Aug. 14, 1962 W. APATOFF ETAL 3,048,935

DISPLAY DEVICE

Filed June 12, 1959 2 Sheets-Sheet 1

FIG. 1

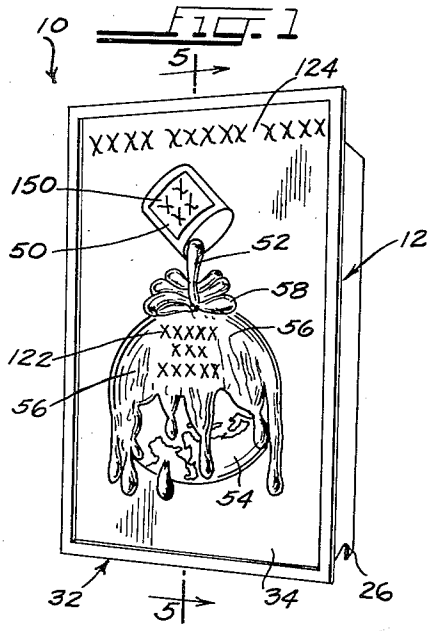


FIG. 2

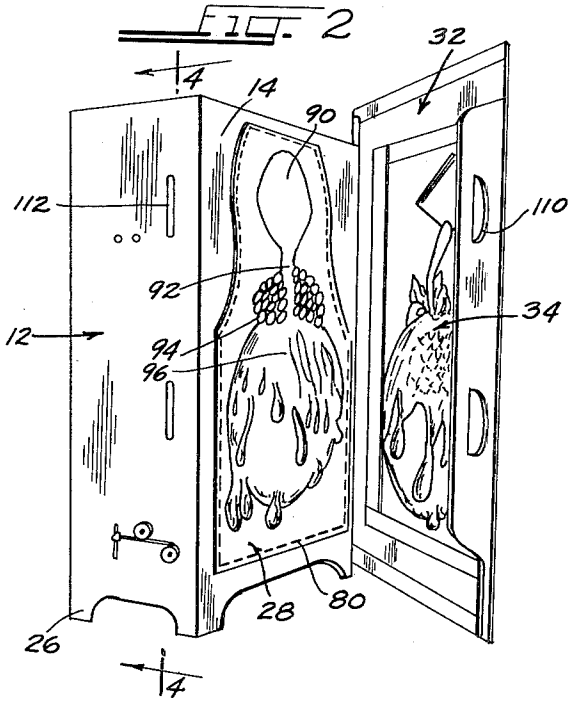


FIG. 4

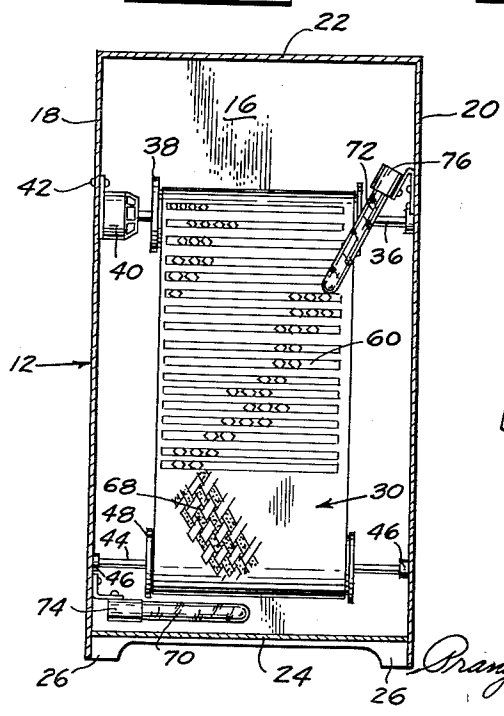
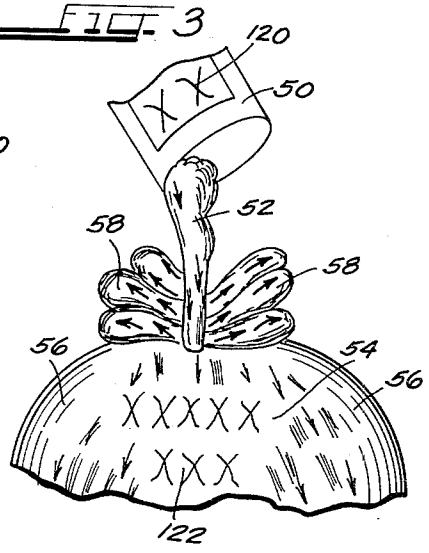


