Sept. 29, 1942. E. G. HENRY 2,297,652

SELECTIVE SWITCH AND MOUNTING THEREFOR

Filed Nov. 8, 1940 2 Sheets-Sheet 1

Fig. 1.

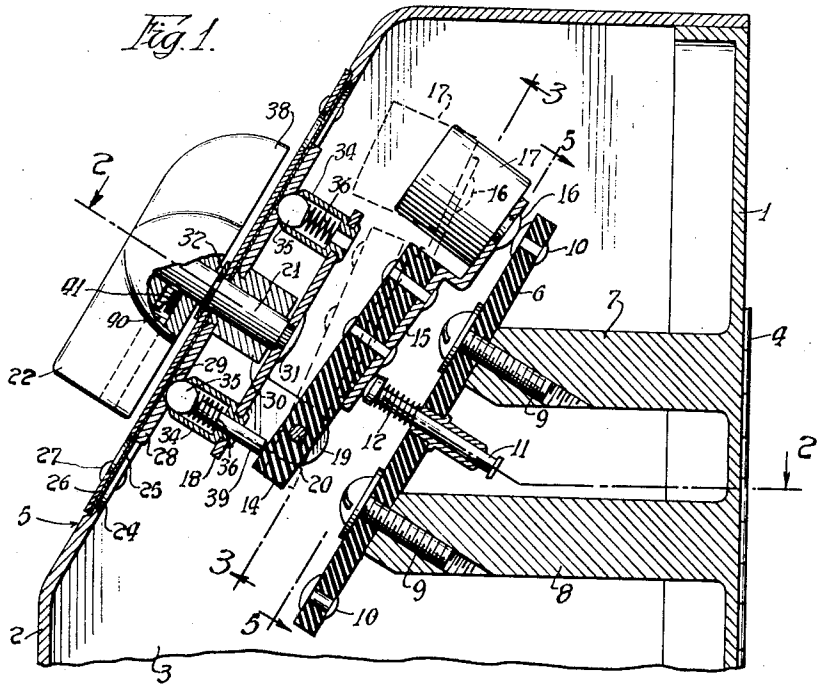



Fig. 5.

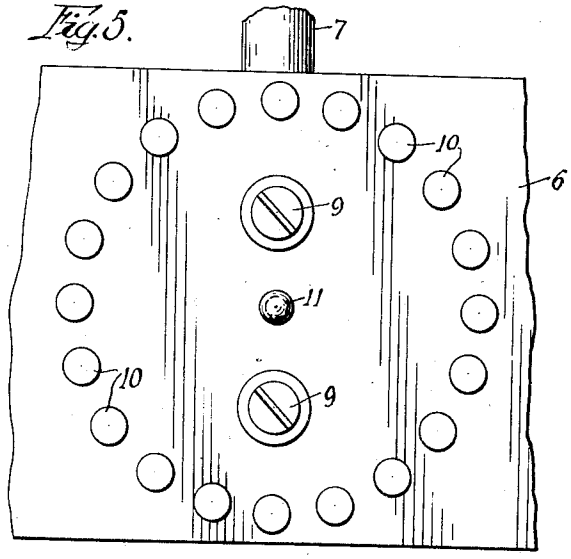
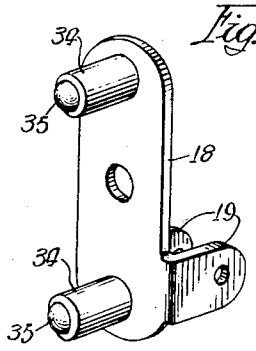



Fig. 6.




