, contact *h*1, starter button contact SB1, the zero contact of wiper arm S3 and contact *l*1 to positive line 45. Contact *p*2 operates the selector wiper arms S1, S2, S3 and S4 through a circuit extending from negative line 37, electro-magnet MS, contact *l*2, and contact *p*2 to positive line 46. Thus, relay P causes relay R to be energised through contact *p*1, the circuit being from negative line 37, the coil of relay R, contact *p*1, contact *h*1, starter button contact SB1, the zero contact of wiper arm S3 and contact *l*1 to positive line 45. The release of relay R, however, is delayed by condenser 27, which is connected in parallel with its coil, through switch KA3, and by variable non-inductive resistance 28 in series with a fixed resistor 48. The resistor 28 limits the charge of the condenser 27 and so controls the delayed release of relay R, and therefore the cycling time of the P/R relay combination. As long as the foot-work of the trainee keeps inside the rhythm given by the automatic cycle of the P/R relay combination, the selector wiper arms S1, S2, S3 and S4 will continue to step, but if the trainee is too slow and relay L is still energised when relay R becomes de-energised and relay P becomes energised, relay H will be energised. The relevant circuit is from negative line 37, the coil of relay H, contact *p*3, switch KA2 and contact *l*1 to positive line 45. In these conditions relay H will hold itself in circuit after relay P has become de-energised, and this is effected by a circuit from negative line 37, relay H, contact *h*2, starter button contact SB2, switch PH, switch contact KA2 and contact *l*1 to positive line 45. While this condition prevails electro-magnet MS is prevented from operating by contact *l*2, and contact *h*1 stops operation of the P/R combination. A signal lamp LF13 in the centre of the indicator board is illuminated through contact *h*3 to show the trainee that has has failed to keep pace with the rhythm of the exercise. Lamp LF13 will continue to be illuminated until the trainee eventually steps on to the correct squares of the platform, whereafter, by the consequent release of relays L and H, the automatic cycling of the relay P/relay R combination is restored. By closing a push/pull switch PB an electric bell LB13 can be energised through contact *h*3 when lamp LF13 lights up.

Three versions of this exercise are provided for.

One of these is a shortened version of the exercise prescribed by the card, and this is effected in the way above described for the standard exercise. The second version involves the automatic repetition of the timed exercise, and this is effected as previously described in relation to the standard exercise. The third version involves the interruption of the timed exercise when the trainee lags behind. If the switch PH is left in its normal close position, relay H will hold its circuit independently of contacts *l*1 and *p*3, this holding circuit being from negative line 37, the coil of relay H, contact *h*2, starter button contact SB2 and switch PH to positive line 49. Thus, the cycle of the P/R relay combination will be stopped until relay H is released by starter button contact SB2 (i.e., by pressing the starter button).

It is desirable when a perforated card is inserted between the selector bars and cross-bars to make sure that it is properly positioned with its perforations at the crossing points of the selector bars and cross-bars. For this purpose a push/pull switch PC is arranged to energise relay P through contacts *r*½ indepedently of the contact *h*1 and wiper arm S3 circuit when the apparatus is set for automatic action. In these conditions the P/R relay combination will pulse until switch PC is subsequently opened after it has been checked that all of the lights of the selection dictated by the perforations of the card have lighted up in their predetermined sequence. If some of them do not, indicating that the card is not accurately positioned, the card is adjusted until, on a repetition of the test, they do. The speed of the test can be varied by adjusting the variable non-inductive resistance 28 so as to control the pulsing time of the P/R relay combination.