FIG. 3



INVENTORS:
WILLIAM APATOFF
ERNEST C. GLASSER
BY
Brangley, Baird, Clayton, Miller & Vogel
ATTYS.

Aug. 14, 1962 W. APATOFF ETAL 3,048,935

DISPLAY DEVICE

Filed June 12, 1959 2 Sheets-Sheet 2

FIG. 5

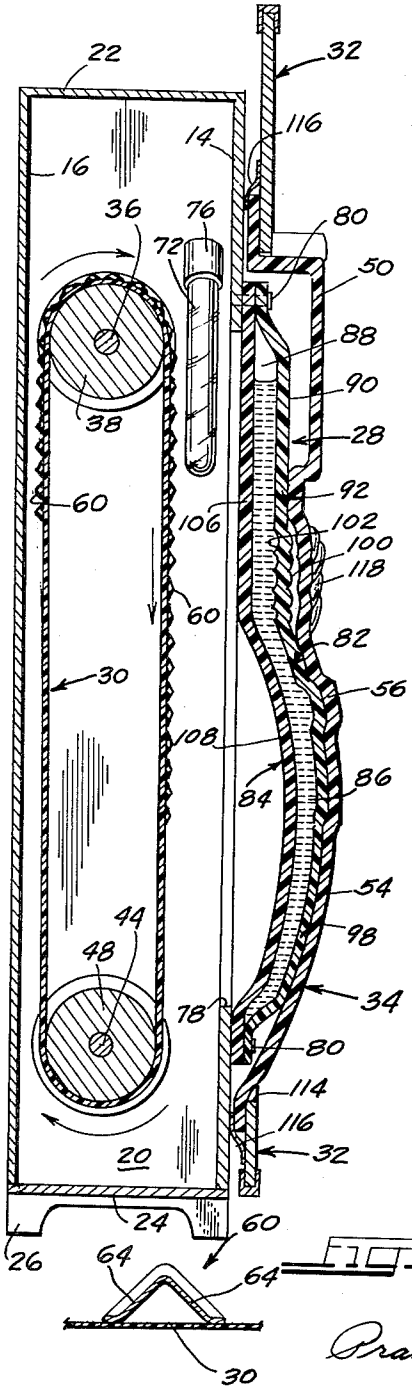


FIG. 6

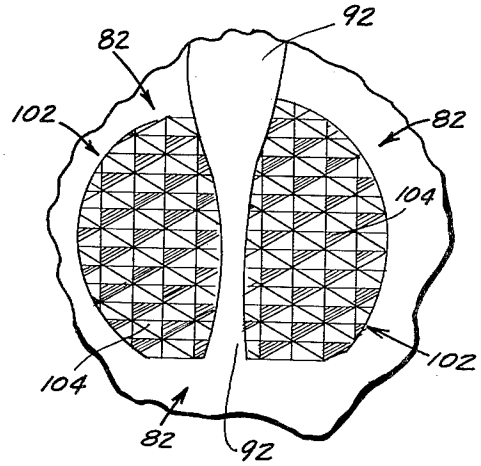


FIG. 7

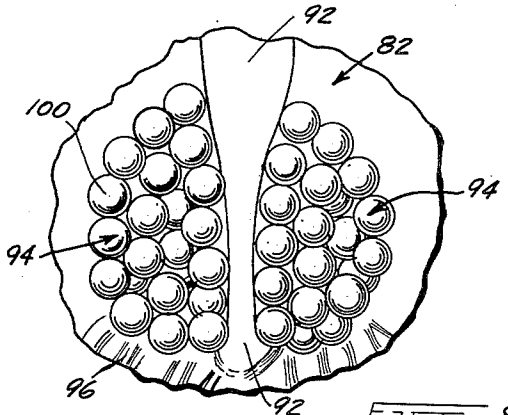


FIG. 8

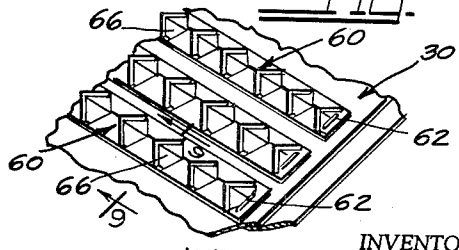


FIG. 9

INVENTORS:
WILLIAM APATOFF
ERNEST C. GLASSER
BY

Brangley, Baird, Clayton, Miller & Vogel
Attys.

United States Patent Office

3,048,935

Patented Aug. 14, 1962

3,048,935

DISPLAY DEVICE

William Apatoff and Ernest C. Glasser, both of 6344 N. Western Ave., Chicago, Ill.

Filed June 12, 1959, Ser. No. 819,891

7 Claims. (Cl. 40—106.53)

This invention relates to illuminated and animated display devices and particularly to display devices useful to provide the illusion of falling or flowing materials such as liquids and the like and further to give the illusion of rippling and splashing.

In order for a point of sales display to be most effective in gaining and holding the attention of a prospective purchaser, it is desirable that the display be animated and illuminated. A greater impact is achieved if the display is associated with some feature or characteristic of the product being advertised. Often the products being advertised are liquids such as liquid refreshments, paint, oil and the like. Animated display devices for use with such products have heretofore been complicated and difficult to build and maintain if they gave a proper illusion of flow of liquid. These problems are increased if in addition to flow it is desired to show rippling and splashing of the liquid as well.

Accordingly, it is an important object of the present invention to provide an improved animated and illuminated display including therein means to give the effect of moving fluid material.

Another object of the invention is to provide an improved display of the type set forth in which rippling and splashing of the liquid can be readily achieved with relatively inexpensive devices.

Still another object of the invention is to provide in a display device of the type set forth an illusion of splashing in a direction opposite to the general direction of flow whereby to enhance the attractiveness and distinctiveness of the display device.

Yet another object of the invention is to provide in a display device of the type set forth a more vivid illusion of sparkling, rippling liquids in combination with the illusion of splashing in a direction opposite to the general flow of the liquid.

