March 5, 1940. J. C. K. SWAN ET AL 2,192,779

SELECTING MECHANISM

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FIG. 1

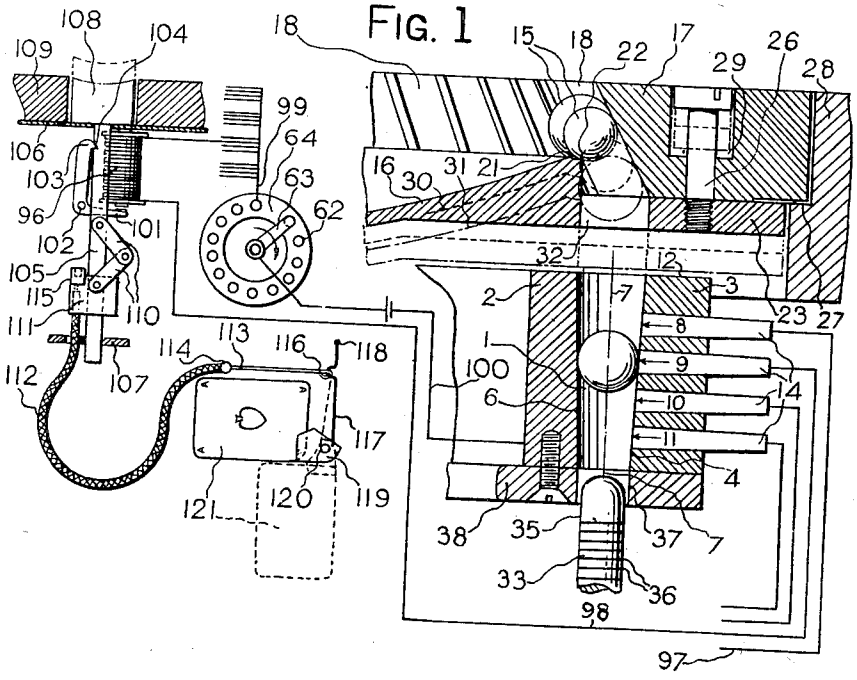


FIG. 2

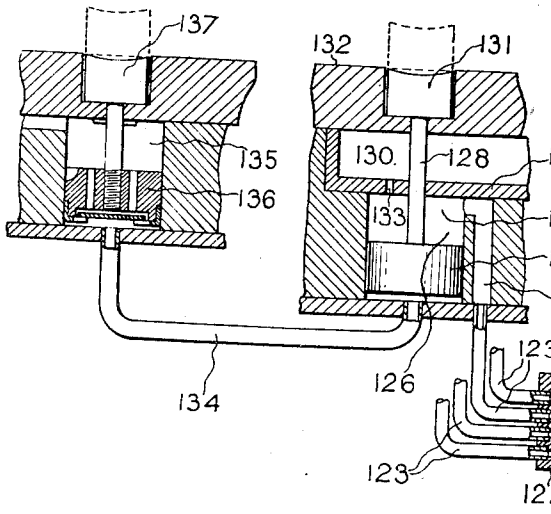
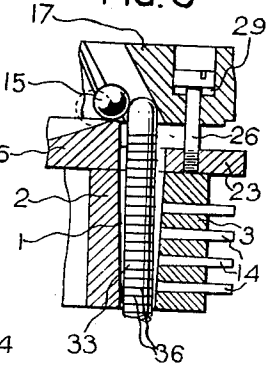