Inventor:
Earle G. Henry,

Witness:
E Camporini

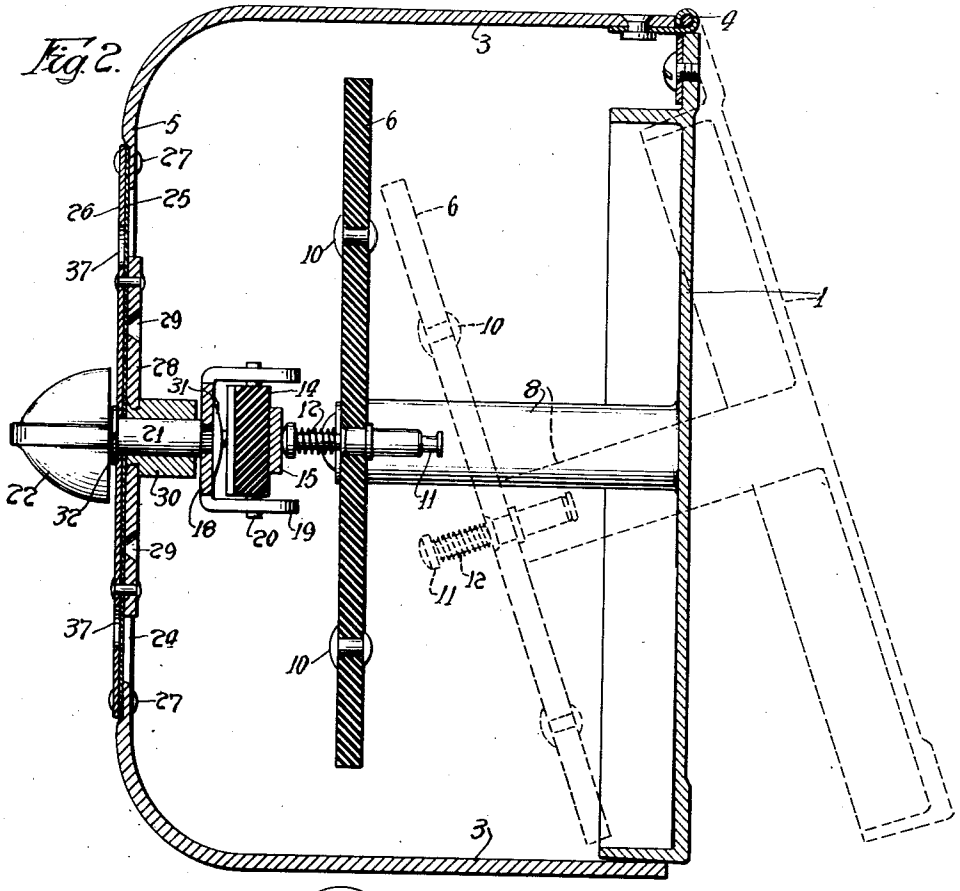
By:
Wm F Freudenreich,
Attorney.

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Fig. 2.



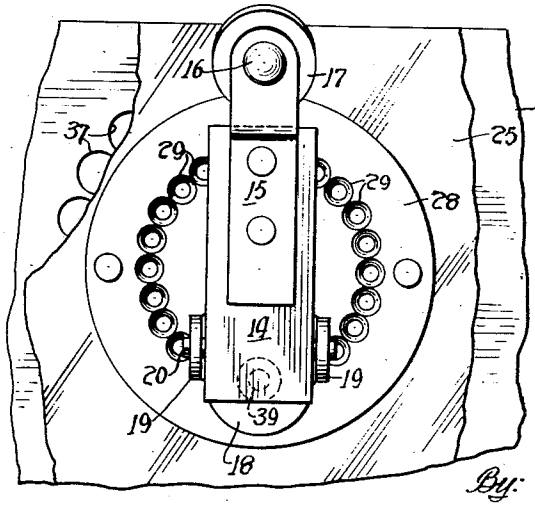




Fig. 3.

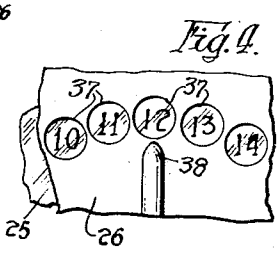



Fig. 4.




Witness:
E. Camporini

Inventor:
Earle G. Henry,
By: Wm. F. Frendenreich.
Attorney.