These and other objects and advantages of the invention will be better understood from the following description when take in conjunction with the accompanying drawings. In the drawings wherein like reference numerals have been utilized to designate like parts throughout:

FIGURE 1 is a perspective view of an illuminated and animated display device made in accordance with and embodying the principles of the present invention;

FIGURE 2 is a perspective view with the front cover opened of the display device of FIGURE 1;

FIGURE 3 is an enlarged fragmentary view illustrating the action that can be achieved by means of the display device of this invention;

FIGURE 4 is a view in vertical section through the display device of FIGURE 2 substantially as seen in the direction of the arrows along the line 4—4 thereof and showing particularly the mounting and drive for the continuously moving light reflecting surface and the lighting thereof;

FIGURE 5 is a view in vertical section on an enlarged scale through the display device of FIGURE 1 substantially as seen in the direction of the arrows along the line 5—5 thereof;

FIGURE 6 is an enlarged fragmentary view of the rear side of the faceted sheet forming a part of the display device and showing particularly the diamond shaped facets therein;

FIGURE 7 is an enlarged view similar to FIGURE 6 showing the front surface of the faceted sheet;

FIGURE 8 is a perspective view on an enlarged scale of a portion of the light reflecting surface of the present invention; and

FIGURE 9 is a view on an enlarged scale in vertical section through the reflecting surface of FIGURE 8 substantially as seen in the direction of the arrows along the line 9—9 thereof.

Referring now to FIGURE 1 of the drawings there is show a display device generally designated by the numeral 10 made in accordance with and embodying the principles of the present invention. It is to be understood that no claim is made to the specific shape of the device illustrated but only to the structure and operation thereof. The display device 10 includes a housing generally designated by the numeral 12 including a front wall 14, a rear wall 16, a pair of side walls 18 and 20, a top wall 22 and a bottom wall 24. Four depending legs 26 are also provided. The housing 12 may be made of plastic, hardboard, cardboard or the like provided that the finished housing 12 has the necessary rigidity to support the parts mounted therein.