FIG. 3



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FIG. 4

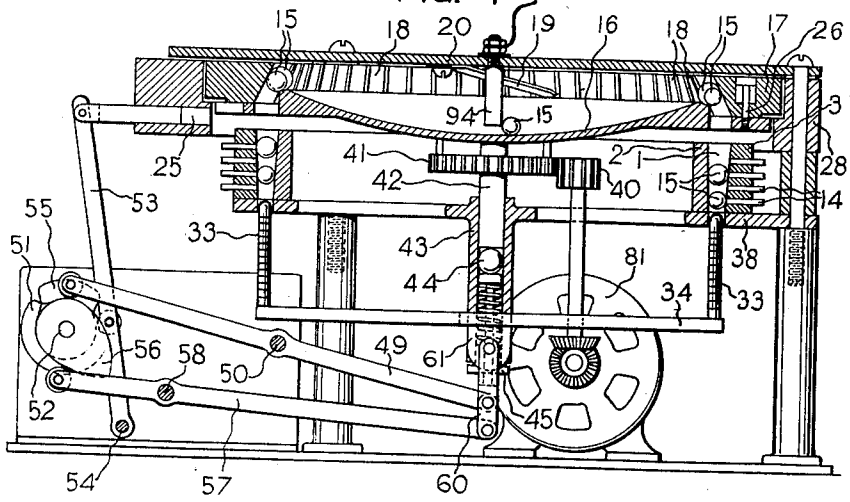


FIG. 5

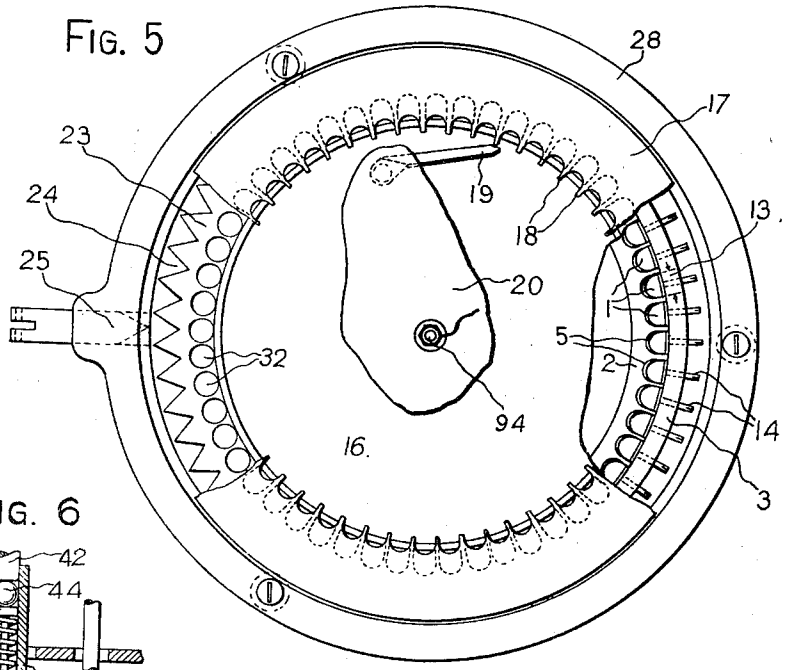
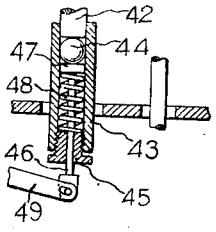


FIG. 6



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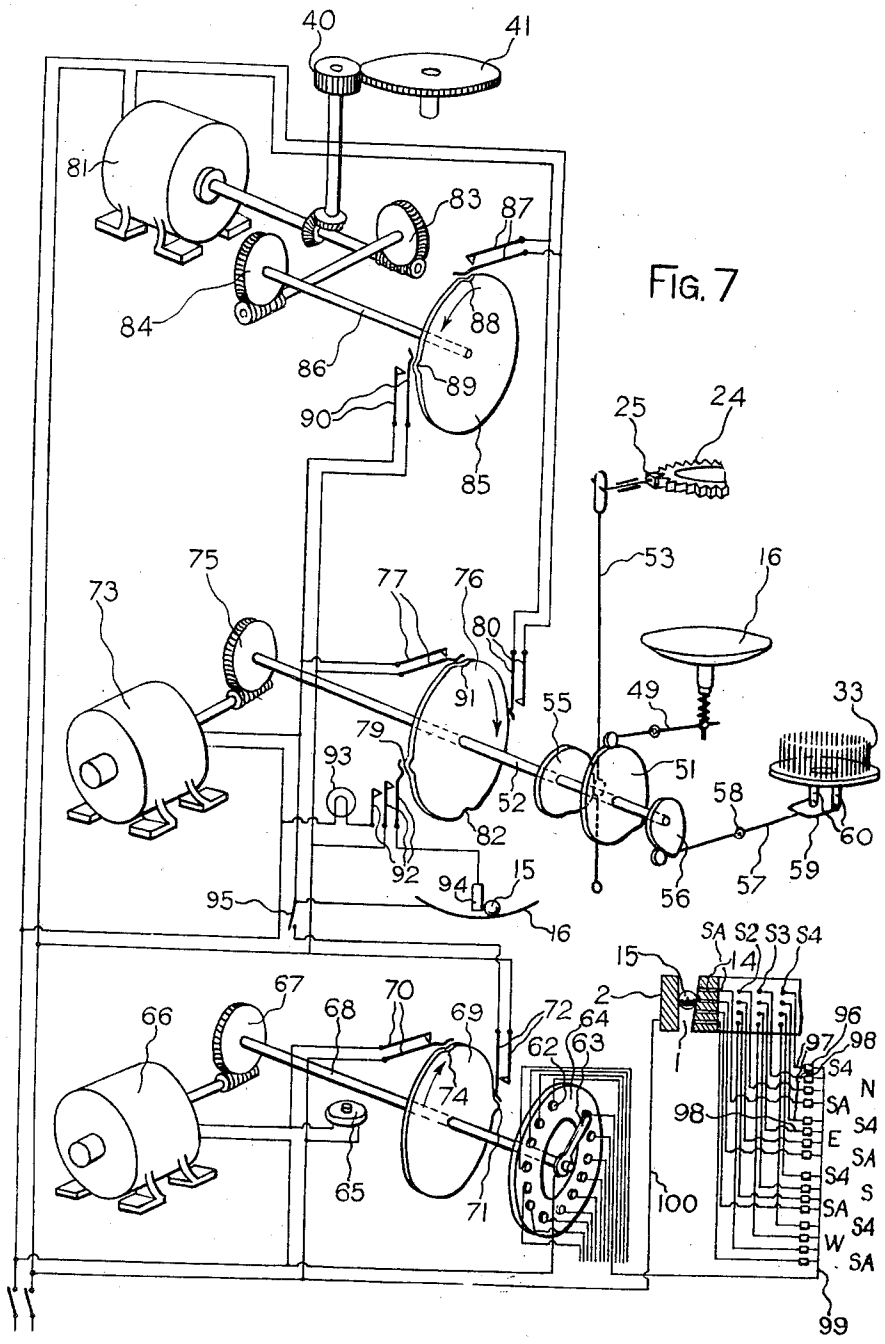


FIG. 7

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UNITED STATES PATENT OFFICE

2,192,779

SELECTING MECHANISM

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Application May 12, 1938, Serial No. 195,662
In Great Britain March 31, 1937

19 Claims. (Cl. 273—149)

This invention relates to selecting mechanism, and especially mechanism for operating a plurality of devices in any desired sequence or combination, which may either be effected at random or in some predetermined manner.

