June 25, 1940. W. O. McCANN ET AL 2,205,572

SCATTERING DEVICE

Filed May 5, 1938 3 Sheets-Sheet 1

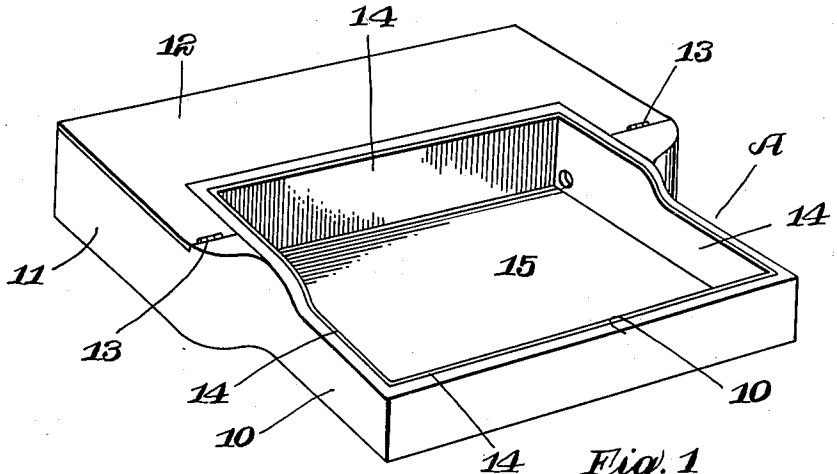



Fig. 1

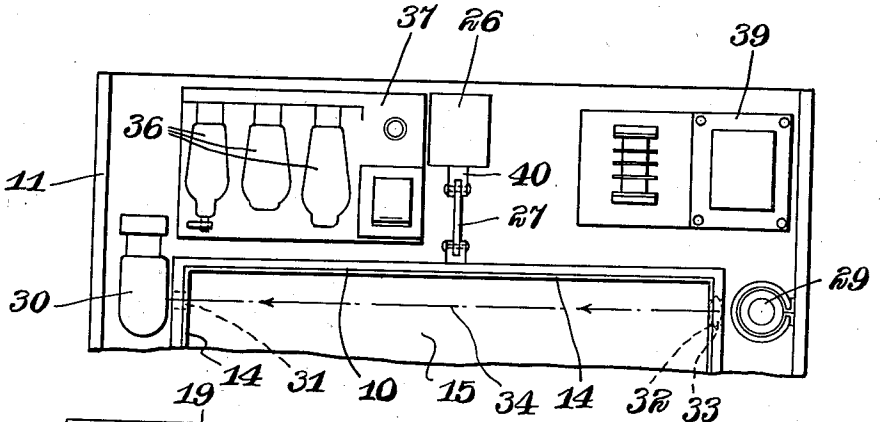



Fig. 2

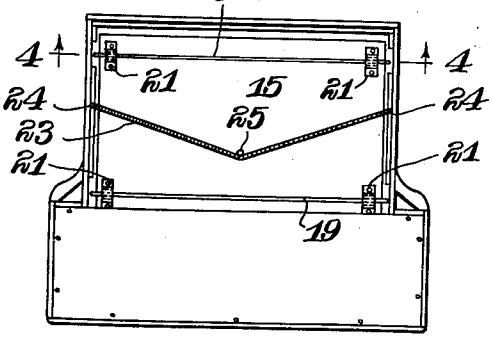



Fig. 3

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SCATTERING DEVICE

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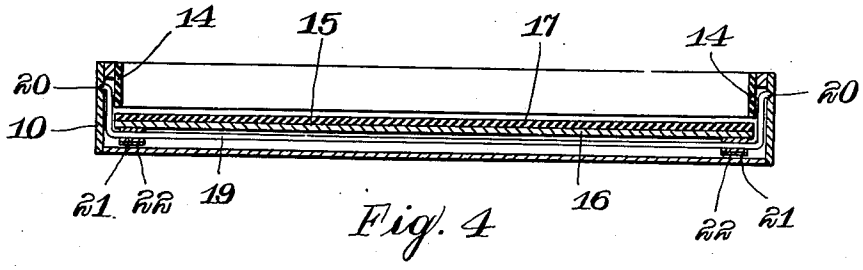