There is provided in an opening in the front wall 14 a lens member generally designated by the numeral 28 which in cooperation with a moving belt 30 provides the desired illuminated and animated display effect. There also is mounted on the housing 12 in a pivotal manner a front cover generally designated by the numeral 32 which has mounted thereon a cover piece or face piece generally designated by the numeral 34.

In order to provide the desired illuminated and animated effect it is necessary to mount and move the belt 30 in a substantially continuous manner. To this end an upper shaft 36 is provided having a pulley 38 thereon which supports the belt 30. The shaft 36 is connected to a motor 40 mounted on the side wall 18 as at 42. Disposed in the housing 12 below the shaft 36 is a idler shaft 44 journalled in a pair of bearings 46 on the side walls of the housing 12. Mounted on the shaft 44 is a pulley 48 which supports the other end of the belt 30.

The belt 30 is preferably formed continuous as may be best seen in FIGURE 5 and is formed of flexible material so that it can bend around the pulleys 38 and 48. To this end the belt 30 may be formed of some suitable material such as rubber or a flexible synthetic organic plastic, a preferred material being a condensation product of ethylene glycol and terephthalic acid sold under the trade name "Mylar."

By a proper construction and operation of the belt 30, the lens member 28 and the face piece 34, a particularly desirable illusion of pouring can be obtained. More specifically, the replica of a can generally designated by the numeral 50 can be made to appear to be pouring a stream of liquid 52 upon a surface 54, the stream 52 appearing to flow downwardly as viewed in FIGURE 3 and in a laminar manner along the portions 56 and simultaneously appearing to be splashing upwardly at the points 58. It further is possible to make the pouring action appear to stop and thereafter begin again at a predetermined time.

In order to achieve the above described visual effect, a suitable light reflecting surface must be provided on the belt 30. The reflecting surface should be highly reflective at certain portions when the pouring action is to be effected and is preferably also black or substantially non-light reflecting along other portions thereof to represent and correspond to the portions of the action when the pouring stops and immediately before the pouring begins.

To this end a certain portion of the belt 30 has affixed thereto a plurality of transversely extending reflector mem-

bers generally designated by the numeral 60 and best illustrated in FIGURES 8 and 9 of the drawings. The reflector members 60 are elongated and extend transversely across the width of the belt 30. This construction makes it possible for the belt to pass around the pulleys 38 and 48 although the reflector members 60 themselves are substantially inflexible, the spacing between adjacent reflector members 60 permitting bending around the pulleys. The reflector members 60 are attached to the belt 30 in any suitable manner such as by gluing, molding or the like, staples 62 having been illustrated as the fastening means in FIGURE 8 of the drawings.

By reference to FIGURE 9 it will be seen that the reflector member 60 is generally triangular in cross section and includes a pair of angularly disposed walls 64. The walls 64 are recessed inwardly as at 66 to provide diamond shaped recesses therealong. A plurality of the recessed portions 66 is provided along the length of each of the reflector members 60. As a result of this formation the reflector members 60 are highly reflective and may be considered to be faceted in nature whereby to give intensive reflection. It is to be understood other shapes and configurations both of the reflector members 60 and the recessed portions 66 defining the lens facets may be used.

If desired, approximately one-half of the length of the belt 30 is provided with the transversely extending reflector members 60. The remaining portion of the belt 30 may be free of the reflector members 60. Preferably the portion of the belt 30 not carrying the reflector members 60 is painted black whereby to give the illusion of no movement thereof when that portion of the belt is before the lens 28. The reflector members 60 and the associated portions of the belt 30 may be painted some color such as red, yellow or the like whereby to give the illusion of flowing colored liquid on the face of the display 10. Preferably also the surface of the belt 30 is provided with an embossed design as at 68 whereby to give increased friction across the drive pulley 38.

