May 26, 1931. F. W. BOWERMAN 1,807,374

REFLECTOR SIGN

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Fig. 1

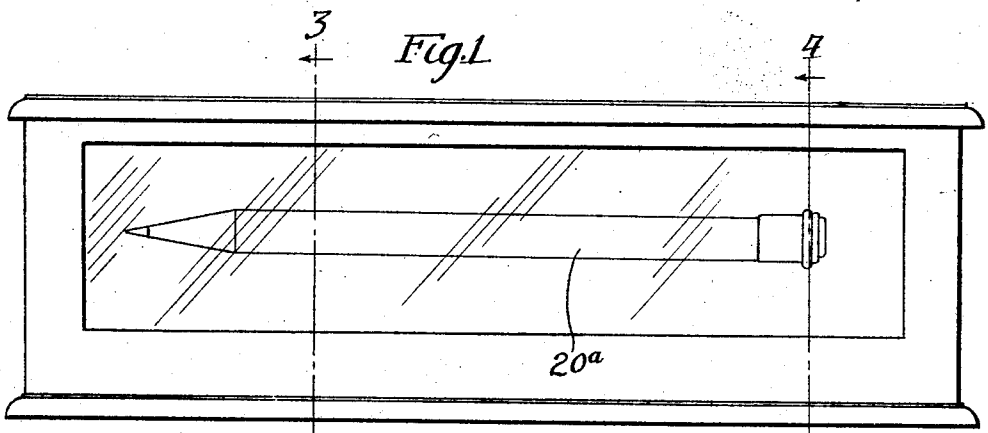


Fig. 2

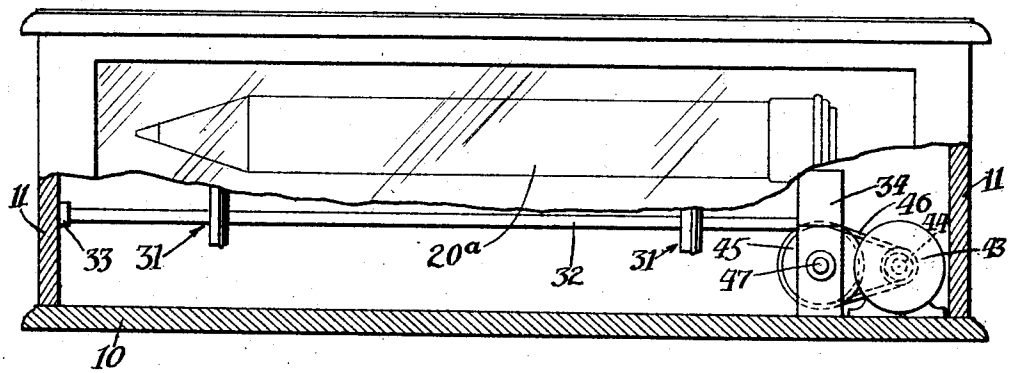


Fig. 3

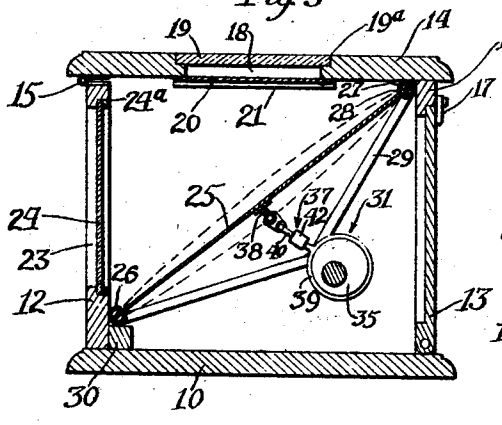
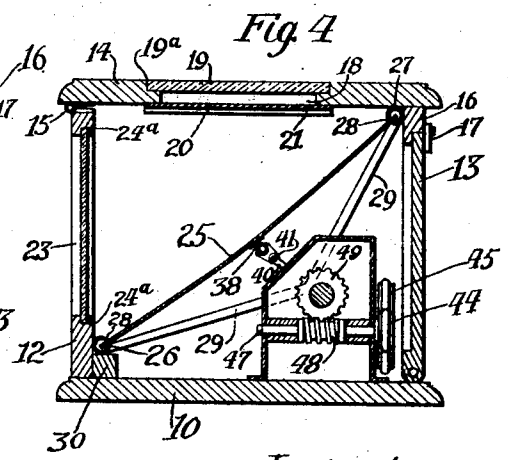


Fig. 4



Inventor

Fred W. Bowerman

By Fred Gerlach Atty.