What I claim as my invention and desire to secure by Letters Patent of the United States is:

1. Apparatus for testing agility and powers of co-ordination, comprising two planar banks of conductive bars, the bars of each bank being parallel to each other and the bars of one of said banks being at right-angles to the bars of the other bank, respective circuits each including a respective one of the bars of said one bank, a respective indicator in each said circuit, a respective normally-closed switch in each said circuit, a respective movable member adapted to be operated by a user of the apparatus to operate a said normally-closed switch to its open condition, a selector mechanism, said selector mechanism adapted selectively to connect the bars of said other bank in a second circuit, means adapted to drive said selector mechanism to select said bars of said other bank for connection in said second circuit in timed sequence, an insulating card to be inserted between said banks, said insulating card provided with holes in predetermined positions where the bars of both said banks cross each other, the bars of both said banks being electrically interconnected by contact with each other through said holes whereby the selector bar of said other bank will energise the indicator in the circuit of each bar of said one bank it contacts until the associated movable member is actuated to open the associated normally-close switch to de-energise the said indicator.

2. Apparatus for testing agility and powers of co-ordination, comprising two planar banks of conductive bars, the bars of each bank being parallel to each other and the bars of one of said banks being at right-angles to the bars of the other bank, respective circuits each including a respective one of the bars of said one bank, a respective indicator in each said circuit, a respective normally-closed switch in each said circuit, a respective movable member adapted to be operated by a user of the apparatus to operate a said normally-closed switch to its open condition, a selector mechanism, said selector mechanism adapted selectively to connect the bars of said other bank in a second circuit, means adapted to drive said selector mechanism to select said bars of said other bank for connection in said second circuit in timed sequence,

means adapted to vary the speed of operation of said selector mechanism whereby to enable the time factor of the timed sequence to be adjusted, an insulating card to be inserted between said banks, said insulating card provided with holes in predetermined positions where the bars of both said banks cross each other, the bars of both said banks being electrically interconnected by contact with each other through said holes whereby the selected bar of said other bank will energise the indicator in the circuit of each bar of said one bank it contacts until the associated movable member is actuated to open the associated normally-closed switch to de-energise the said indicator.

3. Apparatus for testing agility and powers of co-ordination, comprising two planar banks of conductive bars, the bars of each bank being parallel to each other and the bars of one of said banks being at right-angles to the bars of the other bank, respective circuits each including a respective one of the bars of said one bank, a respective indicator in each said circuit, a respective normally-closed switch in each said circuit, a respective movable member adapted to be operated by a user of the apparatus to operate a said normally-closed switch to its open condition, a selector mechanism, said selector mechanism adapted selectively to connect the bars of said other bank in a second circuit, means adapted to drive said selector mechanism to select said bars of said other bank for connection in said second circuit in timed sequence, optionally-operable means for actuating said selector mechanism to its zero position, an insulating card to be inserted between said banks, said insulating card provided with holes in predetermined positions where the bars of both said banks cross each other, the bars of both said banks being electrically interconnected by contact with each other through said holes whereby the selected bar of said other bank will energise the indicator in the circuit of each bar of said one bank it contacts until the associated movable member is actuated to open the associated normally-closed switch to de-energise the said indicator.

4. Apparatus for testing agility and powers of co-ordination, comprising two planar banks of conductive bars, the bars of each bank being parallel to each other and the bars of one of said banks being at right-angles to the bars of the other bank, respective circuits each including a respective one of the bars of said one bank, a respective indicator in each said circuit, a respective normally-closed switch in each said circuit, a respective movable member adapted to be operated by a user of the apparatus to operate a said normally-closed switch to its open condition, a selector mechanism, said selector mechanism adapted selectively to connect the bars of said other bank in a second circuit, means adapted to drive said selector mechanism to select said bars of said other bank for connection in said second circuit in timed sequence, means adapted to vary the speed of operation of said selector mechanism whereby to enable the time factor of the timed sequence to be adjusted, optionally-operable means for actuating said selector mechanism to its zero position, an insulating card to be inserted between said banks, said insulating card provided with holes in predetermined positions where the bars of both said banks cross each other, the bars of both said banks being electrically interconnected by contact wtih each other through said holes whereby the selector bar of said other bank will energise the indicator in the circuit of each bar of said one bank it contacts until the associated movable member is actuated to open the associated normally-closed switch to de-energise the said indicator.