It is necessary to illuminate the surface of the belt 30 disposed toward the lens member 28. To this end a pair of lights 70 and 72 has been provided. The lights 70 and 72 have the usual sockets 74 and 76 which are mounted on the side walls 18 and 20, respectively. It is to be understood that the lights 70 and 72 as well as the motor 40 are provided with suitable electrical connections (not shown) whereby to cause appropriate and suitable operation thereof.

Referring now particularly to FIGURES 2 and 5 to 7 of the drawings, the construction of the lens member 28 will be described in detail. As has been explained above, the front wall 14 of the housing 12 has formed therein an opening 78 which is covered by the lens member 28, the shape of the opening 78 being best illustrated in FIGURE 2 by the line of fasteners 80, which may be staples, that fasten the lens member 28 to the front wall 14 near the edges of the opening 78. The lens member 28 itself includes a pair of plastic sheets 82 and 84, the plastic sheet 82 being disposed outwardly and the plastic sheet 84 inwardly. The two plastic sheets have substantially the same outline, that outline being the one shown in FIGURE 2, and are joined adjacent the outer edges to provide a sealed container. The space between the sheets 82 and 84 is filled with a suitable liquid 86 which together with the plastic sheets 82 and 84 form a water filled lens member 28. Other suitable liquids besides water can be used much as for example alcohol, alcohol-water mixtures, glycerol, mineral oil and the like or other suitable light transmitting fluid. Preferably a small open space 88 is provided at the upper end of the lens member 28 to accommodate expansion of the liquid 86.

The plastic sheets 82 and 84 are preferably formed of a transparent plastic material which is inert to the liquid 86. When using distilled water and the like a suitable plastic is a butyrate plastic. A suitable thickness of the

sheets 82 and 84 is 50 gauge although thinner or thicker sheets may be used depending on the size and strength requirements.

The outer sheet 82 is preferably shaped generally as illustrated in FIGURE 2 of the drawings including outwardly extending portion 90 corresponding to the container 50, an outwardly extending portion 92 corresponding to the flow stream 52, an area 94 corresponding to the upward splashing area 58 and a series of laminar flow areas 96 corresponding to the downward flow over the member 54. There also is a lower area 98 on the sheet 82 which corresponds to the uncovered portion of the surface 54. Further details of the portion of the sheet at the upward splash area 58 can be best seen in FIGURE 7 of the drawings. In FIGURE 7 it will be seen that the stream area 92 narrows toward the lower end thereof and merges with the laminar areas 96. Disposed on each side of the stream area 92 are part-spherical molded shapes 100 corresponding to the splash area 58. The molded shapes 100 are divided into two parts and are disposed on both sides of the stream area 92 and have an area substantially equivalent to that of the splash area 58.

The rear surface of the sheet 82 is generally contoured to conform with the front surface thereof. In the rear surface as at 102 in FIGURE 5 facets are molded in that area corresponding to the molded part-spherical shapes 100 which correspond to the splash areas 58. FIGURE 6 of the drawings is an enlarged view of the rear side of the plastic sheet 82 in the area 102. It will be seen that a plurality of juxtaposed diamond shaped facets 104 has been provided at this area, the facets being divided into two areas on either side of the flow stream 92 and generally corresponding to the rear portion of the part-spherical molded shapes 100. The facets 104 form a part of a plastic lens which in cooperation with the suitably spaced belt 30 serve to reverse the apparent direction of the movement of the belt 30 whereby to cause the movement in the faceted area 102 to be reversed to that in the adjacent area such as the flow areas 52 and 56. As a result when the direction of flow in the areas 52 and 56 appears to be downwardly, the reversing lens action of the facets 104 serves to reverse the apparent direction of flow in the splash area 58 whereby to give the illusion that liquid is flowing upwardly and outwardly in the splash areas 58.

The lens facets 104 are shaped so that when taken with the other parts of the lens member 28 they provide a lens structure having a focal length approximately equal to the distance to the light reflecting members 60. Instead of being diamond shaped, the facets 104 may assume other shapes such as part-spherical, triangular and the like.