The essential part of the mechanism according to the invention comprises a socket into which any of a plurality of balls of different sizes can be introduced, the width of the socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, and means disposed at each such point adapted to be controlled by the introduction of a ball into the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism. Thus, the socket may be tapered, the means controlled by the introduction of a ball being disposed at points in the socket where the widths of the socket correspond to the diameters of the balls employed.

The delivery of a ball selected at random or in a predetermined manner from a plurality of balls of different sizes enables the selection to be effected between elements connected to the socket at the various points at which the balls can be restrained. Thus, at the restraining points there may be pairs of contacts included in a corresponding number of circuits intended to be selectively operated and connected by the introduction of a ball of conducting material. Again, there may be an aperture at each of the restraining points, so that one of a plurality of tubes terminating at the apertures is closed by a ball restrained at a corresponding point to permit a vacuum to be set up in the tube and provide for selective pneumatic operation of the element connected to that tube.

The number of restraining points in the socket varies in accordance with the number of elements to be operated, and a plurality of sockets may be used in association with each other to increase correspondingly the selective scope of the apparatus. Thus, a plurality of sockets may be used to effect a random operation of a plurality of elements, as, for instance, in effecting the "dealing" of a pack of cards among a plurality of players. For example, there may be used fifty-two sockets each representing a card and each containing four pairs of contacts to be used with thirteen balls of each of four different sizes to enable the cards to be dealt among the four players.

In a case such as that just mentioned, only one ball should be delivered to each socket, and the invention further comprises means for distributing the balls among a plurality of sockets. This mechanism comprises means for delivering individual balls from a plurality of balls of different sizes to each of several sockets. The balls may be supplied in predetermined order to the distributing means, or they may be selected at random before distribution. The mechanism also comprises means for enabling repeated distribution of the balls among the sockets to be carried out effectively in rapid sequence. Advantageously, the number of balls governing the selection exactly equals the number of sockets, and for random selection means are provided to mix the balls thoroughly between each distribution. There may, however, be used more than one set of balls; for example two sets may be used, one set being held in readiness for distribution to the sockets immediately following the discharge of the other set from the sockets. Again, more balls than sockets may be used, e. g. twelve, eighteen, or twenty-four balls for six sockets.

Advantageously, centrifugal means may be used to distribute balls to a plurality of sockets arranged in an arc of a circle, as, for example, by means of a rotatable dish that flings the balls into contact with a member having inwardly extended serrations spaced so as to correspond with the spacing of the sockets. Release of the balls from this member, e. g. with the serrations outwardly inclined, by dropping the dish, permits one to fall into each socket.

A ball may be removed from a socket after the operation initiated by it has been completed by any desired means. For example, a plunger may be pushed upwardly through the socket; or, where a number of sockets are in use, a corresponding number of plungers may be pushed through the sockets, e. g. simultaneously.

Electrical controlling means may advantageously be used to bring about the cycle of operations. For example, closures of an electric circuit may effect automatically (and starting at any desired point in the cycle) the rotation of the dish and serrated member, registering of the serrations with the sockets, dropping the dish, and, after the balls in the sockets have served their purpose, removal of the balls from the sockets, raising of the dish, and freeing of the dish and serrated member for rotation.

The invention also comprises means for use in association with the mechanism indicated above in playing games involving the distribution of cards or the like among a plurality of players, and the following description sets out

by way of example the application of the invention in this latter connection to the playing of a four-handed card game. It is to be understood, however, that the invention is not limited to games of this type. It may be used, for example, for playing card games in which various numbers of players may take part, e. g. "poker".

The invention will now be described in greater detail with reference to the accompanying drawings, in which

Fig. 1 shows a socket arranged for electrical selection of a card-playing mechanism, together with means for introducing a ball into the socket and means for removing the ball from the socket.

Fig. 2 shows a socket arranged for pneumatic selection of card-playing mechanism;

Fig. 3 shows the operation of removing a ball from the socket;

Fig. 4 shows in sectional elevation a selecting device comprising a plurality of the sockets shown in Fig. 1 together with its operating mechanism;

Fig. 5 is a plan view of the selecting device shown in Fig. 4 with parts broken away;

Fig. 6 is a sectional elevation of a detail of Fig. 4; and

Fig. 7 shows diagrammatically the driving mechanism and electrical connections of the selecting device shown in Figs. 4 and 5.

Referring to Figs. 1, 4, and 5, fifty-two sockets 1 are formed in a composite ring comprising an inner ring 2 and an outer ring 3, the outer face of the ring 2 and the inner face of the ring 3 being tapered so as to fit closely to each other, as indicated by the line 4 in Fig. 1.