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Fig. 5

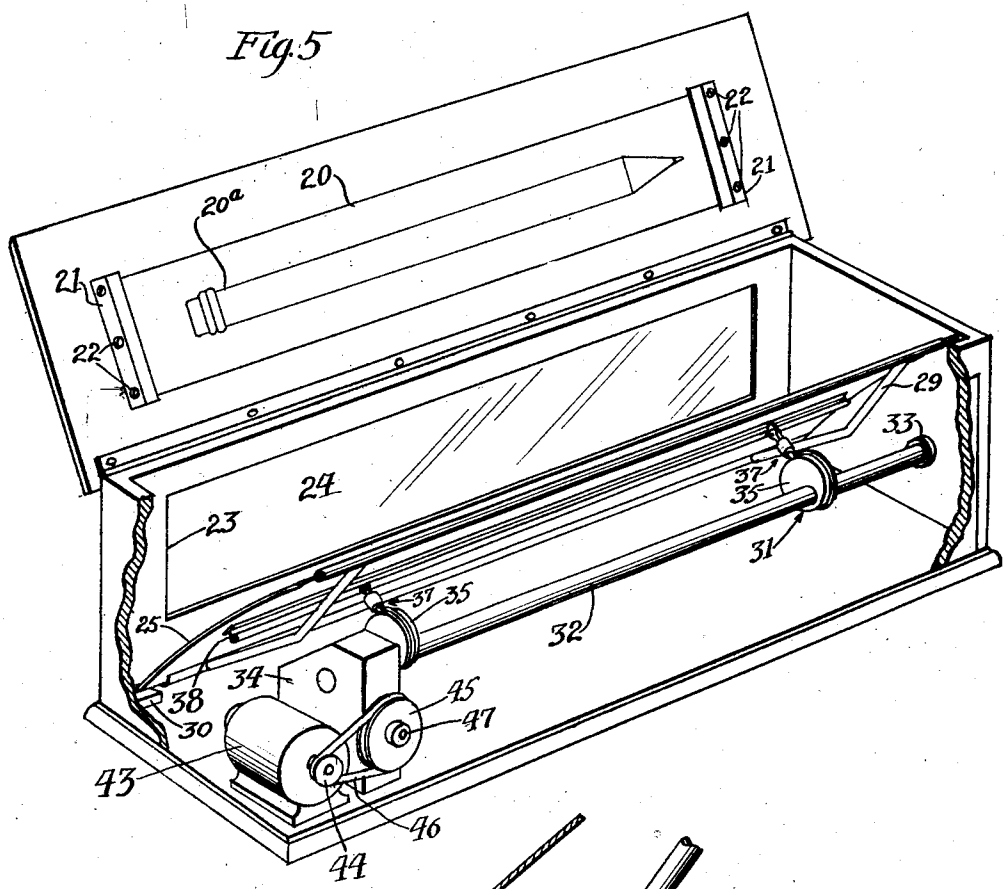
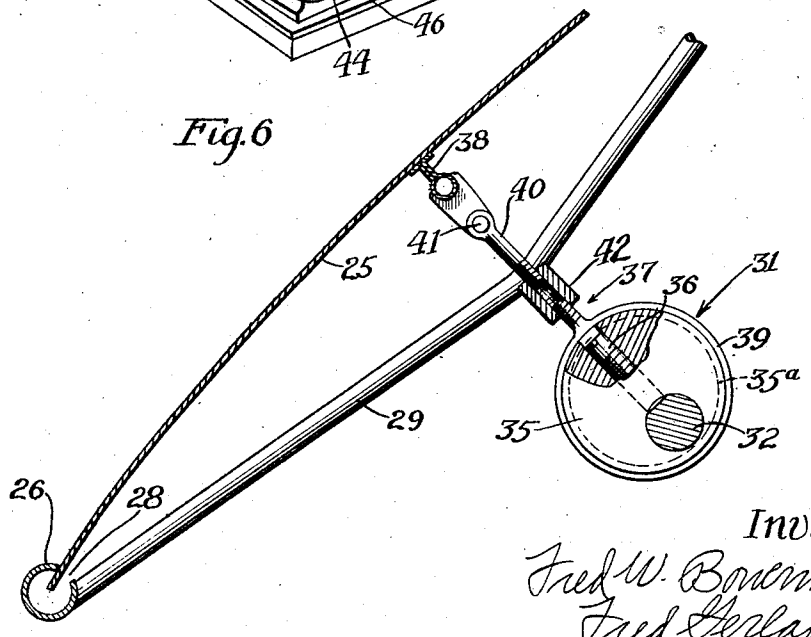