Fig. 4

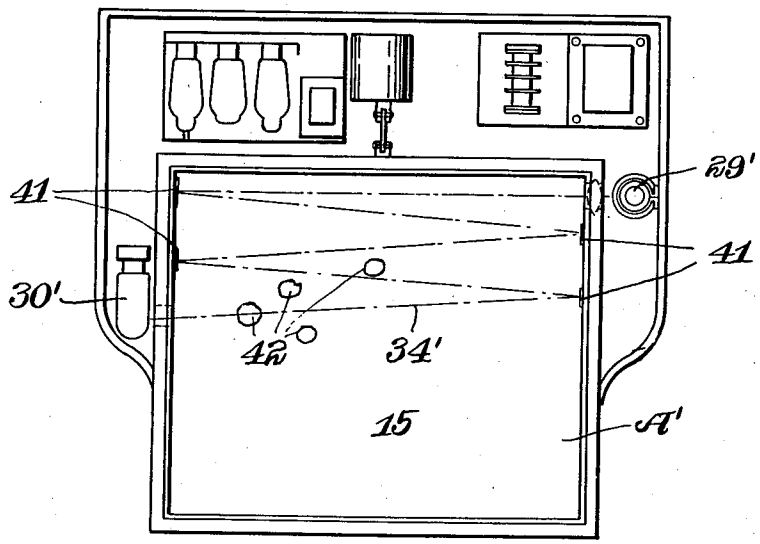



Fig. 5

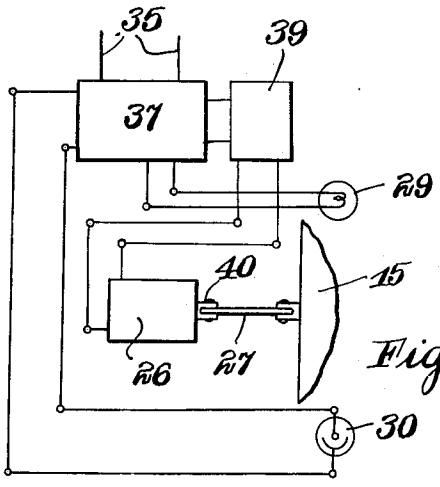



Fig. 6

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SCATTERING DEVICE

Filed May 5, 1938 3 Sheets-Sheet 3

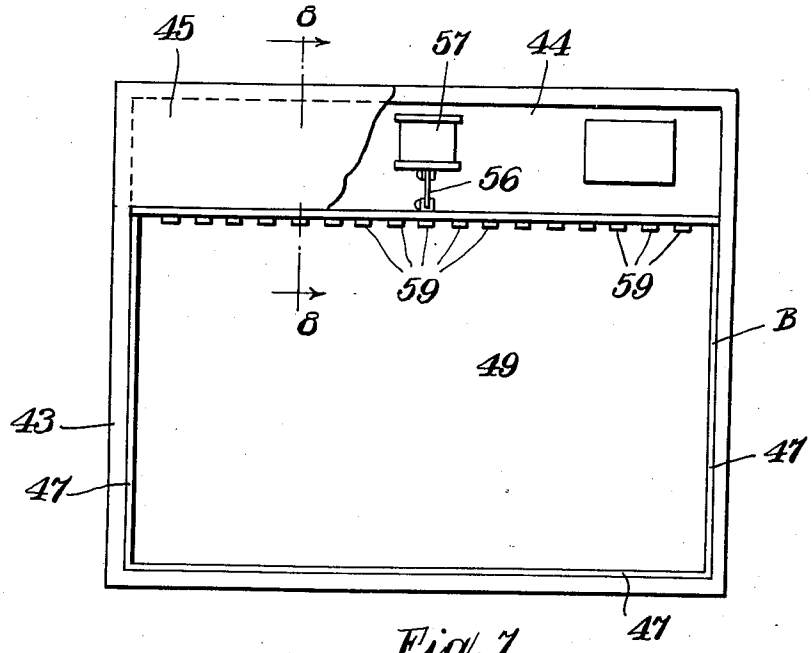



Fig. 7

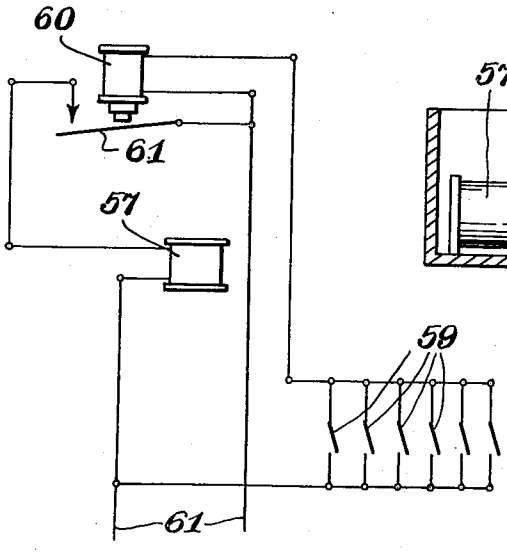



Fig. 9

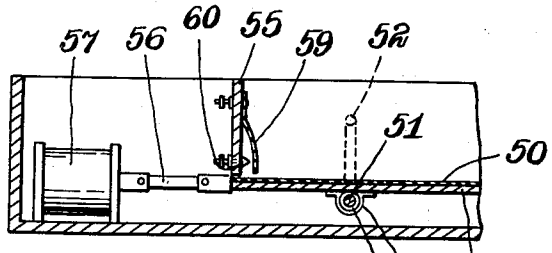



Fig. 8

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Patented June 25, 1940 2,205,572

# UNITED STATES PATENT OFFICE

2,205,572

## SCATTERING DEVICE

William O. McCann and Thomas G. Weldon,
St. Paul, Minn.

Application May 5, 1938, Serial No. 206,163

10 Claims. (Cl. 273—145)

Our invention relates to an improvement in scattering devices wherein it is desired to provide a means actuated by the sudden movement of objects over the surface of a board to move the board in such a way as to cause the objects to scatter out on the board.

Our device can be used for many purposes without changing the invention. For example, when a series of articles are to be placed upon a table to be counted, it is essential that the objects do not remain in a pile, for in this position they cannot be readily counted. With our device, the movement of the objects onto the table sets off a mechanism to move the table in such a way as to shake the pile causing the same to be shaken down into a single layer.

It is the object of our invention to provide a device comprising a receptacle having means therein for automatically moving articles dropped upon the table. For example, if beans or peas were dropped upon the table, a mechanism would be set into motion imparting a sudden jerk to the member supporting the peas or beans which will cause the same to rotate, so that all sides of the same may be quickly inspected, and so that imperfect peas or beans may be discarded. With our simple mechanism, all sides of the articles thrown or dropped upon the surface of the receptacle may be quickly inspected enabling the eye to catch the position of any imperfect article.

It is a further feature of our invention that our device may be utilized in the formation of a game board or the like upon which articles such as dice are to be thrown. It will be seen that when articles of this nature are thrown upon the game board, a mechanism will be set up to move the movable bottom of the game board, or to move the game board itself with a quick jerk which will cause all of the dice or other playing elements to be projected into a single plane, and to cause rotation of these dice out of the position into which they are dropped. Thus it may be seen that a player attempting to win a game by placing dice in a certain position upon the board, will find that the dice will roll out of the position in which they have been placed.