The rear plastic sheet 84 is formed substantially straight at the upper end thereof as at 106 but is curved outwardly as at 108 to conform generally to the outwardly curved shape of the sheet 82 as viewed in FIGURE 5. Preferably the mean distance between the sheets 82 and 84 is approximately ¼ inch. This gives the desired lens effect in the finished display.

The front cover 32 is hinged to the right hnd side of the housing 12 as viewed in FIGURE 2. The left hand side of the front cover 32 is provided with a latch 110 which in conjunction with a keeper 112 on the housing 12 serves to hold the cover piece 34 over the lens member 28 when the front cover 32 is in the closed position. The front cover 32 has a generally rectangular opening 114 therein which is filled by the cover piece 34. Any suitable means such as pressure sensitive tape 116 may be used to mount the cover piece 34 on the front cover 32. The cover piece 34 is generally contoured to conform with the outwardly facing surface of the sheet 82 of the lens member 28. In addition there is molded therein the representation of the container 50 which, as may be best seen in FIGURE 5, extends outwardly beyond the front surface of the member 32. In the splash area 58 a plurality of tear drop

shaped portions 118 are molded, these portions extending upwardly and being larger at the outer ends than at the ends adjacent to the pour stream 52. These portions 118 overlie the faceted area of the lens member 28 which gives the reversing lens action. Below the splash area 58 are the laminar flow areas 56 and further down are areas corresponding to the uncovered body 54.

Preferably the cover piece 34 is formed of some synthetic organic plastic material which can be readily shaped and molded to the desired form and can receive advertising matter thereon. An example of a preferred plastic material is a vinyl plastic. There also can be provided on the cover piece 34 suitable advertising indicia such as at 120 on the container 50, as at 122 immediately beneath the pouring action, and as at 124 on the cover piece 34 above the container 50.

The operation of the display device 10 will now be described in detail. The parts are first assembled as illustrated in FIGURES 1 and 5. The motor 40 is geared down such that it requires approximately eighteen seconds for a point on the belt 30 to complete its travel around the pulleys 38 and 48. Further assuming that the reflector members 60 occupy one-half of the length of the belt 30, the operation will be as follows. The motor 40 is energized whereby to cause the belt 30 to move in the direction indicated by the arrows in FIGURE 5. The lighrts 70 and 72 are illuminated whereby to cause the light to be reflected from the belt 30. Assuming that the parts begin with the blackened area of the belt behind the lens member 28, there will be no illusion of motion and substantially no display until the first reflector member 60 passes downwardly at a point opposite the upper end of the pour stream area 52. As soon as the first reflector member 60 comes in alignment with the upper end of the pour stream area 52, that area will immediately be illuminated and animated. If the reflector member 60 and the associated portion of the belt 30 are colored red, it will appear as though red paint is beginning to pour from the container 50. Continued movement of the reflector member 60 downwardly will make it appear as though the pour stream is falling upon the object 54. When the reflector members 60 are behind the splash area 58, the reversing action of the lens facets 104 will give the illusion that the liquid is moving upwardly or splashing. This is accomplished by the combination of the lens facets 104, the part-spherical areas 100 and the tear drop shaped portions 118. Continued movement of the reflector member 60 downwardly will give the illusion of the liquid flowing in the laminar manner along the areas 56 over the object 54.

As long as the reflector members 60 are disposed behind the transparent and translucent portions of the lens member 28 and the cover piece 34, a continuous pouring action will be achieved. Furthermore, the faceted character of the reflector members 60 will give a continued agitation to the pouring whereby to give the illusion that the liquid is rippling and flowing. Similarly the lens facets 104 will give the illusion that the liquid is continually splashing upwardly in the areas 58.

After nine seconds of pouring action the last of the reflector members 60 passes the upper end of the pour channel 52, the following black surface of the belt 30 will give the illusion that pouring from the container 50 has ended. Gradually the last of the reflector members 60 will pass downwardly across the splash area 58 and the laminar flow area 56 and finally beyond the lower end of the lens member 28. This will give the illusion of a stoppage of the pouring action. Substantially immediately thereafter pouring will again begin from the downwardly positioned end of the container 50 whereby to recreate the illusion of pouring and splashing.