Patented Sept. 29, 1942

2,297,652

# UNITED STATES PATENT OFFICE

2,297,652

## SELECTIVE SWITCH AND MOUNTING THEREFOR

Earle G. Henry, Chicago, Ill., assignor to Buckley Music System, Inc., a corporation of Illinois

Application November 8, 1940, Serial No. 364,762

5 Claims. (Cl. 200—167)

It is common to employ in connection with coin-controlled musical apparatuses coin-receiving boxes that are set upon counters or fixed to the walls of a room. Where the customer is to be given the opportunity of making a selection among compositions that can be played, it is necessary to provide means whereby he can cause the desired composition to be played when he deposits a coin. This is easily accomplished by placing within the box a selective switch that is operable from the outside of the box by means with which is associated a dialing device that has positions corresponding to the individual compositions.

Because the program or list of compositions or records is usually mounted on the broad front side of the box, it is desirable that the indicating device associated with the selective switch be also located on the front side of the box. However, the front side of the box is usually made in the form of a door or, at least, is movably connected to other parts of the box so that relative movements between the same and the latter serve to open and close the box; thus making it necessary to divide the unit comprising the selective switch and its operating and indicating devices, so that the wires connected to the switch will not be drawn out upon the opening of the box. Where the switch as a whole is mounted in a fixed position within the box, the operating member extending to the exterior of a movable part of the box must be so fastened that it will automatically connect itself to and disconnect itself from the movable member of the switch upon the closing and the opening of the box. Obviously, since the indicator must at all times show to what composition or record a given position of the switch corresponds, it is necessary that the operating member and the movable switch member always be in the same relative angular positions before they can be operatively connected. Consequently, whenever an attendant opens a box to remove the coins that have been deposited therein, he must make sure that the indicating device is set just right before he again attempts to close the box. This results in wasting the time of the attendant or collector. Furthermore, in assembling the switch apparatus and a box, great difficulty is experienced in properly aligning the dialing or indicating means located on the door or the like, and the actual switch mechanism, occupying a fixed position in the box, to insure proper coordination between the same.

The object of the present invention is to produce a selective switch of the general type above mentioned, which may be operated by an element mounted on a door or other movable part of a box without being open to any of the objections above noted.

In carrying out my invention, I mount all of the stationary contacts, which are the only ones to which wires need be connected, in stationary positions within the box, while the switch arm or movable member, together with the actuator and dialing means, are all mounted on the door or other wall which is movable to open and close the box. Then, when the box is opened, the movable member of the switch is simply carried away from the stationary contacts and, when the box is closed, it is again brought into operative relation to the stationary contacts. It makes no difference what the angular position of the movable member of the switch is, because the dial always shows what record or composition will be played while the box is closed or upon the closing of the box if it be open. Therefore, all that the attendant has to do is to open and close the box without paying any attention to the selective switch. The ratchet devices associated with the movable switch arm and which make it possible to stop the arm in any working position and yieldingly hold it there, are, of coourse, mounted on the door or other part of the box that is moved to open and close the box. By mounting the ratchet in permanent fixed relation to the dial, it is a very simple matter initially to have the dial on the outside of the box register exactly with the ratchet on the inside. Then, should the dial and the ratchet be displaced slightly, in their angular positions relatively to the arc-shaped row or circle of stationary contacts, no harm is done because the face of the movable contact member may be wide enough to insure that a good electrical connection is made with a stationary contact, regardless of any slight departure from absolute registration as may occur in installing a switch in a box. I therefore make it possible to insure perfect coordination between the switch and the dialing device if only ordinary care is exercised in making an installation.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a vertical section through the upper portion of a box equipped with a switch em-

bodying the present invention, the movable member of the switch being shown in dotted lines in an intermediate position which it assumes in passing from one stationary contact to the next; Fig. 2 is a section on line 2—2 of Fig. 1; Fig. 3 is a section on line 3—3 of Fig. 1; Fig. 4 is a front view of the box showing a small fragment of the dial; Fig. 5 is a section taken on line 5—5 of Fig. 1; and Fig. 6 is a perspective view of the little turntable on which the movable switch member is mounted.

Referring to the drawings, 1 represents the rear wall of a box, which wall is adapted to remain stationary in use, while 2 is the front wall which is movable relatively to the rear wall to open and close the box. In the arrangement shown, the side walls 3 are connected to the front wall, one of the side walls being hinged to the rear wall, as indicated at 4. Therefore, when the box is opened, only the rear wall stands still. The upper part of the front wall is inclined upwardly and rearwardly, as indicated at 5 in Fig. 1, and it is upon and behind this part of the front wall that the switch mechanism is located.