It is a further feature of our invention to provide a construction in which a supporting board or the like is movably supported and is moved by throwing articles upon the table with a quick motion. These articles may be picked up from the table without actuating the table moving mechanism. Thus articles to be inspected may be projected onto the board, and the board will be moved with a quick jerk. The hands may be used to pick up these articles without setting the board in motion.

It is a feature of our invention that the board moving mechanism may be moved through action of one or a series of articles quickly intercepting a ray of light between a source of light supply and a photo-electric cell. Articles quickly intercepting this beam as in the case of articles being thrown forcibly into the path of the beam will cause action of the photo-electric cell. The control of this photo-electric cell, however, is so arranged that when the beam is intercepted slowly, the resistance of the photo-electric cell increases more gradually, and the relay controlled thereby is not actuated thereby causing the board to remain stationary.

This action may also be accomplished in a modified form of our device, in which the objects thrown or dropped onto the table will cause the contact to be closed to actuate the table. This contact arrangement may be constructed more inexpensively than the table employing the photo-electric cell arrangement, but actual force against the contact is necessary in order to close the circuit to move the table.

These and other objects and novel features of our invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of our specification:

Figure 1 is a perspective view of a board or table upon which articles may be thrown and the table actuated.

Figure 2 is a top plan view of the operating mechanism for the table, the cover normally enclosing the same having been removed.

Figure 3 is a bottom plan view of the supporting mechanism for the table shown in Figures 1 and 2, a portion of the bottom covering member having been removed to disclose the construction of the supporting means.

Figure 4 is a sectional view through the table on the line 4—4 of Figure 3, illustrating the table supporting mechanism.

Figure 5 is a slightly modified form of construction illustrating a reflector arrangement for the photo-electric cell actuating means.