The sockets 1 are formed by cutting parallel-sided grooves down the length of the ring 2, the bottoms of the grooves being semi-circular as shown at 5 in Fig. 5, and the line of the grooves being inclined to the vertical as shown by the line 6 in Fig. 1. The lines 4 and 6 are equally inclined with respect to the vertical axis 7 of the socket 1, this inclination being such that at the levels 8, 9, 10 and 11 the distance between the lines 4 and 6 is ¼-inch, $^{15}/_{64}$-inch, $^{7}/_{32}$-inch and $^{13}/_{64}$-inch, or, measured as sixty-fourths of an inch, 16, 15, 14 and 13. At the upper face 12 of the rings 2, 3, the width of the socket is somewhat greater than ¼-inch. The transverse width 13 of the socket (see Fig. 5) is also somewhat greater than ¼-inch.

If a ball of ¼-inch diameter is dropped into the socket 1, it will fall freely until it reaches the level 8, when it will then engage the bottom of the groove in the ring 2 and the corresponding opposite point in the ring 3, contact with the sides of the groove not being possible because the groove is rather more than ¼-inch wide. Similarly, a $^{15}/_{64}$-inch ball will reach the level 9, there being engaged by the bottom of the groove and the corresponding opposite point in the ring 3. A $^{7}/_{32}$-inch ball will reach the level 10, and a $^{13}/_{64}$-inch ball the level 11.

If, therefore, from a set of balls varying in diameter from ¼-inch down to $^{13}/_{64}$-inch, one is dropped at random into the socket 1, selective actuation of the mechanism is rendered possible by the retention of the ball at one and only one of the levels 8 . . . 11.

In Fig. 1, contact members 14 are secured in the ring 3 (which is made of insulating material and forms one side of the socket) with their ends flush with the inner surface of the ring, thus enabling a ball in the socket to make electrical connection between the ring 2 (made of suitable metal and forming the opposite side of the socket) and the contact 14 disposed at the level at which the ball is retained. Other than electrical means may be employed in connection with the socket, for example the pneumatic means shown in Fig. 2 which will be described in detail later.

Figs. 1, 4, and 5 show means for distributing fifty-two balls 15 to the fifty-two sockets of the contact ring. The fifty-two balls, comprising thirteen of each of the four sizes mentioned above, are permanently retained in the device, and these balls are distributed to the fifty-two sockets 1 by means of a rotatable dish 16 and a ring 17 rotatable with the dish and provided on its inner edge with inclined serrations 18. The serrations 18 have a width slightly greater than ¼-inch so that when the dish 16 is rotated the balls 15 are flung outwardly and enter the serrations. Should any ball rest on a ball that has already entered a serration, or between pairs of adjacent balls already in the serrations, such a ball is dislodged by a spring blade 19 secured to a fixed cover 20 and pointing outwardly and downwardly close to the serrations and continues to be dislodged until it has found a vacant serration. Though centrifugal force serves to keep the balls in the serrations during the rotation of the dish 16 and the ring 17, provision is made to ensure that they remain in place when these members come to rest. For this purpose the edge of the dish 16 is formed with two rims 21, 22 over which the smallest and the largest balls respectively pass when they contact with the bottoms of the grooves forming the serrations, so that the weight of the balls urges the balls outwardly and prevents their rolling back into the dish.

When all the serrations have been filled, the dish 16 and the ring 17 are brought to rest and the fifty-two serrations 18 are registered with the fifty-two sockets 1 below the dish 16 and the ring 17. For this purpose, the dish 16 is formed with an annular extension 23 having fifty-two deep indentations 24 into which a detent 25 can be caused to enter. The annulus 23 serves to support the ring 17, and headed screws 26 passing through the ring 17 into the annulus 23 enable the ring to be driven by the dish 16.

To release the balls from the serrations 18 and allow them to drop into the sockets 1 provision is made for lowering the dish 16 with respect to the ring 17. When the dish 16 has been lowered a small amount, the ring 17 rests on a ledge 27 in a supporting ring 28 and is incapable of following the dish 16 further. It will be observed that a cavity 29 is formed below the head of the screw 26 which permits the screw to drop with respect to the ring 17 as it is carried downwardly by the lowering of the dish 16.

The lowering of the dish vertically has the effect of increasing the distance between the rim 22 of the dish and the bottom of the inclined serrations 18, with the result that as the dish reaches the level 30 sufficient space is provided for the smallest size of ball 15 to drop over the rim 22 of the dish, and at the level 31 of the dish the largest ball can pass over the rim. The balls are thus free to fall through holes 32 in the annulus 23, these holes of slightly more than ¼-inch in diameter being registered with the serrations 18 and therefore with the sockets 1. The fifty-two balls are thus dropped into the sockets 1 with the distribution they had in the serrations 18.

Since the balls lie in a cluster in the dish 16 and are flung out by centrifugal force, the dis-

tribution is an entirely random one, and when they reach the sockets they provide an allocation of fifty-two balls divided at random into sets of thirteen disposed at the four different levels 8 . . . 11. If, therefore, the fifty-two contacts provided at the level 8 are connected to a group of fifty-two mechanisms, and the three other sets of fifty-two contacts at the levels 9, 10, and 11 are connected respectively to three other sets of fifty-two mechanisms, thirteen balls retained at each of the four levels enables thirteen corresponding mechanisms to be actuated out of the fifty-two at each of the four levels. If, therefore, each socket 1 represents a card in a pack, the fifty-two cards of the pack can be allocated at random thirteen at a time to four different players.

