Nov. 16, 1943. M. RAGAN 2,334,440

DISPLAY DEVICE

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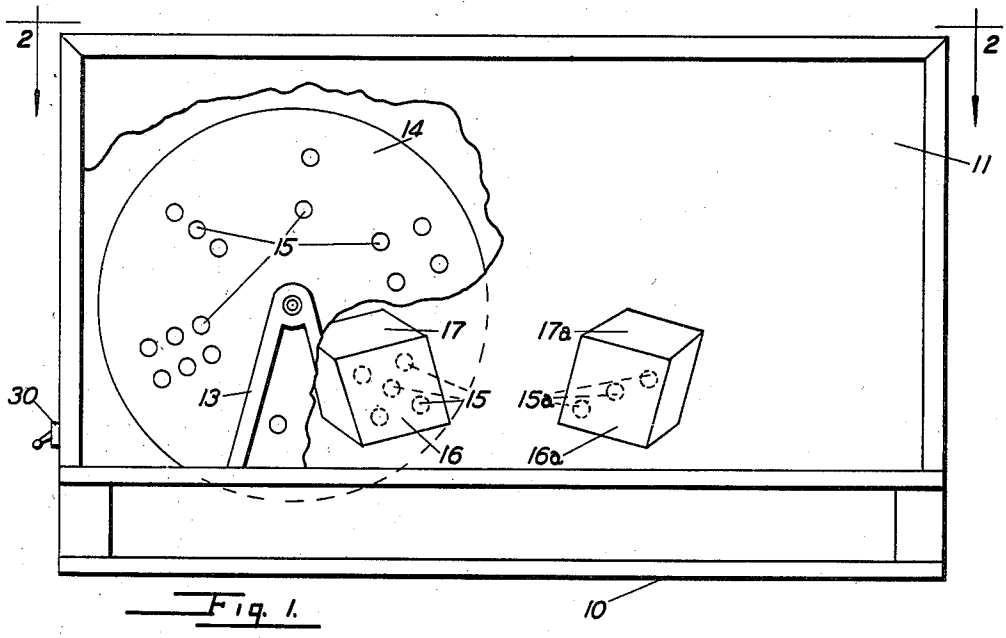
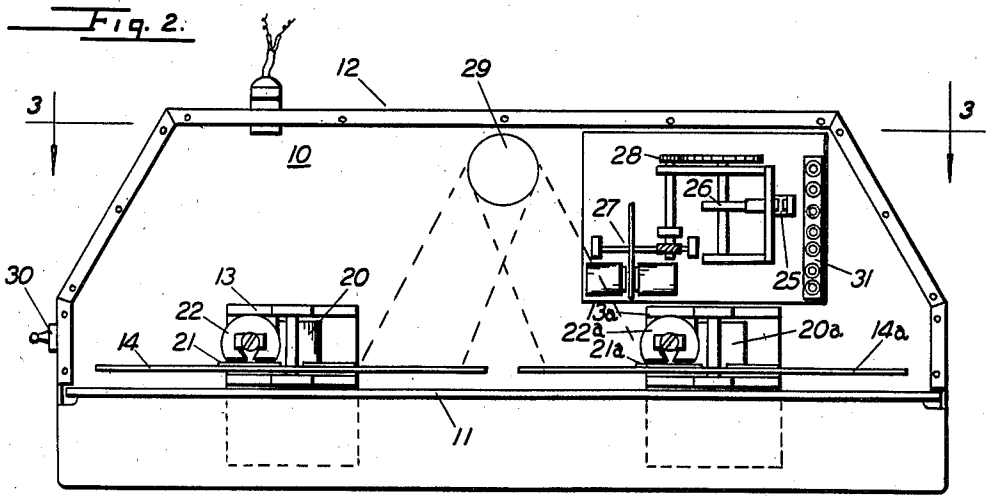


Fig. 1.

Fig. 2.



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Fig. 3.