5. Apparatus for testing agility and powers of co-ordination, comprising two planar banks of conductive bars, the bars of each bank being parallel to each other and the bars of one of said banks being at right-angles to the bars of the other bank, respective circuits each including a respective one of the bars of said one bank, a respective indicator in each said circuit, a respective normally-closed switch in each said circuit, a respective movable member adapted to be operated by a user of the apparatus to operate a said normally-closed switch to its open condition, two selector mechanisms, each said selector mechanism adapted selectively to connect the bars of a respective one-half of said other bank in a second circuit, means adapted to drive said selector mechanisms in synchronism to select said bars of said other bank for connection in said second circuit in timed sequence, an insulating card to be inserted between said banks, said insulating card provided with holes in predetermined positions where the bars of both said banks cross each other, the bars of the respective halves of said other bank being relatively laterally displaced and adapted to coact with separate series of holes in said card, the bars of both said banks being electrically interconnected by contact with each other through said holes whereby the selected bar of said other bank will energise the indicator in the circuit of each bar of said one bank it contacts until the associated movable member is actuated to open the associated normally-closed switch to de-energise the said indicator.

6. Apparatus for testing agility and powers of co-ordination, comprising two planar banks of conductive bars, the bars of each bank being parallel to each other and the bars of one of said banks being at right-angles to the bars of the other bank, respective circuits each including a respective one of the bars of said one bank, a respective indicator in each said circuit, a respective normally-closed switch in each said circuit, a respective movable member adapted to be operated by a user of the apparatus to operate a said normally-closed switch to its open condition, two selector mechanisms, each said selector mechanism adapted selectively to connect the bars of a respective one-half of said other bank in a second circuit, means adapted to drive said selector mechanisms in synchronism to select said bars of said other bank for connection in said second circuit in timed sequence, means adapted to vary the synchronous speed of operation of said selector mechanisms whereby to enable the time factor of the timed sequence to be adjusted, an insulating card to be inserted between said banks, said insulating card provided with holes in predetermined positions where the bars of both said banks cross each other, the bars of the respective halves of said other bank being relatively laterally displaced and adapted to coact with separate series of holes in said card, bars of both said banks being electrically interconnected by contact with each other through said holes whereby the selected bar of said other bank will energise the indicator in the circuit of each bar of said one bank it contacts until the associated movable member is actuated to open the associated normally-closed switch to de-energise the said indicator.

7. Apparatus for testing agility and powers of co-ordination, comprising two planar banks of conductive bars, the bars of each bank being parallel to each other and the bars of one of said banks being at right-angles to the bars of the other bank, respective circuits each including a respective one of the bars of said one bank, a respective indicator in each said circuit, a respective normally-closed switch in each said circuit, a respective movable member adapted to be operated by a user of the apparatus to operate a said normally-closed switch to its open condition, two selector mechanisms, each said selector mechanism adapted selectively to connect the bars of a respeceive one-half of said other bank in a second circuit, means adapted to drive said selector mechanisms in synchronism to select said bars of said other bank for connection in said second circuit in timed sequence, means adapted to vary the synchronous speed of operation of said selector mechanisms whereby to enable the time factor of the timed sequence to be adjusted, optionally-operable means for actuating said selector mechanisms

simultaneously to their zero positions, an insulating card to be inserted between said banks, said insulating card provided with holes in predetermined positions where the bars of both said banks cross each other, the bars of the respective halves of said other bank being relatively laterally displaced and adapted to coact with separate series of holes in said card, the bars of both said banks being electrically interconnected by contact with each other through said holes whereby the selected bar of said other bank

will energise the indicator in the circuit of each bar of said one bank it contacts until the associated movable member is actuated to open the associated normally-closed switch to de-energise the said indicator.

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