To enable a fresh distribution of the balls to be made, and consequently fresh allocation of the fifty-two cards, the balls 15 are returned to the dish 16. This takes place while the dish 16 is lowered, by raising fifty-two plungers 33 secured to a plate 34 until the balls retained in the sockets 1 are pushed over the rims 21, 22 of the dish 16. To ensure that no balls are retained in the serrations 18, the plungers 33 comprise tips 35 mounted on springs 36 forming the stems of the plungers, so that when the tips engage the bottoms of the serrations 18 the springs can yield and enable the tips to continue their upward motion until the balls can roll clear of the rims 21, 22. The mere rolling of the balls into the dish brings about a mixing of the balls, this mixing being continued when the dish is once again rotated, and when the balls are again flung into the serrations 18 an entirely different distribution is effected. The plungers 33 remain permanently in register with the sockets 1, their tips 35 entering holes 37 in a supporting spider 38 to which the rings 2, 3 are secured.

Fig. 4 shows the means for driving the dish 16 and the means for registering the serrations 18 with the sockets 1, means for lowering and raising the dish 16, and means for lowering and raising the plungers 33. The dish 16 is driven by means of a motor 81 through a pinion 40 meshing with a spur gear 41 secured to the underside of the dish. The spindle 42 of the dish rotates in a bearing 43 forming part of the spider 38, the ball 44 providing for free rotation of the spindle. The bottom of the bearing 43 terminates in a screwed cap 45 through which passes a plunger 46 having a head 47 on which the ball 44 rests. Between the head 47 and the cap 45 is a strong spring 48. The plunger 46 is connected to a lever 49 pivoted at 50 and controlled by a cam 51 on a cam shaft 52. The detent 25 for engaging the indentations 24 is connected to a lever 53 pivoted at 54 and controlled by a cam 55 on the shaft 52. A third cam 56 controls a lever 57 pivoted at 58, terminating in a fork 59 (see particularly Fig. 7) connected by links 60 to ears 61 on the underside of the plunger supporting plate 34. The cams 51, 55, and 56 come into operation when the dish 16 is at rest, and the cam 55 ensures that the detent 25 registers the serrations 18 before the dish 16 is lowered to permit the balls to drop from the serrations into the sockets 1. The cam 56 expels the balls from the sockets while the dish 16 is lowered (see Fig. 3).

For use in distributing cards to a plurality of players, the mechanism is only called on to make the distribution at fairly long intervals, and advantageously the mechanism may be brought to rest with the fifty-two balls already lying in the sockets 1 ready for immediate allocation of the cards to the players. It is, of course, possible for the fifty-two mechanisms whose circuits have been completed by the fifty-two balls to be actuated simultaneously. It is, however, advantageous to effect the actuation by groups in order to cut down the current required. For this purpose, the 208 circuits (four for each of the fifty-two sockets) may be connected to the source of supply in groups of sixteen, as is indicated at the bottom right-hand corner of Fig. 7, each group of sixteen being connected to one of thirteen studs 62 arranged to be swept by a contact arm 63. One complete rotation of the arm 63 closes the fifty-two circuits selected out of the total of 208 by the fifty-two balls. The arm 63 comes to rest in a gap 64 between the studs 62.

The mechanism is put into operation as follows:

A switch, which may be, for example, coin-operated but is shown simply as a push button switch 65 in Fig. 7, closes the circuit of a motor 66 which drives through gearing 67 a shaft 68 carrying the contact arm 63. A disc 69 secured to the shaft 68 serves to close a pair of contacts 70 to maintain the circuit of the motor 66 closed so that the rotation of the arm 63 continues until all the fifty-two circuits completed by the balls 15 have been energized. Just before the disc 69 has completed a revolution, a projection 71 closes a pair of contacts 72 to complete the circuit of a motor 73. Immediately afterwards a recess 74 in the disc 69 permits the opening of the contacts 70 and the motor 66 comes to rest. The motor 73 drives through gearing 75 the cam shaft 52, a disc 76 on the shaft closing a pair of contacts 77 to keep the motor 73 in operation. At this time, the dish 16 is held in its lowest position with the serrated ring 17 resting on the ledge 27. The cam 56 through the lever 57 raises the plungers 33 to eject the balls from the sockets 1 and cause them to roll into the dish 16. The cam 51 then lifts the plunger 46 through the lever 49 to raise the dish 16 and lift the ring 17 clear of the ledge 27. The cam 55 permits a spring 78 to withdraw the detent 25 from the indentation 24 with which it is engaged so as to free the dish for rotation. By this time the disc 76 has rotated nearly a half-revolution to bring a projection 79 into position to close a pair of contacts 80 in the circuit of a dish-driving motor 81. When the disc 76 has made a half-revolution, a recess 82 in the disc 76 permits the contacts 77 to open and the cam shaft motor 73 comes to rest.

The motor 81 drives the dish through the pinion 40 and the gear 41, and through reduction gearing 83, 84 drives slowly a disc 85 on a shaft 86. The rotation of the disc 85 allows a pair of contacts 87 to close to keep the motor 81 in operation for a full revolution. The time taken for this revolution depends on the time that experience shows to be necessary for all the balls to be carried from the dish into the serrations 18. For example, a minute may be allotted for this purpose, though, as is shown below, provision may be made for a shorter time than this.