As shown, there is a thin sturdy slab 6 of insulating material fixed within the box parallel with the sloping portion 5 of the front wall and at a considerable distance behind it. This slab is shown as being fastened to the front ends of a pair of sturdy arms 7 and 8 integral with and extending forwardly from the rear wall; the fastening means being screws 9.

On the front face of this slab are mounted a series of stationary contact pieces 10 arranged in an arc of any desired length, the contacts, as shown, forming a complete circle. These contacts may be in the form of rivets, the stems of which extend through the supporting slab and are then headed over on the rear side of the slab. To the rear end of each contact there is adapted to be secured an electric conductor, not shown. At the center of the circle of the stationary contacts is another contact which is in the form of a long headed stem 11 extending through and slidable in the member 6. A light spring 12, surrounding the forward end of the member 11 and underlying the head on the latter, serves to hold the head end of the contact projected a substantial distance forwardly from the member 6. This contact 11, although yieldable, is properly a stationary contact, as it forms one terminal for each of the circuits controlled by the surrounding stationary contacts. After the member 6 has once been securely fastened to its supports, it remains in that position as long as the box is in use.

The movable member of the switch is a sturdy arm 14 of insulating material having on one side a strip 15 of conducting material that projects beyond one end of the same and is there provided with a shallow dome-like boss 16 adapted to engage with one or another of the stationary contacts 10; the plate being long enough to enable it to engage with the center contact piece 11 while the part 16 engages with one of the contacts 10. On the front side of the projecting portion of the plate 15 is a weight 17. The end of the arm 14 opposite that at which the weight is located is hinged to a little turntable 18; the latter member being shown as having at one end a pair of rearwardly-projecting ears 19 between which the switch arm extends and to which it is attached by a hinge pin 20. This turntable is fixed to a shaft 21 that extends through and is mounted in a removable section of the part 5 of the front wall in axial alignment with the central contact piece 11. On the outer end of the shaft 21 is a combined finger piece and pointer 22. In the actual construction illustrated, said removable wall section forms a closure for a large opening or window 24 in the part 5. This removable section comprises a plate 26 fastened to the box wall by rivets 27 or otherwise, a thin translucent plate 25 behind the plate 26 and a metal disk 28 smaller in diameter than the window lying behind and in contact with the member 25; all three members being secured together by rivets or otherwise. The disk 28 is provided with a series of frusto-conical holes 29 extending entirely through the same and arranged in a circle about the axis of the shaft 21; the large ends of the holes facing toward the rear; and there being as many holes as there are stationary contact pieces 10. In making the assembly, the disk 28 is so placed that the holes therein will align or register with the stationary contact pieces 10. By this I mean that each radial plane intersecting one of the stationary contact pieces similarly intersects one of the holes 29. Fixed to the disk 28 and surrounding the shaft 21 is a thick sleeve-like member 30 which provides a long bearing for the shaft. The turntable 18 is behind the rear end of the sleeve 30 and is held in place by riveting over the rear end of the shaft 21, as indicated at 31. Cooperating with the shaft 21 on the outside of the box is a split ring 32 surrounding and interlocked with the shaft to keep it from being drawn rearwardly into the box.