Figure 6 is a general diagram of the arrangement of the elements for actuating the table.

Figure 7 is a top plan view of a modified form of table.

Figure 8 is a cross-sectional view through the table illustrated in Figure 7, the section being indicated by the line 8—8 of Figure 7.

Figure 9 is a wiring diagram of the table illustrated in Figures 7 and 8 of the drawings.

The table A illustrated in Figures 1 through 4 of the drawings comprises a rectangular frame 10 having an enclosure 11 formed integral therewith. A cover 12 pivoted at 13 enables the operating mechanism of the device to be normally concealed. Within the rectangular frame 10 a lining wall 14 may enclose the sides of the frame. This lining wall 14 may be formed of soft resilient material if desired, such as sponge rubber, to cause articles projected against the same to be resiliently urged outwardly toward the center of the table.

The movable board or table onto which articles are to be dropped or thrown is indicated in the drawings by the numeral 15. This board or table 15 is preferably formed with a stiff or relatively inflexible board 16 covered with a softer covering material such as 17. This covering 17 may be formed of cloth or of some material such as sponge rubber or a combination of these elements, and may be smooth on top or may be corrugated or otherwise formed on the top surface so as to better engage the elements thrown thereupon and to cause rotation of the same when the board is moved.

The board 15 is shown being supported by U-shaped brackets 19, the ends 20 of which pivotally engage the sides of the frame 10. The brackets 19 are pivotally secured at the point 20 somewhat above the level of the table 15 and project downwardly beneath the table and across the same. Bearings 21 encircle the brackets 19 and are held in place by straps containing brackets 22. The brackets are freely rotatable in the bearings 21.

As shown in Figure 3 of the drawings, the board or table 15 is supported by two or more of the brackets 19, and the table is normally held in one extreme position toward the end of the frame 10 opposite the mechanism enclosure 11. A spring 23 is secured at 24 to opposite sides of the frame 10 and extends about a pin 25 in the table 15 and resiliently holds the table 15 normally in retracted position.

Within the enclosure 11 we provide a solenoid 26 which is pivotally connected by means of link 27 to an end of a board or table 15. When the solenoid 26 is energized, the table 15 is pulled toward the enclosure 11, the brackets 19 swinging about the pivoted ends 20. When the current to the solenoid 26 is released, the table 15 assumes its normal position, being retracted by the spring 23.

Within the enclosure 11 and on opposite sides of the frame 10 near one end of the same, we provide a bulb 29 on one side of the frame 10 and a photo-electric cell 30 on the opposite side of the frame. Openings 31 and 32 are formed in the frame 10 and through the liner 14 so that a beam of light may be projected from the bulb or illuminating means 29 to the photo-electric cell 30. A lens 33 or a suitable reflector may be used to condense the beam of light which is indicated at 34.

In the operation of our device, the current is turned on from a suitable source of supply indicated by wires 35 in Figure 5 of the drawings. This current heats the tubes 36 of the combined amplifier and relay indicated in general at 37. A beam of light from the illuminating means 29 normally provides a low resistance through the photo-electric cell 30. This low resistance will not cause actuation of the relay, nor will the relay be actuated when the beam 37 is intercepted by a relatively slow movement, but will only be actuated by a sudden increase in resistance through the tubes caused by a sudden interception of the beam 34. When such a sudden increase in resistance occurs, however, the relay mechanism 37 is actuated, creating an impulse through the solenoid 26. The current from the relay and amplifying mechanism 37 preferably passes through a direct current power pack 39 which is used to furnish direct current to the solenoid to prevent undue hum and noise in the operation of the same. The actuation of the solenoid 26 causes inward movement of the armature 40 of the same, acting to pull the table or board 15 with a jerk toward the end of the frame to which the enclosure 11 is attached. At the end of the impulse to the solenoid 26, the spring 23 returns the table or board 15 to its normal position.

In other words, from the foregoing description, it will be understood that the photo-electric cell 30 creates an impulse in the combined relay and impulse amplifier which is used to amplify the electrical impulse from the photo-electric cell, and to operate a self-contained relay. In a case of a slow interception of the beam 34, an impulse is not created in the circuit, and the table or board 15 will not be moved.

In Figure 5 of the drawings, we illustrate a device identical to that illustrated in Figures 1 through 4 of the drawings, with the exception that the photo-electric cell 39' is located at a point not directly opposite the position of the light source 29'. In this construction, a series of reflecting means 41 are provided so that the beam 34' is reflected back and forth over any desired area of the table or board 15. Obviously, this construction is identical in operation with the construction previously described, with the exception that in the construction of Figure 5, the scattering device A' is actuated by articles such as 42, placed anywhere in the beam 34', which covers a much greater area of the table 15.