After a full revolution of the disc 85, a recess 88 enables the contacts 87 to open and the motor 81 to come to rest. Just before this, a projection 89 on the disc 85 closes a pair of contacts 90 in the circuit of the cam shaft motor 73 and allows the cam shaft 52 to make a further half-revolution. In the first portion of this further

half-revolution, the cam 56 completes the withdrawal of the ejector plungers 33 which had started during the first half-revolution; causes the cam 55 to bring the registering detent 25 into engagement with one of the indentations 24 to align the serrations 18 with the sockets 1; and allows the plunger 46 to be lowered below the dish spindle 42 to let the newly distributed balls drop into the sockets 1.

A recess 91 in the disc 76 opens the contacts 77 to permit the cam shaft motor to come to rest. Just before this, the projection 79 closes three contacts 92 to complete the circuit of a lamp 93 that serves to indicate the completion of the cycle. Should, however, one or more balls have failed to enter the serrations 18, a circuit is completed by such ball or balls through the dish 16 and an insulated peg 94 depending from the cover 20. Two of the contacts 92 are included in this circuit, so that instead of the motor 73 stopping, it continues in operation to repeat the distributing cycle.

By the provision of these means for detecting the presence of any balls still remaining in the dish, the cycle of the spinning motor 31 can be cut down to a minimum, since on the rare occasions when the cycle is not sufficient to bring all the balls into the serrations 18, a repetition of the cycle gives the balls a further chance of reaching the serrations. In cases where further spinning proves necessary, the indicator lamp 93 only lights briefly since the continued rotation of the disc 76 withdraws the projection 79 and allows the contacts 92 to reopen.

In cases where it is desired to repeat the same distribution of the cards, a switch 95 in the cam shaft motor circuit may be opened, so that closing of the contacts 72 as the disc 69 of the switch motor completes its revolution is ineffective to start the cam shaft motor.

The bottom right-hand corner of Fig. 7 shows diagrammatically a portion of the rings 2, 3 with four adjacent sets of four contact pins 14, together with the socket 1 corresponding to one such set.

If it be assumed that the four sets of pins 14 correspond respectively to the Ace, 2, 3, and 4 of Spades, then the connections of the pins 14 at the four levels 8 . . . 11 (see Fig. 1) must be such that any one of the cards can be allotted to any one of the four players North, East, South, and West (N, E, S, W) in accordance with the size of the ball 15 that happens to drop into the socket 1 corresponding to that card. If, therefore, each player has fifty-two indicators corresponding to the fifty-two cards of a pack and each of these indicators is connected to the fifty-two pins 14 lying at the same level, then when thirteen of the fifty-two balls distributed at random round the ring 17 are retained at that level, thirteen corresponding indicators of that player's set of fifty-two are actuated.

In Fig. 7, 96 indicates electro-magnets adapted to operate the indicators. The use of these electro-magnets will be described in greater detail later. Four sets of such magnets 96 are shown to correspond with the four sockets SA, S2, S3, S4, the first of each set of four magnets being shown connected by leads 97 to the uppermost contact pins 14 (level 8), the next by leads 98 to the second row of contact pins 14 (level 9), and so on. A common lead 99 connects the magnets to one of the studs 62 and so through the rotating contact arm 63 to the supply, and a lead 100 connected to the ring 2 completes the circuit. Similar common leads 99 are provided for each set of sixteen pins 14 and are connected to the studs 62. Therefore, with any four balls resting in the four sockets SA, S2, S3, S4, circuits are completed through these balls to the magnets 96 of the appropriate players when the arm 63 comes into contact with the studs 62 to which the leads 99 are connected. The arm 63 moves over thirteen studs 62 in turn so as to complete the circuits made by the whole of the fifty-two balls four at a time to distribute the whole of the fifty-two cards to the players, there being thirteen for each player.

Fig. 1 shows diagrammatically how a player receives an indication that a particular card has been allotted to him. A ball 15 is shown retained at level 9. This completes a circuit through the lead 98 to the electro-magnet 96 which thereupon attracts the lower arm 101 of a bell-crank lever pivoted at 102, so withdrawing the latched arm 103 of the lever from the notch 104 in a stem 105 capable of sliding vertically through the plates 106, 107. The upper end of the stem carries a tablet or key 108 ordinarily lying flush with the table top 109. When the stem is raised the key is brought to the position shown in dotted lines, thus indicating to the player that there has been allotted to him a particular card, which may be shown by the upper face of the key bearing some suitable designation. With the raising of the stem 105, a pair of toggle links 110 are straightened. When the player wishes to play that particular card he depresses the key 108 and the straightened toggle forces downwards a slider 111, freely mounted on the stem 105, to which is secured one end of the casing 112 of a Bowden cable 113. The other end of the casing is anchored to a fixed point 114. One end of the cable itself is anchored at 115 and the other end is connected at 116 to a spring wire lever 117 fixed at 118. The free end of the lever 117 engages a stirrup 119 pivoted at 120 to which is attached the representation of a playing card 121 normally hidden from view.