Fig. 6



Inventor

Fred W. Bowerman

Fred Gerlach

By

Atty.

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REFLECTOR SIGN

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Fig. 7

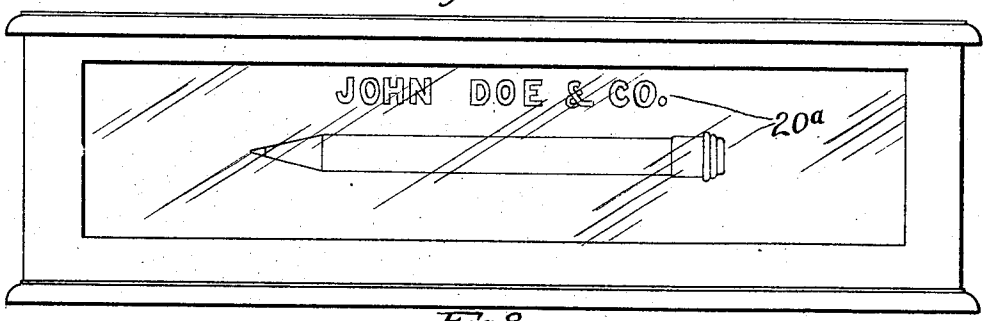


Fig. 8

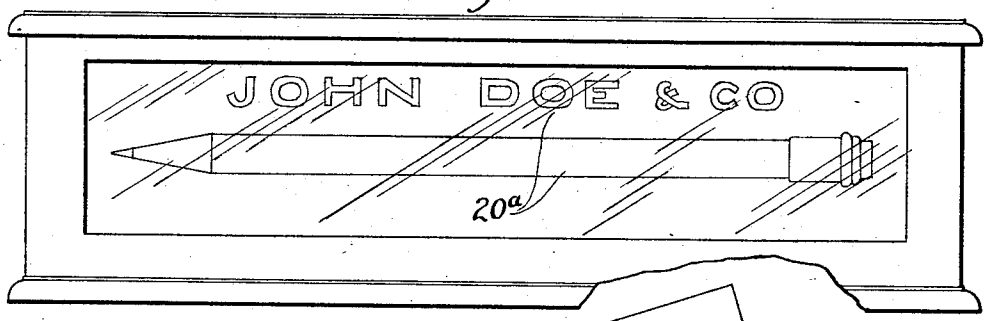
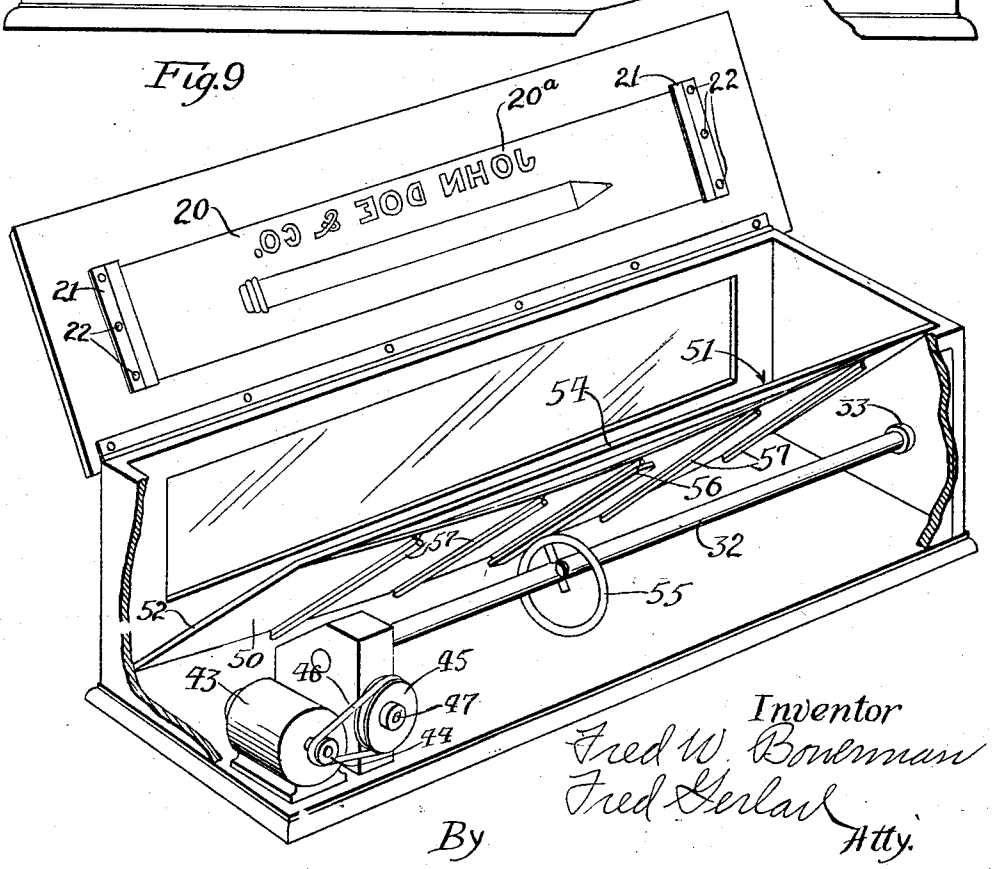


Fig. 9



Inventor
Fred W. Bowerman
Fred Gerlach
By Atty.

Patented May 26, 1931

1,807,374

UNITED STATES PATENT OFFICE

FRED W. BOWERMAN, OF CHICAGO, ILLINOIS

REFLECTOR SIGN

Application filed May 16, 1929. Serial No. 363,516.

The present invention relates generally to display signs and more particularly to those signs which are primarily adapted for use in connection with advertising and consist of an elongated letter or symbol-bearing strip which is formed of transparent material and is positioned horizontally and so as to receive light from above, and a reflector which is arranged angularly beneath the transparent strip and operates to reflect a substantially vertical image of the letters or symbols on the strip.

One object of the invention is to provide a display sign of this character in which the reflector is rectangular in conformation and formed of flexible material such, for example, as polished tin, and provision is made for continuously deflecting or warping the reflector back and forth so as to cause the image that is reflected thereby to increase and decrease alternately in size.

Another object of the invention is to provide a reflector sign of the aforementioned type in which the means for continuously deflecting the reflector comprises a cam device which is mounted on a shaft that is driven from an electric motor by means of speed reducing gearing.

A further object of the invention is the provision of a box-like cabinet or case which serves to house in a compact manner the various parts of the sign and embodies means whereby the reflector and strip are removably held in their operative positions so that they may be readily replaced whenever desired.

A still further object of the invention is to provide a reflector sign which embodies various novel features of construction and is generally an improvement upon signs of this character which have heretofore been proposed.