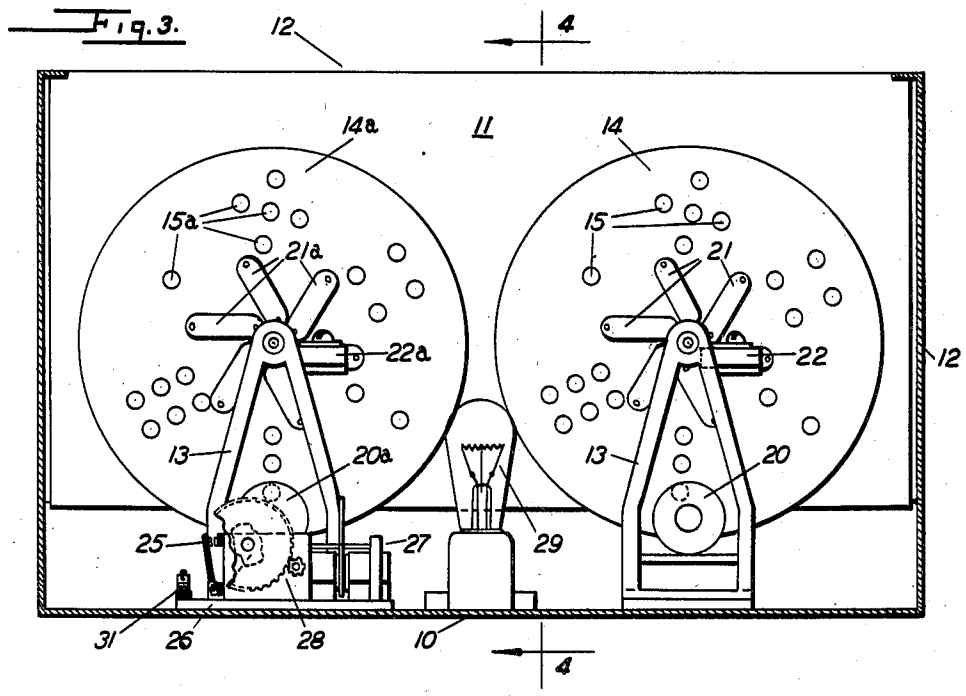


Fig. 4.

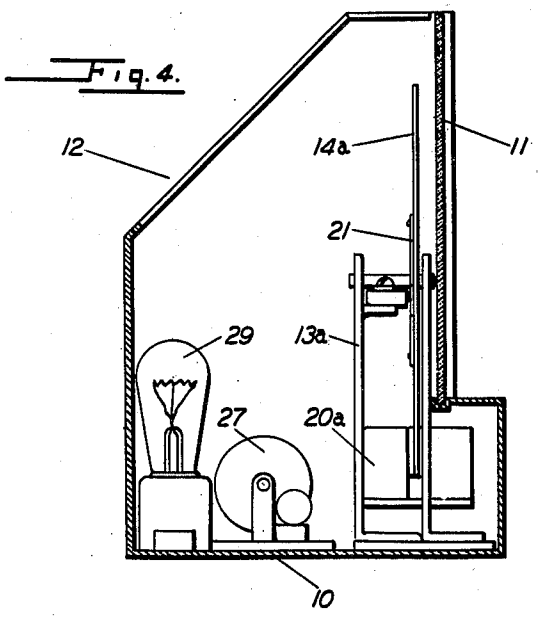
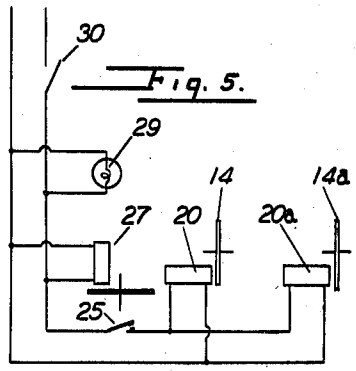


Fig. 5.



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2,334,440

DISPLAY DEVICE

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Application March 26, 1941, Serial No. 385,270

5 Claims. (Cl. 273—142)

My invention relates generally to display devices, and more particularly to animated display devices.

While there are many signs now in operation which use animation or motion to attract the attention of the public, these signs usually have a relatively short cycle of animation, and hence after a person has observed the sign for two or three complete cycles he finds no further interest in it and looks away. If a relatively long cycle is used a person may not have time to observe a complete cycle, and hence any beneficial effect of the animation is lost.