Compression of the Bowden casing 112 puts the cable 114 in tension and causes the lever 117 to rock the stirrup 119 about its pivot 120 and bring the card 121 to the exposed position shown in dotted lines. The key 108 is held depressed by re-engagement of the latch 103 with the notch 104. Breaking of the toggle links 110 by any suitable means (not shown) allows the Bowden casing 112 to return the slider 111 to its uppermost position and brings the card 121 back to its hidden position.

It is to be understood that the above brief description of the manner in which any one of the cards of each player's set may be exposed and returned into position is given solely by way of example, the main purpose of this part of the mechanism shown in Fig. 1 being to show how the circuits completed by the balls 15 between the ring 2 and the contact pins 14 can serve to give an indication to the player of the cards that have been distributed to him by the operation of the rotating dish 16.

Fig. 2 shows the ring 3 adapted for pneumatic connection to the players' mechanisms. Four holes 122 are formed in the ring at levels corresponding to the levels 8 . . . 11 of Fig. 1 and are connected to tubes 123. One of these tubes is shown connected to a passage 124 leading to the upper side 125 of a cylinder 126 in which lies a piston 127. A piston rod 128 passes through the cover 129 of the cylinder and through a suction

chamber 130 to terminate in a tablet or key 131 normally lying flush with a table top 132. A passage 133 connects the cylinder 126 with the chamber 130.

Suction being applied by any suitable bellows or other means (not shown) to the chamber 130, such suction has no effect on the piston 127 unless a ball 15 happens to lie in the socket 1 opposite the mouth of the hole 122 connected to the cylinder 126 containing that piston. Air being unable to leak through the hole (at any rate, not in substantial quantity), sufficient suction is created in the cylinder 126 to raise the piston 127 and therefore the key 131, as is shown in dotted lines. The key remains raised so long as the suction is applied, the raised piston 127 blanking off the end of the passage 124.

From the bottom of the cylinder 126 a tube 134 leads to the bottom of a cylinder 135 in which is a piston 136 connected to a tablet 137 bearing a representation of the card corresponding to the key 131. Depression of the key 131 causes the tablet 137 to be raised in a position exposed to the other players.

Having described our invention, what we desire to secure by Letters Patent is:

1. Selecting mechanism comprising a socket into which any of a plurality of balls of different sizes can be introduced, the width of the socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, and means disposed at each such point adapted to be engaged by a ball introduced into the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism.

2. Selecting mechanism comprising a tapered socket into which any of a plurality of balls of different sizes can be introduced and restrained at points in the length of the socket where the width of the socket corresponds to the diameter of any ball, and means disposed at each such point adapted to be engaged by a ball introduced into the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism.

3. Selecting mechanism comprising a socket into which any of a plurality of balls of different sizes can be introduced, the width of the socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, and electric contacts disposed at each such point adapted to be connected by a ball of conducting material introduced into the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism.

4. Selecting mechanism comprising a socket into which any of a plurality of balls of different sizes can be introduced, the width of the socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, one side of the socket comprising conducting material and the opposite side insulating material carrying a plurality of electric contacts disposed at the points where the balls are restrained so that a ball of conducting material introduced into the sockets connects the conducting side of the socket with one of the contacts on the other side of the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism.

5. Selecting mechanism comprising a socket into which any of a plurality of balls of different sizes can be introduced, the width of the socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, and an aperture in the socket at each such point adapted to be closed by a ball introduced into the socket to permit pneumatic actuation of one of a corresponding plurality of devices by the selecting mechanism.

6. Selecting mechanism comprising a number of sockets into each of which any of a plurality of balls of different sizes can be introduced, the width of each socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, and means disposed at each such point adapted to be engaged by a ball introduced into the socket to permit each socket to control actuation of one of a corresponding plurality of devices.

7. Selecting mechanism comprising a number of vertical sockets into each of which any of a plurality of balls of different sizes can be introduced, the width of each socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, means disposed at each such point adapted to be engaged by a ball introduced into the socket to permit each socket to control actuation of one of a corresponding plurality of devices, means to distribute a plurality of balls into positions above the sockets, means to release the balls to permit them to fall into the sockets, and means to lift the balls out of the sockets.

8. Selecting mechanism comprising a number of vertical sockets arranged round an arc of a circle, means to distribute a plurality of balls of different sizes to positions above the sockets, means to release the balls to permit one to fall into each socket, each socket having a width that varies progressively along tis length so that the differently sized balls are restrained at different points in the length of the socket, means disposed at each such point adapted to be engaged by a ball introduced into the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism, and means to lift the balls out of the sockets.

9. Selecting mechanism comprising a number of vertical sockets arranged round an arc of a circle, a rotatable member above the sockets having a number of inwardly extending serrations spaced so as to correspond with the spacing of the sockets, a rotatable dish within said member, means to rotate the dish and the serrated member so as to distribute centrifugally into the serrations a plurality of differently sized balls contained in the dish, means to register the serrations with the sockets, means to release the balls so as to permit one to fall into each socket, each socket having a width that varies progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, means disposed at each such point adapted to be engaged by a ball introduced into the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism, and means to lift the balls out of the sockets.