Other objects of the invention and the various advantages and characteristics of the present construction will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features hereinafter set forth and more particularly defined by the claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification of disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a front elevational view of the improved sign, showing the same equipped with a reflector which is adapted to be deflected or warped longitudinally so as to cause the image to increase and decrease alternately in height;

Figure 2 is a view partly in elevation and partly in section, disclosing the construction and arrangement of the reflector deflecting mechanism and exhibiting the reflector in the deflected position wherein the image is of a maximum height;

Figures 3 and 4 are transverse sectional views taken on the lines 3—3 and 4—4 of Figure 1, respectively;

Figure 5 is a perspective view, the top or cover of the cabinet being shown in its open or raised position and the back being broken away for purposes of illustration;

Figure 6 is a detail view of one of the cam devices which is used for deflecting longitudinally the reflector shown in Figures 1 to 5 inclusive;

Figure 7 is a front elevational view, showing the sign equipped with a reflector which is adapted to be continuously deflected crosswise or transversely so as to cause the image to increase and decrease alternately in width;

Figure 8 is a view similar to Figure 7, exhibiting the transversely deflectable reflector in the position wherein the image of the letter or symbol-bearing strip is of a minimum width; and

Figure 9 is a perspective view of the sign arrangement disclosed in Figures 8 and 9.

The invention is exemplified in a sign which is of the reflector type and comprises a box-like cabinet or case in which the various hereinafter described operating parts are mounted. The cabinet consists of a bottom 10, a pair of sides 11, a front 12, a back 13 and a top 14. The front and sides are

fixedly secured to the bottom so as to form with the latter a substantially rigid structure. The top 14 is connected to the upper part of the front 12 by a hinge 15 so that it may be swung upwardly when access from above is desired to the interior of the cabinet. The back 13 is pivotally connected at the lower part thereof to the side 11 and is in the nature of a door which may be swung outwardly to permit of access to the interior of the cabinet from the rear. A bar or beam 16 extends between and is fixedly secured to the upper rear corner parts of the sides 11 and operates to reinforce said sides and form a stop for preventing the back 13 from swinging into the cabinet. Said back is held in its closed position by a latch 17 which is pivotally connected to and depends from the bar 16. The top 14 has formed therein a rectangular opening 18. This opening extends completely through and is located at the front part of the top. It is preferably of such longitudinal dimension that it extends from one end of the top to the other. A plate 19 of glass or similar transparent material is seated in a groove 19ª which is formed in the part of the top that forms the opening 18. An elongated strip or panel 20 is arranged directly beneath the opening 18 so as to receive light from above. This strip is preferably formed of celluloid or some other flexible transparent material and has affixed thereto letters or symbols 20ª. If desired, the letters or symbols may be printed on separate pieces which are removably connected to the strip so that they may be rearranged or replaced in the event that the user of the sign desires to effect a change in advertising material. The strip 20 is coextensive with the opening 18 and is protected by the glass plate 19. It is removably held in its operative position by means of a pair of sheet metal brackets 21. The latter are positioned adjacent the ends of the top 14 and are secured in place by screws 22 or similar securing devices. The strip 20 is connected to the brackets by bending or flexing it centrally and then inserting the ends thereof under the distal and onwardly extending parts of the brackets. A rectangular opening 23 is formed in the front 12. This opening is preferably slightly larger than the opening 18 and extends from one end of the front to the other. A plate 24 of glass is seated in a groove 24ª which is formed in the part of the front 12 that forms the front 12.