The turntable is simply a narrow flat plate. At each end and on the front side, as distinguished from the rear side where the ears 19 are located, are two tubular projections 34 the distance between whose centers is equal to the distance between centers of two diametrically-opposed holes 29 in the ratchet disk. In each of the tubular projections or sleeves 34 is a little ball 35 somewhat larger in diameter than the diameter of the large ends of the holes 29. Also, within each tubular projection or sleeve, behind the ball therein, is a spring 36. The parts are so proportioned that whenever the balls are in registration with a pair of holes 29, the springs force them partly into such holes, thereby forming a yielding means for holding the turntable from shifting into another position. However, when the finger piece 22 is grasped and a turning pressure is applied thereto, the shaft 21 turns and carries the turntable with it; the balls riding up the inclined sides of the holes 29 and thereafter rolling over the flat rear face of the disk 28 until the next hole is reached by each ball. This construction therefore constitutes a satisfactory ratchet device to enable the operator to turn the combined finger piece and pointer step by step or continuously, and to stop it accurately in any position corresponding to a closed position of the switch. In order that the operator stop the pointer at the position that will cause the desired selection to be played, there is provided a suitable dial graduated in harmony with the locations of the stationary contacts and the holes in the ratchet disk. In the particular arrangement shown, the dial simply consists of a series of consecutive numbers painted or otherwise imposed in the form of a circle on the front face of the plate 25, and exposed through holes 37 in the outer plate 26; each of these holes, as shown in Fig. 4, being large enough to render the corresponding number visible and being lo-

cated just beyond the path of the tip or pointed end 38 of the finger piece 22. The numbers on the dial are arranged in a circle larger than the disk 28 so that they may be illuminated from a light source, not shown, within the box. Since the holes in the ratchet disk and the numbers on the dial occupy permanent, fixed positions, it is a simple matter to place them initially in registration or alignment. Then, also, it is a simple matter to mount the slab 6, carrying the stationary contacts, in its final fixed position, registered and aligned with the ratchet device and the dial.

In order to make it impossible, within the short time that a circuit remains closed by a coin-operated switch, upon depositing a coin, to cause the switch arm to make contact with a plurality of the stationary contact pieces 10, I provide means for lifting the movable contact member clear of the contact pieces 10 whenever the arm is turned from one position toward another. It is for this reason that the movable switch arm is hinged and weighted. It will be seen that the hinge axis of the arm is closer to the axis of the turntable than are the axes of the sleeve-like members 34. The hinged end of the arm is extended far enough to overlie the adjacent tubular member or sleeve 34 and, in the latter, I place a pin or plunger 39 which is long enough to rest on the ball and extend rearwardly far enough to engage with the front edge of the switch arm at the time when the latter is making contact with one of the contact pieces 10, as shown in full lines in Fig. 1. With the parts in the positions shown in full lines in Fig. 1, the turning of the finger piece causes the balls of the ratchet device to rise out of the sockets in the ratchet plate, whereby the pin 39 is caused to press rearwardly against the front edge of the switch arm and rock the arm until it assumes the position indicated in dotted lines in Fig. 1. The weighted switch arm has sufficient inertia to insure that if it is rotated rapidly to cause it to travel from one contact piece past the second and to the third, the sluggishness of the switch arm prevents it from swinging back again to the contact making position until after the second stationary contact piece has been passed, so that no circuit will be closed until the switch arm reaches the third stationary contact. By this means an operator is prevented from securing the playing of more than a single composition or record when he pays for only one.

Whenever the switch arm engages one of the stationary contacts 10, it also engages the center contact 11, thereby closing a circuit by connecting those two contacts together. The reason for making the contact 11 yielding is to insure a good electrical connection with each of the two contacts without attempting to make the parts so accurate as would be necessary if the center contact were unyielding.

After the assembly on the front wall of the box has been completed, with the exception of securing the combined finger piece and pointer to the shaft 21, the finger piece is slipped on the shaft and, after having been adjusted, while the shaft stands still so as to point properly to the number that corresponds to the position occupied at that time by the turntable, a little pit may be formed in the periphery of the outer end of the shaft by inserting a drill through a radial hole 40 in the finger piece and then screwing in a little set screw 41 until it enters this pit. Thereafter, the ratchet device and the indicator device remain permanently in registration, so that the weighted switch arm always swings downwardly into switch-closing position at a time when it is above one of the stationary contacts 10 and able to engage the same; this being on the assumption that the ratchet device has been fairly aligned or registered with the circle of stationary contacts.