10. Selecting mechanism comprising a number of vertical sockets arranged round an arc of a circle, a rotatable member above the sockets having a number of inwardly extending serrations spaced so as to correspond with the

spacing of the sockets, a rotatable dish within said member, the serrations being outwardly inclined and engaged by the edge of the dish, means to rotate the dish and the serrated member so as to distribute centrifugally into the serrations a plurality of differently sized balls contained in the dish, means to register the serrations with the sockets, means to lower the dish so as to increase the distance between the edge of the dish and the bottom of the serrations until the balls in the serrations can pass the edge of the dish and fall one into each socket, each socket having a width that varies progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, means disposed at each such point adapted to be engaged by a ball introduced into the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism, and means to lift the balls out of the sockets.

11. Selecting mechanism comprising fifty-two sockets, the width of each of which varies progressively along its length to permit four differently sized balls to be restrained at four different points in the length of the socket, means disposed at each of the four such points adapted to be engaged by a ball introduced into the socket, and means to distribute at random to the sockets fifty-two balls comprising thirteen balls of each of four different sizes to permit the thirteen largest balls to select for control thirteen out of one set of fifty-two means disposed in the sockets, the thirteen balls next in size to select for control thirteen out of the next set of fifty-two means disposed in the sockets, the thirteen balls next in size to the smallest thirteen out of the next set of fifty-two means and the thirteen smallest balls thirteen out of the last set of fifty-two means.

12. Selecting mechanism comprising fifty-two vertical sockets arranged in a circle, the width of each of which varies progressively along its length to permit four differently sized balls to be restrained at four different levels in the length of the socket, means disposed at each of the four such levels adapted to be engaged by a ball introduced into the socket, a rotatable member above the sockets having a number of inwardly extending serrations spaced so as to correspond with the spacing of the sockets, a rotatable dish within said member, means to rotate the dish and the serrated member so as to distribute centrifugally into the serrations a plurality of differently sized balls contained in the dish, means to register the serrations with the sockets, means to lower the dish so as to increase the distance between the edge of the dish and the bottom of the serrations until the balls in the serrations can pass the edge of the dish and fall one into each socket, and means disposed at each of the four levels in each of the sockets adapted to be controlled by the ball of the particular size that happens to enter the socket.

13. Selecting mechanism comprising a plurality of vertical sockets arranged in a circle, each socket having a width that varies progressively along its length and provided at different levels with means adapted to be engaged by differently sized balls introduced into the socket, a rotatable dish having its edge above the sockets, an inwardly serrated member rotatable with the dish, its serrations being inclined outwardly, means to rotate the dish and the other member so as to fling into the serrations a plurality of differently sized balls carried by the dish, means to stop the rotation, means to register the serrations with the sockets, means to lower the dish so that the balls in the serrations fall into the sockets to engage the means disposed in the sockets, means to eject the balls from the sockets into the dish, means to raise the dish, and means to free the dish and the serrated member for rotation.

14. Selecting mechanism according to claim 13 comprising electrical controlling mechanism for the dish-rotating and dish-lowering means, an electric contact above and adjacent the lowest point of the dish, an electric circuit adapted to be completed through said contact and the dish by any ball that has failed to enter a serration, and means controlled by the completion of this circuit to prevent the actuation of the dish-lowering means and to repeat the operation of the dish-rotating means.

15. Selecting mechanism comprising a socket into which any of a plurality of balls of different sizes can be introduced, the width of the socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, electric contacts disposed at each such point adapted to be connected by a ball of conducting material introduced into the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism, a plurality of electro-magnets connected to said contacts, a plurality of indicating means and latches for locking said indicating means, one of said latches being released upon operation of one of the electro-magnets by a ball connecting a pair of contacts in the socket.

16. Selecting mechanism comprising a socket into which any of a plurality of balls of different sizes can be introduced, the width of the socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, electric contacts disposed at each such point adapted to be connected by a ball of conducting material introduced into the socket to permit actuation of one of a corresponding plurality of devices by the selecting mechanism, a plurality of electro-magnets connected to said contacts, a plurality of indicating means and latches for locking said indicating means, one of said latches being released upon operation of one of the electro-magnets by a ball connecting a pair of contacts in the socket, further indicating means and connecting means between such further indicating means and the magnet-controlled indicating means to enable each such further indicating means to be operated by manual operation of its associated indicating means after the latter has been released by its electro-magnet.

17. Selecting mechanism comprising a socket into which any of a plurality of balls of different sizes can be introduced, the width of the socket varying progressively along its length so that the differently sized balls are restrained at different points in the length of the socket, an aperture in the socket at each such point adapted to be closed by a ball introduced into the socket to permit pneumatic actuation of one of a corresponding plurality of devices by the selecting mechanism, a tube connected to each aperture, each tube being connected to a cylinder, a piston in the cylinder, an indicator connected to the piston, and a suction chamber in communication with the cylinder, the suction in said chamber becoming operative to work the piston when a ball

in the socket closes the aperture in which the tube terminates.

18. Selecting mechanism according to claim 17, comprising a further pneumatic indicator in association with each cylinder, and a pneumatic connection between each cylinder and its associated cylinder, whereby manual actuation of an indicator released when a ball renders the suction operative serves to operate the associated further indicator.

19. Selecting mechanism according to claim 3 comprising a plurality of sockets adapted to receive simultaneously a corresponding plurality of balls, each of which closes one of the several circuits controlled by each socket, common leads connecting groups of such circuits to the supply, and means for completing one at a time the connections of such groups to the supply.

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