In addition to the cabinet or case, the sign comprises a reflector for producing an image of the strip 20 which is visible through the opening 23 in the front 12. In Figures 1 to 7 of the drawings, the reflector is designated by the reference numeral 25 and is rectangular in conformation. The reflector 25 is formed of any suitable flexible material such, for example, as highly polished lacquered or shellaced tin. It is positioned in the cabinet beneath the letter or symbol-bearing strip 20 and is mounted in a frame comprising a pair of tubular members 26 and 27. The latter are arranged in parallel relation and are longitudinally slotted as at 28, so as to extend loosely around the bottom and top marginal parts of the reflector. The frame also comprises a pair of cross rods 29 which extend between and serve to hold in parallel relation the members 26 and 27. The frame-member 26 is adapted to abut against the lower part of the front 12 and to rest upon a block 30 which is fixedly secured to the bottom 10. The frame-member 27 is adapted to rest against the crossbar 16 and is held in place against said crossbar by the rear part of the top 14. By arranging the frame in the manner set forth, the reflector is caused to extend diagonally with respect to the interior of the cabinet and consequently operates to produce an image which may be seen through the opening 23. The frame-members 26 and 27 by gripping loosely the marginal parts of the reflector, permit the reflector to be deflected longitudinally without interference. When the reflector is deflected in this manner, the image is caused to change in height, as indicated in Figures 1 and 2. The cross rods 29 of the frame are located adjacent the under side of the reflector and are bent so that they do not interfere with the aforementioned longitudinal deflection of the reflector. When the top 14 is swung upwardly, the reflector is released so that it may be removed for cleaning or replacement purposes.

The reflector 25 is adapted to be continuously deflected back and forth so as to cause the image of the strip 20 to increase and decrease alternately in height, by means of mechanism comprising a pair of cam devices 31 which are mounted on a shaft 32 and are located adjacent the ends of the reflector. The shaft 32 is positioned beneath the reflector and extends longitudinally with respect to the cabinet. One end of the shaft is mounted in a bearing 33 which is set in one of the sides 11. The other end of the shaft is journalled in a gear box 34 which is secured to the bottom 10 adjacent the other of the two sides 11. Each of the cam devices comprises a disk-like body 35 which is eccentrically mounted on the shaft 32 and is fixedly secured to the latter by a set screw 36; and pitmen 37 which extend between the body 35 and a stay or rib 38 which is fixed to the central part and under side of the reflector 25. The rib 38 is soldered or otherwise secured to the reflector 25 and extends from one end thereof to the other so that the reflector is deflected uniformly

throughout its entire length. The pitmen 37 of the cam devices consist of ring-shaped pieces 39 which encircle the bodies 35 and are mounted in annular grooves 35ª in the peripheries of the latter. In addition to the pieces 39, the pitmen comprise links 40 which have their front ends pivotally connected to the rib 38 by pins 41. The inner ends of the links are connected to the ring-shaped pieces by collars 42. These collars are connected to the pieces 39 and links 40 by right and left screw thread connections so that the links may be adjusted to and from the eccentrically mounted bodies 35. When the shaft 32 is rotated, reciprocatory movement is imparted to the central part of the reflector by means of the cam devices and the stay 38. Inasmuch as the top and bottom marginal parts of the reflector are held against displacement in the cabinet by the frame, this reciprocatory movement operates to cause the reflector to be deflected or warped back and forth, with the result that the image of the letter-bearing strip 20, as reflected by the reflector 25, alternately increases and decreases in height.

The shaft 32 is driven by means of mechanism comprising an electric motor 43 which is mounted in the bottom 10 adjacent and outwardly of the gear box 34; a pulley 44 which is keyed or otherwise secured to the rotor shaft of the motor; a pulley 45 which is connected to and driven from the pulley 44 by an endless belt 46 and is mounted on a shaft 47 that is journalled in the gear box 34; a worm 48 which is fixedly secured to the central portion of the shaft 47 and is housed in the box 34; and a worm wheel 49 which meshes with and is driven by the worm 48 and is fixedly secured to the end of the shaft 32 that projects into said box 34. The worm gearing 48, 49 together with the belt and pulley driving instrumentality between the motor and the shaft 47, operates as speed reducing gearing. When the electric motor 43 is operated this gearing causes the shaft 32 to rotate slowly and effect the desired back and forth deflection of the reflector.