In the construction illustrated in Figures 7, 8, and 9, a scattering device B is shown as comprising a rectangular frame 43, having embodied in one end thereof, a receptacle 44 or enclosure normally covered by means of a cover 45 which may be removed by any suitable means. The walls of the frame 10 may be lined with a resilient lining 47. A board or table 49 covered if desired with a resilient or fabric covering 50 is mounted similarly to the table or board 15, and a bracket 51 is shown pivoted at 52 and supported in bearings 53 attached to the table by straps 54. A partition wall 55 extends into close proximity with the table 49 and separates the table portion of the board from the receptacle 44.

The board 49 is actuated by a link 56 pivotally connected to a solenoid 57. Upon the creation of an impulse to the solenoid 57, a board 49 is moved toward the solenoid with a sudden jerky movement. As in the case of the foregoing construction, the table 49 extends into the front wall of the frame 43, so that when drawn toward the solenoid 57 when the circuit is closed to the same, the end of the board will not be exposed.

A series of contact strips 59 are secured to the partition wall 55 and are normally resiliently supported in spaced relationship from a cooperating contact point 60. However, when an article strikes one of the resilient contact strips 59, a circuit is closed from the supply wires 61, illustrated in Figure 9, through one of the contact strips 59 to the relay 60. The relay 60 moves an armature 61 to close an obvious circuit to the

solenoid 57. The solenoid 57 is actuated thereby, and moves the table 49 toward the solenoid 57, thus imparting a jerk or sudden pull to this table. The table 49 is normally held in retracted position by some means such as the spring 23, illustrated in Figure 3 of the drawings.

It may be seen that with my construction a sudden movement of articles onto a table will cause movement of the table, thus acting to scatter the articles on the table, and to cause the same to rotate. Obviously, this device is suited for various purposes, and may be used equally well for scattering objects to be inspected, or for moving game elements, such as dice thrown upon the table.

In accordance with the patent statutes, we have described the principles of construction and operation of our scattering device; and while we have endeavored to set forth the best embodiments thereof, we desire to have it understood that this is only illustrative of a means of carrying out our invention, and that obvious changes may be made within the scope of the following claims, without departing from the spirit of our invention.

We claim:

1. A scattering device comprising a movably mounted table upon which articles may be thrown, momentarily operating means for jerking said table with a sudden jerk to move articles thereon with respect to said table, and means actuated by the movement of articles onto said table to actuate said table jerking means.

2. A scattering device comprising a movably mounted board, means for moving said board, means for normally retaining said board in one position, and means actuated by articles moving on said board to operate said table moving means.

3. An apparatus for moving articles on a board comprising a table, momentarily operating means for jerking articles on said table with a sudden jerk to move articles thereon with respect to said table, and means actuated by the projection of articles onto said table to actuate said article jerking means.

4. A scattering device comprising a movable table, solenoid means for actuating said table, a normally open circuit from a suitable current supply to said solenoid, and means actuated by movement of articles on said table to close said circuit to actuate said solenoid.

5. A scattering device comprising a movable table normally in fixed position, means for moving said table out of said fixed position and back into said fixed position with a sudden jerk to move articles thereon with respect to said table, a beam of light projected across said table, and means actuated by the interception of said beam of light to actuate said table moving means.

6. A scattering device comprising a movably mounted table, a solenoid for operating said table to move the same, a beam of light extending over said table, and means controlled by said beam of light and operable upon the interception thereof to actuate the solenoid to move said table.

7. A scattering device comprising a table, means for movably mounting said table, a beam of light projected across said table, means reflecting said beam of light to create a plurality of paths across said table, and means actuated by the interception of said beam of light to move said table.

8. A scattering device comprising a movably mounted table, means for moving said table, means resiliently retaining said table in one extreme position, means projecting a beam of light over said table, means sensitive to said beam of light and operated only by a sudden interception of said beam of light to actuate said table moving means.

9. A scattering device comprising a table, a series of contacts mounted adjacent said table for operation by articles thrown upon said table, means for moving said table, and means actuated by the closing of any of said contacts to actuate said table moving means.

10. A scattering device comprising a table, a series of contacts connected in parallel, a solenoid actuated by the closing of any of said contacts, and means connecting said solenoid to said table to move said table upon actuation of said solenoid.

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