It is therefore a major object of my invention to provide a display device which has a relatively short cycle of animation, with each cycle different from the preceding ones so that repetition is reduced to a minimum.

It is another object of my invention to provide chance means to determine the result of each cycle so that a continuing interest is created in the display.

It is a further object of my invention to provide such a display device which is entirely automatic in its operation and which may be made sufficiently compact for use in stores, restaurants, and similar establishments.

These and other objects of my invention will become apparent from the following description of a preferred form thereof, and from the drawings illustrating that form, in which

Fig. 1 is a front elevational view of the device with a portion of the display front broken away to indicate the position of the rotatable member;

Fig. 2 is a plan view of the device with the cover removed, and showing the relative position of the various parts;

Fig. 3 is a rear elevational view taken at 3—3 in Fig. 2;

Fig. 4 is a cross-sectional view taken at 4—4 in Fig. 3; and

Fig. 5 is a schematic wiring diagram of my preferred form.

In general appearance, my invention somewhat resembles the customary signs now often used in stores, shops, etc., and has a display front on which any suitable advertising message may be placed. To attract and retain attention, however, changeable indicia are visible through a portion of this front, and a partial design is applied to the display front so that the changeable indicia cooperate therewith to form a unitary design. In the preferred form which will be described, the display front may have a message such as "Don't gamble! Drink blank beer!," together with two cubes below the message. One of the faces of each cube is merely outlined, and through the area within that outline, indicia are visible which correspond to the markings on the faces of dice, and which cooperate with the cubes to simulate dice.

Referring now to the drawings, and particularly to Figs. 1–4 thereof, the numeral 10 indicates a base having an upstanding forward wall 11 which serves as a display front. The various operating members of the device are assembled on the base 10, and the whole may be enclosed in a housing 12 which protects it from dirt, etc., and which braces and helps support the display front 11. Immediately behind the display front 11 I place an upright 13 which supports a rotatable member 14 having indicia 15 thereon; and in my preferred form, this member 14 takes the form of a disc which is parallel to the plane of the display front.

The major portion of the display front 11 is relatively opaque, but to render the indicia 15 visible, I provide a transparent or translucent area 16 which is preferably surrounded by a partial design 17 that cooperates with the indicia to form a completed unitary design. In the embodiment shown, the partial design 17 represents a die having as one of its faces the translucent area 16, and within this area the indicia 15 may be seen as the spots of the various faces of the die. A very convenient method of forming the indicia 15 on the disc 14 is to provide groups of perforations in the latter, and I may then pass light through these onto the area 16 which acts as a projection screen. In the form of my device which is illustrated, I have shown two dice 17 and 17*a* on the display front 11, each provided with its own rotatable member 14 and 14*a* respectively, but it will be seen that three or more dice may be shown if this is desirable.

Since there are six different indicia on the customary die, each of the discs 14 and 14*a* is provided with six groups of perforations, each group corresponding to the markings on one of the die faces. By using a separate disc for each die shown on the display front, I am able to keep the size of the individual disc within limits where it may be enclosed in a housing in keeping with the size of the dice. If a single disc were used for both sets of indicia, thirty-six pairs of indicia would have to be disposed around the periphery of the disc, thus requiring a much larger disc; and if three dice were to be shown instead of two, the size of the disc needed would be completely out of proportion to the size of

the dice. By using one disc for each individual die, however, the device may be kept within a moderate space, and in addition, the interest of the observer is increased.

Various means may be used to rotate the discs **14** and **14***a*, but I prefer to use individual motors to drive each disc, and one very simple and satisfactory method of accomplishing this is to use the discs as the rotors of shaded pole motors. The principles of operation and the construction of such motors are well known in the art, and they may briefly be described as having a disc of a material such as aluminum suspended for rotation between the poles of a specially designed electro-magnet which has a portion of each pole surrounded by a short-circuited winding. When the electro-magnet is energized with alternating current, the disc is caused to rotate, and a motor is thus provided which does not require a commutator or slip-rings with their attendant troubles and disadvantages. Such motors do not develop a large torque, but this is not required in the use I make of them; and their simplicity and trouble-free operation make them ideally suited for this application.