A characteristic and an advantage of utilizing set screws 36 to secure the disk-like body 35 to the shaft 32 is that it is possible to adjust the bodies relatively to each other. In other words, the set screws make it possible to secure the bodies 35 to the shaft so that they may be adjusted relatively to each other in the event the user of the sign desires to have the reflector deflector in an uneven manner. In order to have the one end of the image of a maximum height and the other end of a minimum height, the bodies 35 may be adjusted so as to extend in opposite directions. When the bodies are arranged in this manner the pitmen move backwards and forwards in opposite directions and consequently cause one end of the rib 38 to be pulled inwardly while the other is forced outwardly.

In Figures 7, 8 and 9 the reflector, which is designated by the reference numeral 50, is adapted to be deflected transversely so as to cause the image of the letter or symbol-bearing strip 20 to change in width. This reflector 50, like the longitudinally deflectable reflector 25, is formed of flexible material. It is mounted in a retangular frame 51 which comprises a pair of side bars 52 and a pair of longitudinally extending members 53 and 54. The latter members are comparable to the members 26 and 27 in that they are adapted to rest on the block 30 and against the crossbar 16 respectively. The ends of the reflector are loosely held in the side bars 52. By connecting the reflector to the frame 51 in this manner, the central portion of the frame is free so that it may be deflected transversely.

The back and forth transverse deflection of the reflector 50 is obtained by means of a cam 55. The latter is removably secured to the medial part of the shaft 32 and operates against a shoe 56 on the back and central part of the reflector 50. The action of gravity upon the central and free portion of the reflector 50 causes the shoe 56 to engage at all times against the cam 55. When the latter is driven, the cam 55 causes the shoe 56 to be shifted back and forth with the result that the reflector is deflected in such a manner that the image reflected thereby first decreases and then increases in width. The reflector 50 is reinforced against longitudinal bending movement by means of a series of stays 57 which are secured to the back face of the reflector and extend from the bottom margin thereof to the top.

In using the sign, the user will employ a strip 20 bearing the desired combination and arrangement of letters or symbols 20ª. The strip, as previously pointed out, will be secured in its operative position by shifting the ends thereof into engagement with the brackets 21. After assembly or attachment of the strip the top 14 is closed. When the top is in this position it locks the frame for the reflector against displacement and positions the strip 20 so that the reflector operates to produce an image thereof which is visible through the opening 23 in the front 12. When it is desired to have the image of an animated or changeable nature, the motor 43 is operated. This causes drive movement to be imparted to the shaft 32 and results in a continuous back and forth deflection of the reflector. When the user desires to have the image increase and decrease in size, the reflector 25 is employed and is operatively connected to the shaft 32 by the cam devices consisting of the disk-like

bodies 35 and the pitmen 37. Should it be desired to produce an image which continuously increases and decreases in width, the reflector 50 is substituted for the reflector 23 and the cam 55 is connected to the shaft 32. When access to the motor or driving parts is necessary, the back 13 may be released from the crossbar 16 and swung outwardly.

In view of the fact that the sign embodies but a comparatively small number of operating parts, it may be manufactured at a comparatively low cost. By disposing the different parts in the cabinet, the sign is of a unitary character and may be transported from one place to another readily.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a display sign, the combination of an object-strip, a flexible reflector arranged with respect to the strip so as to produce an image of the latter, means for deflecting the reflector back and forth to cause the reflected image to change in size or shape, and a motor connected to operate said means and effect a continuous and automatic deflection of the reflector.

2. In a display sign, the combination of an object-strip, a flexible reflector arranged with respect to the strip so as to produce an image of the latter, means including a cam for deflecting the reflector back and forth to cause the reflected image to change in size or shape, and a motor for driving the cam and effecting a continuous and automatic deflection of the reflector.

3. In a display sign, the combination of an object-strip, a flexible reflector arranged with respect to the strip so as to produce an image of the latter, and means for deflecting the reflector back and forth to cause the reflected image to change in size or shape, said means comprising a power driven shaft and a cam mounted on the shaft and adapted to effect deflection of the reflector during rotation of said shaft.