It is to be understood that various other arrangements of the faceted reflector members 60 can be made on the belt 30. For example ⅔ of the surface of the belt 30 may be covered by the reflector members 60. In such a case it would appear that the pouring action occurs for twelve seconds and that there was a six second interval before beginning of the next pouring action. Other colors may be used to color the belt 30. A plurality of different colors could be used on the same belt to give the illusion of several simultaneous colors being poured upon the object 54. Other coloring effects can be achieved by using colored light sources or by coloring the plastic of the lens members 28 or the cover piece 34. It further is desirable in many instances to make certain portions of the cover piece 34 translucent but not transparent whereby to give illumination thereto but not to have any action associated therewith. In yet other instances it may be desirable to render portions of the cover piece 34 opaque whereby to have no light thereon.

Although one preferred form of the invention has been shown in the drawings for purposes of illustration, it is to be understood that various changes and modifications can be made therein without departing from the spirit and scope of the invention. Accordingly, the invention is to be limited only as set forth in the following claims.

We claim:

1. A display device for creating the illusion of the pouring of a fluid in flow stream areas over an object simultaneously accompanied by the splashing of the fluid in splash areas on the object, comprising a housing, a lens member fixedly mounted on said housing and having flow stream areas and splash areas in a position to be seen by a viewer, a reflector member mounted in said housing behind said lens member to be seen therethrough in said flow stream areas and said splash areas, means for shining light upon said reflector member to reflect the light therefrom through said lens member in said flow stream areas and said splash areas, means for moving said reflector member continuously in the same direction past said lens member, and lens facets on said lens member in said splash areas for reversing the apparent direction movement of said reflector member therepast as compared to the direction of movement of said reflector member past said flow stream areas, whereby upon movement of said reflector member continuously past said lens member to create the illusion simultaneously of one direction of flow continuously in said flow stream areas and of a reversed direction of flow continuously in said splash areas.

2. A display device for creating the illusion of the pouring of a fluid in flow stream areas over an object simultaneously accompanied by the splashing of the fluid in splash areas on the object, comprising a housing, a lens member fixedly mounted on said housing and having flow stream areas and splash areas in a position to be seen by a viewer, a reflector member mounted in said housing behind said lens member to be seen therethrough in said flow stream areas and said splash areas, means for shining light upon said reflector member to reflect the light therefrom through said lens member in said flow stream areas and said splash areas, means for moving said reflector member continuously in the same direction past said lens member, and lens facets on said lens member in said splash areas and closely spaced part-spherical portions on said lens member in alignment with said lens facets for reversing the apparent direction of movement of said reflector member therepast as compared to the direction of movement of said reflector member past said flow stream areas, whereby upon movement of said reflector member continuously past said lens member to create the illusion simultaneously of one direction of flow continuously downwardly in said flow stream areas and of a reversed direction of flow continuously upwardly and outwardly in said splash areas.

3. A display device for creating the illusion of the pouring of a fluid in flow stream areas over an object simultaneously accompanied by the splashing of the fluid in splash areas on the object, comprising a housing, a plastic lens member fixedly mounted on said housing and having on a portion thereof flow stream areas and splash

areas in a position to be seen by a viewer, a reflector member mounted in said housing behind said lens member to be seen therethrough in said flow stream areas and said splash areas, means for shining light upon said reflector member to reflect the light therefrom through said lens member in said flow stream areas and said splash areas, means for moving said reflector member continuously in the same direction past said lens member, and lens facets on said lens member on the rear side thereof in said splash areas and closely spaced part-spherical portions on the front face of said lens member in said splash areas for reversing the apparent direction of movement of said reflector member therepast as compared to the direction of movement of said reflector member past said flow stream areas, whereby upon movement of said reflector member continuously past said lens member to create the illusion simultaneously of one direction of flow continuously downwardly in said flow stream areas and of a reversed direction of flow continuously upwardly and outwardly in said splash areas.