It is believed that the operation of the switch has been made clear in connection with the foregoing description of the construction of the device. It may be noted, however, that in Fig. 2 the rear or stationary part of the box with which the switch is associated is shown in dotted lines in a position corresponding to a partial opening of the box; indicating the manner in which one section of the switch device simply moves away from or toward the other when the box is opened or closed. It should also be noted that the turntable 18 is supported by the balls 35 which provide antifriction bearings therefor as they ride over the face of the disk 28 while the switch arm is being shifted from one position to another; the springs 36 pressing the turntable rearwardly so as to hold it clear of the rear end of the bearing member 30.

While I have illustrated and described with particularity only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:

1. The combination with two walls of a container movable relatively to each other to open and close the container, of a selective switch including a series of stationary contacts arranged in the arc of a circle supported by one of said walls, within the container, a shaft extending through and rotatable in the other of said walls with its axis extended passing through the center of said circle, a switch arm carried upon the inner end of the shaft to cooperate with the stationary contacts when the container is closed, a switch actuator on the outer end of said shaft, and graduations on the exterior of the container distributed in an arc about the shaft and corresponding in number and disposition to said stationary contacts, and a ratchet device mounted on the last-mentioned wall between that wall and the switch arm to raise said arm above the plane of said stationary contacts when the arm is turned from one working position toward another and hold it raised until it reaches the new position.

2. The combination with two walls of a container movable relatively to each other to open and close the container, of a selective switch including a series of stationary contacts arranged in a circle supported by one of said walls, within the container, a shaft extending through and rotatable in the other of said walls with its axis extended passing through the center of said circle, a stationary plate on the inner side of the last-mentioned wall containing a series of holes arranged in a circle having its center at the axis of the shaft, a turntable on the inner end of said shaft, spring-pressed balls disposed diametrically opposite each other on the turntable in position to engage in any pair of diametrically-opposed holes in said series or to ride on said plate in the spaces between the holes, a switch arm movably mounted on said turntable to cooperate with the stationary contacts when the container is closed, a switch

actuator on the outer end of said shaft, and graduations on the exterior of the container distributed in a circle about the shaft and corresponding in number and disposition to said stationary contacts.

3. The combination with two walls of a container movable relatively to each other to open and close the container and one of which walls has at the top an upwardly and inwardly-inclined section, of a selective switch including a series of stationary contacts arranged in the arc of a circle supported by the other of said walls in a plane parallel to said inclined wall section, a massive switch arm mounted upon the inner side of the inclined wall section for rotary movements about an axis at right angles to said plane and registering with the center of said circle and for rocking movements at right angles to said plane for cooperation with the stationary contacts when the container is closed, means to rock said arm away from the plane of said contacts while the arm is travelling from one contact to the next, and means on the outer side of the inclined wall section to turn said arm and at all times indicate its position relatively to said stationary contacts.

4. The combination with two walls of a container movable relatively to each other to open and close the container and one of which walls has an upwardly and inwardly-inclined section, of a selective switch having stationary contacts including a series arranged in a circle supported by the other of said walls in a plane parallel to said inclined wall section and a contact at the center of the circle, a massive switch arm mounted upon the inner side of the inclined wall section for rotary movements about an axis at right angles to said plane and registering with the center of said circle and for rocking movements at right angles to said plane about an axis near one end thereof for connecting the central contact with any one of the other stationary contacts when the container is closed, means on the outer side of the inclined wall section to turn said arm and at all times indicate its position relatively to said stationary contacts, and means on the inner side of said inclined wall section to rock said arm away from said plane whenever it begins to move from one contact of said series to another and hold it thus until the arm arrives at another contact in the series.

5. The combination with two wall members of a container movable relatively to each other to open and close the container, of a series of stationary contacts arranged in a circle and supported by the first of said members near the top of the latter, a contact located at the center of said circle, a shaft extending through and rotatable in the second of said members with its axis extended passing through the center of said circle, a switch arm carried upon the end of the shaft on one side of said second member to connect said central contact with any one of said series of stationary contacts when said members are in working positions relative to each other and to stand clear of the plane of the latter contacts in other relative positions of said member, a switch actuator on the other end of said shaft, graduations on the other side of said second member, said graduations being arranged in a circle about the shaft and corresponding in number and distribution to the contacts of the aforesaid series, and a pointer on the shaft cooperating with said graduations.

EARLE G. HENRY.