4. In a display sign, the combination of an object-strip, a flexible reflector arranged with respect to the strip so as to produce an image of the latter, and means for deflecting the reflector back and forth to cause the reflected image to change in size or shape, comprising a power driven shaft and a pair of cam devices connected to the reflector and driven by the shaft, each of said devices consisting of a disk-like body eccentrically and adjustably mounted on the shaft and a pitman operatively connected to the body.

5. In a display sign, the combination of an object-strip, an elongated flexible reflector arranged adjacent the strip and adapted to produce an image thereof, and power driven means for continuously and automatically deflecting the reflector longitudinally so as to cause the reflected image alternately to increase and decrease in size.

6. In a display sign, the combination of an object-strip, a rigid frame positioned adjacent the strip, a flexible reflector adapted to produce an image of the strip and mounted loosely in the frame so that it may be deflected back and forth, and means for deflecting the reflector so as to cause a change in the size or shape of the reflected image.

7. In a display sign, the combination of an object-strip, a frame positioned adjacent the strip, a flexible reflector adapted to produce an image of the strip and having opposite parts thereof connected to the frame, the central part of the reflector being free with respect to the frame so that it may be deflected back and forth, and means for deflecting said reflector so as to cause a change in the size or shape of the reflected image.

8. In a display sign, the combination of a cabinet having an opening in one side thereof, an object-strip associated with the cabinet, a flexible reflector housed in the cabinet and positioned to produce an image of the strip which is visible through the opening, and means for deflecting the reflector to cause a change in the size or shape of the reflected image, said means being housed also in the cabinet and including a motor.

9. In a display sign, the combination of a cabinet having a hinged top and an opening in one side thereof, an object-strip removably connected to the top of said cabinet, a flexible reflector housed in the cabinet and positioned to produce an image of the strip which is visible through the opening, and power driven means for deflecting the reflector to cause a continuous change in the size or shape of the reflected image, said means being housed also in the cabinet.

10. In a display sign, the combination of a cabinet having an opening in one side thereof and provided with a hinged top having an opening therethrough, a transparent object-strip secured to the top adjacent the opening therein, a flexible reflector housed in the cabinet and positioned to produce an image of the strip which is visible through the opening in the side of the cabinet, and means for deflecting the reflector to cause a change in the size or shape of the reflected image, said means being housed also in the cabinet.

11. In a display sign, the combination of a cabinet having an opening in one side thereof and provided with a hinged cover having an opening therethrough, a trans-

parent object-strip removably secured to the top adjacent the opening therein, and a reflector housed in the cabinet and positioned to produce an image of the strip which is visible through the opening in the side of the cabinet.

12. In a display sign, the combination of a cabinet having an opening in one side thereof and provided with a hinged top having an opening therethrough, a transparent object-strip secured to the top adjacent the opening therein, a frame housed in the cabinet and held in place against displacement by the top when the latter is in its closed position, and a flexible reflector mounted in the frame and adapted to produce an image of the strip which is visible through the opening in the side of the cabinet.

13. In a display sign, the combination of a cabinet having an opening in the front thereof, an object-strip associated with the top of the cabinet, a flexible reflector positioned angularly in the cabinet so as to produce an image of the strip which is visible through the opening, and power driven deflecting means for the reflector housed in the cabinet adjacent the back thereof.

14. In a display sign, the combination of a cabinet having an opening in the front thereof and provided with a hinged back, an object-strip associated with the top of the cabinet, a flexible reflector positioned angularly in the cabinet so as to produce an image of the strip which is visible through the opening, and means including gearing for deflecting the reflector, said gearing being housed in the cabinet adjacent the back thereof and accessible when said back is open.

15. The combination with a transparent support, of a subject of display disposed on said support, a source of light for illuminating said support, flexible reflecting means disposed within the confines of said support for reflecting images of said subject of display, means for varying the form of said mirror, and adjustable means for setting the variance scope of said first mentioned means.

Signed at Chicago, Illinois, this 13th day of May, 1929.

FRED W. BOWERMAN.