4. A display device for creating the illusion of the pouring of a fluid in flow stream areas over an object simultaneously accompanied by the splashing of the fluid in splash areas on the object, comprising a housing, a lens member fixedly mounted on said housing and having flow stream areas and splash areas in a position to be seen by a viewer, a reflector member mounted in said housing behind said lens member to be seen therethrough in said flow stream areas and said splash areas, means for shining light upon said reflector member to reflect the light therefrom through said lens member in said flow stream areas and said splash areas, means for moving said reflector member continuously downwardly in the same direction past said lens member, and reversing lens facets on said lens member in said splash areas for reversing the apparent direction of movement of said reflector member downwardly therepast in said splash areas while the downward direction of movement of said reflector member past said flow stream areas remains unchanged, whereby upon movement of said reflector member continuously downwardly past said lens member to create the illusion simultaneously of a downward direction of flow continuously in said flow stream areas and of an upward direction of flow continuously in said splash areas.

5. A display device for creating the illustion of the pouring of a fluid in flow stream areas over an object simultaneously accompanied by the splashing of the fluid in splash areas on the object, comprising a housing, a lens member fixedly mounted on said housing and having flow stream areas and splash areas in a position to be seen by a viewer, a pair of support pulleys mounted within said housing behind the said lens member, a continuous and endless belt mounted on said pulleys behind said lens member and having a first area of the surface thereof light reflecting and having the remaining area of the surface thereof substantially non-light-reflecting, motor means mounted in said housing for driving one of said pulleys to move said belt to cause said light reflecting area to move continuously in the same direction past said lens member, means for shining light upon the surface of said belt disposed toward said lens member to reflect the light therefrom through said lens member in said flow stream areas and said splash areas, and lens facets on said lens member in said splash areas for reversing the apparent direction of movement of said light reflecting areas of said belt therepast as compared to the direction of movement of said light reflecting areas of said belt past said flow stream areas, whereby upon movement of said reflecting member continuously past said lens member alternately to display no pouring of fluid and alternately to create the illusion simultaneously of one direction of flow continuously in said flow stream areas and of a reversed direction of flow continuously in said splash areas for a predetermined period of time.

6. A display device for creating the illusion of the pouring of a fluid in flow stream areas over an object simultaneously accompanied by the splashing of the fluid in splash areas on the object, comprising a housing, a lens member fixedly mounted on said housing and having flow stream areas and splash areas in a position to be seen by a viewer, a front cover mounted on said housing and overlying said lens member and including light transmitting areas corresponding to said flow stream areas and said splash areas, and including non-light-transmitting areas defining said light transmitting areas, a pair of support pulleys mounted within said housing behind the said lens member, a continuous and endless belt mounted on said pulleys behind said lens member and having a first area of the surface thereof light reflecting and having the remaining area of the surface thereof substantially non-light-reflecting, motor means mounted in said housing for driving one of said pulleys to move said belt to cause light reflecting area to move continuously in the same direction past said lens member, means for shining light upon the surface of said belt disposed toward said lens member to reflect the light therefrom through said lens member in said flow stream areas of said splash areas, and lens facets on said lens member in said splash areas for reversing the apparent direction of movement of said light reflecting areas of said belt therepast as compared to the direction of movement of said light reflecting areas of said belt past said flow stream areas, whereby upon movement of said reflecting member continuously past said lens member alternately to display no pouring of fluid and alternately to create the illusion simultaneously of one direction of flow continuously in said flow stream area and of a reversed direction of flow continuously in said splash areas for a predetermined period of time.

7. The display device as set forth in claim 6, wherein the light trannsmitting areas on said front cover corresponding to said flow stream areas on said lens member being channeled, and the light transmitting areas on said front cover corresponding to said splash areas on said lens member being in the form of teardrops extending upwardly and outwardly from said flow stream area.

References Cited in the file of this patent

UNITED STATES PATENTS

2,419,216	Hotchner	Apr. 22, 1947
2,507,975	Hotchner	May 16, 1950
2,811,798	Brooks	Nov. 5, 1957
2,824,396	Thomas	Feb. 25, 1958
2,953,676	Glasser	Sept. 20, 1960

FOREIGN PATENTS

252,566	Great Britain	June 3, 1926