In my preferred form, I place a specially designed coil **20** in the lower portion of the upright **13** so that the magnetic flux from the coil passes through the disc **14** in a direction perpendicular to the plane of the latter. The coil **20** is placed near the outside of the disc **14** where its flux will not pass through the perforations **15**, and when the coil is energized, the disc begins to rotate. When the coil is deenergized, the forces causing rotation cease, the disc coasts to a stop, and one of the indicia may be observed on the area **16**. A similar coil **20***a* is provided for the disc **14***a*, and in this way each disc is individually driven by its own motor.

The possibility is quite remote that either of the discs **14** or **14***a* will come to a stop with one of its indicia **15** properly centered with respect to the area **16** unless some auxiliary means is provided for this purpose. In my preferred embodiment, this auxiliary means comprises a number of ferro-magnetic members **21** attached to the disc **14** near its center and in a generally radial position, and co-acting with these members **21** is a magnet **22** supported by the upright **13**. The members **21** and the magnet **22** are positioned so that when any one of the members is immediately adjacent the poles of the magnet, one of the indicia **15** is properly centered with respect to the area **16**. It will thus be seen that by placing the members **21** and the magnet **22** near the center of the disc **14**, there will always be a ferromagnetic member near the magnet for the latter to attract, and by providing a sufficiently strong attraction between the two, some one indicia will always come to rest properly centered. A similar arrangement is provided to insure the centering of indicia **15***a* of the disc **14***a*.

In addition to centering the indicia **15**, the members **21** and magnets **22** and **22***a* act somewhat as brakes to slow the rotation of the discs **14** and **14***a* when the coils **20** and **20***a* are no longer energized. By setting one magnet so that it has a smaller air gap between it and its associated ferromagnetic members than the other magnet has, one disc will come to rest before the other and thereby add interest to the device. The results will be more satisfactory if the discs **14** and **14***a* are of a substantially non-magnetic material, but the centering effect will still be produced if the discs, but not the members **21**, are far enough away from the magnets so that the latter will exert no appreciable effect on the discs, and in the claims when I speak of a non-magnetic disc I mean to include one having a non-magnetic effect, whatever it be made of.

To energize the coils **20** and **20***a* periodically, I preferably insert electrical contacts **25** in series with them, and provide a cam **26** to open and close the contacts. The cam **26** is operated by a motor **27** which is preferably of the shaded pole variety, and which is connected through suitable reduction means **28** to the cam. The motor **27** and cam **26** run continuously, and by suitable adjustment they may be adapted to control the discs **14** and **14***a* so that the latter rotate for a few seconds, coast to a stop, and remain stationary a few seconds before starting the cycle again. The motor **27** is thus energized continuously while the display device is in operation, and a light **29**, adapted to project the indicia **15** onto the area **16** is likewise continuously energized. A switch **30** may be supplied to control the operation of the device, and a terminal block **31** may be provided for convenience in wiring, but neither of these latter members is necessary for the operation of my device.

In use, an observer sees a sign such as "Don't gamble! Drink blank Beer!" with two dice on the sign. As he watches, the spots on the dice, which are formed in light, begin to move, and after they have been moving a few seconds, they slow down and finally come to rest. This cycle is repeated as long as the machine is in operation, but the average observer, instead of quickly tiring of it, continues to watch it to see if the indicia visible at the end of any given cycle are the same as any previous cycle. However, because of the chance means used in the device, the possibility of this occurring within the memory of the average person is extremely remote. Most persons are fascinated by such a device, and will watch it for a much longer period than they would the usual animated sign; and as a result, when the observer leaves the sign he will carry away a memory of "Blank beer" which will be much more lasting than if a non-animated, or a conventional sign were used.

While the observer has been seeing these results, the motor **27** has been continuously energized and the contacts **25** have been regularly making and breaking the circuit of the coils **20** and **20***a*. When the coils were energized, the discs **14** and **14***a* started to rotate and continued to do so as long as the coils were energized; but when the contacts **25** opened the circuit and deenergized the coils **20** and **20***a*, the discs coasted to a stop. While the possibility of the discs' stopping at any given indicia was purely a matter of chance, the magnets **22** and **22***a* cooperated with the members **21** so that the centering of that particular indicia with respect to the viewing portion **16** of the display front **11** was assured. Meanwhile, the light **29** has been projecting the image of these indicia on the display front **11**, and after the particular indicia have remained stationary for a few seconds, the cycle repeats and the contacts **25** close to energize the coils **20** and **20***a* so that the discs **14** and **14***a* will start to rotate.

While I have shown and described a preferred form of my invention which is fully capable of achieving the objects and advantages set forth, it is to be understood that variations may be

made, and I claim all such variations which come within the scope of the appended claims.

I claim as my invention:

1. A display device of the character described which includes: a display front having a plurality of screen areas; a plurality of non-magnetic metallic discs each having a plurality of groups of apertures constituting indicia thereon rotatably mounted behind said display front and in a plane generally parallel thereto; shaded coils adjacent each of said discs to form therewith shaded pole motors; a plurality of ferromagnetic members attached to said discs, each member being associated in predetermined angular relation with a respective one of said groups; a magnet adjacent each of said discs and adapted to attract any one of said ferromagnetic members whereby an undetermined one of said indicia is held in a predetermined position when said disc is at rest; a motor; a cam driven by said motor; electrical contacts operated by said cam to energize said coils periodically whereby said discs are periodically rotated; and a light positioned behind said display front adapted to project said indicia onto said screen areas.

2. A display device of the character described which includes: a display front having a plurality of screen areas; a plurality of non-magnetic discs each having a plurality of groups of apertures constituting indicia thereon rotatably mounted behind said display front and in a plane generally parallel thereto; a motor associated with each of said discs and adapted to rotate each disc independently of the remainder; a plurality of ferromagnetic members attached to each of said discs, each member being associated in predetermined angular relation with a respective one of said groups; a magnet adjacent each of said discs and adapted to attract any one of said ferromagnetic members whereby an undetermined one of said indicia is held in a predetermined position when said disc is at rest; a motor; means driven by said motor to energize said first motors periodically, whereby said discs are periodically rotated; and a light positioned behind said display front adapted to project said indicia onto said screen areas.

3. A display device of the character described which includes: a display front having a screen area; a non-magnetic disc having a plurality of groups of apertures constituting indicia thereon rotatably mounted behind said display front and in a plane generally parallel thereto; a motor adapted to rotate said disc; a plurality of ferromagnetic members attached to said disc, each member being associated in predetermined angular relation with a respective one of said groups; a magnet adjacent said disc and adapted to attract any one of said ferromagnetic members whereby an undetermined one of said indicia is held in a predetermined position when said disc is at rest; a second motor; means driven by said second motor to energize said first motor periodically, whereby said disc is periodically rotated; and a light positioned behind said display front adapted to project said indicia onto said screen area.

4. A display device of the character described, which includes: a display front having a screen area thereon, a lamp positioned rearwardly of said front, an electric motor including a rotor disc formed of non-magnetic material interposed between said lamp and said screen area to intercept light cast toward said screen area and provided with a plurality of apertures forming groups in accordance with the arrangement of dots upon the various sides of a die to permit the passage of beams of light therethrough to impinge upon said screen-area simulating the markings of a die, a continuously operated motor, an electric circuit supplying both of said motors, means actuated by said second named motor to interrupt at selected intervals the portion of said circuit supplying current to said first named motor, strips of ferromagnetic material secured to said disc at intervals corresponding to the placement of said groups of apertures about the disc and in predetermined angular relation with respect thereto, and a magnet positioned adjacent the rotary path of said strips and arranged to bring the disc to a stop upon the breaking of said circuit whereby an undetermined one of said groups is held in a predetermined position when said disc is at rest.

5. A display device of the character described, which includes: a display front having a screen area; a non-magnetic disc having a plurality of groups of indicia thereon; a motor adapted to rotate said disc; a plurality of ferromagnetic members attached to said disc, each member being associated in a predetermined angular relation with a respective one of said groups; a magnet adjacent said disc and adapted to attract any one of said ferromagnetic members whereby an undetermined one of said groups is held in a predetermined position when said disc is at rest; means adapted to energize said motor periodically, whereby said disc is periodically rotated; and a light positioned behind said display front adapted to project said indicia onto said screen area.

MIKE RAGAN.