R. G. CARPENTER.

SIGN MECHANISM.

APPLICATION FILED JAN. 17, 1917. RENEWED MAY 14, 1919.

**1,310,689.**

Patented July 22, 1919.

3 SHEETS—SHEET 1.

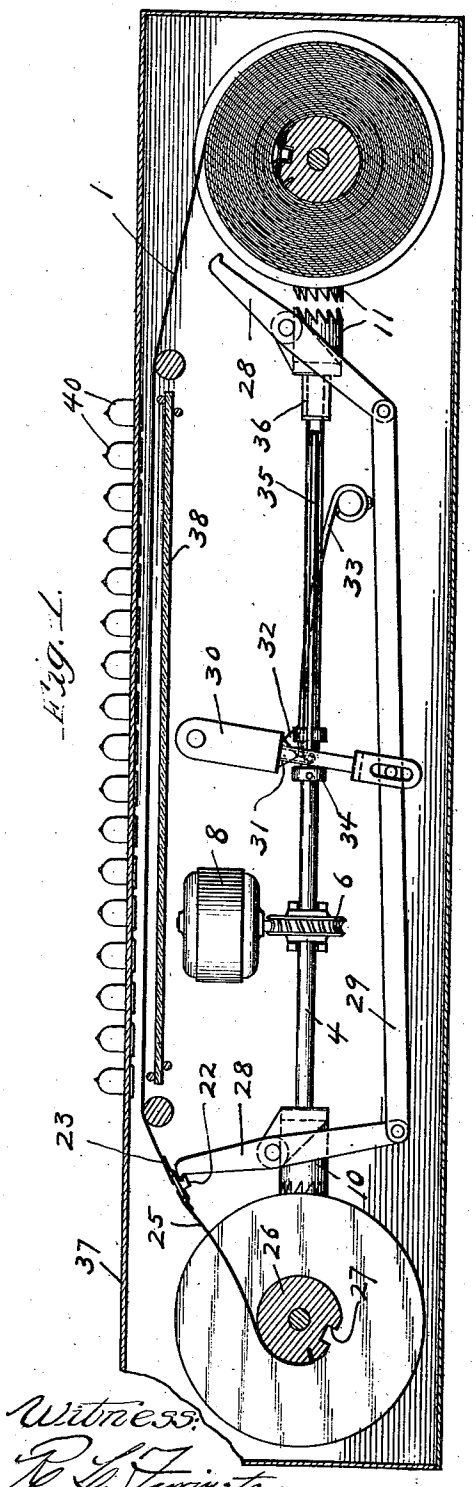



Fig. 1.

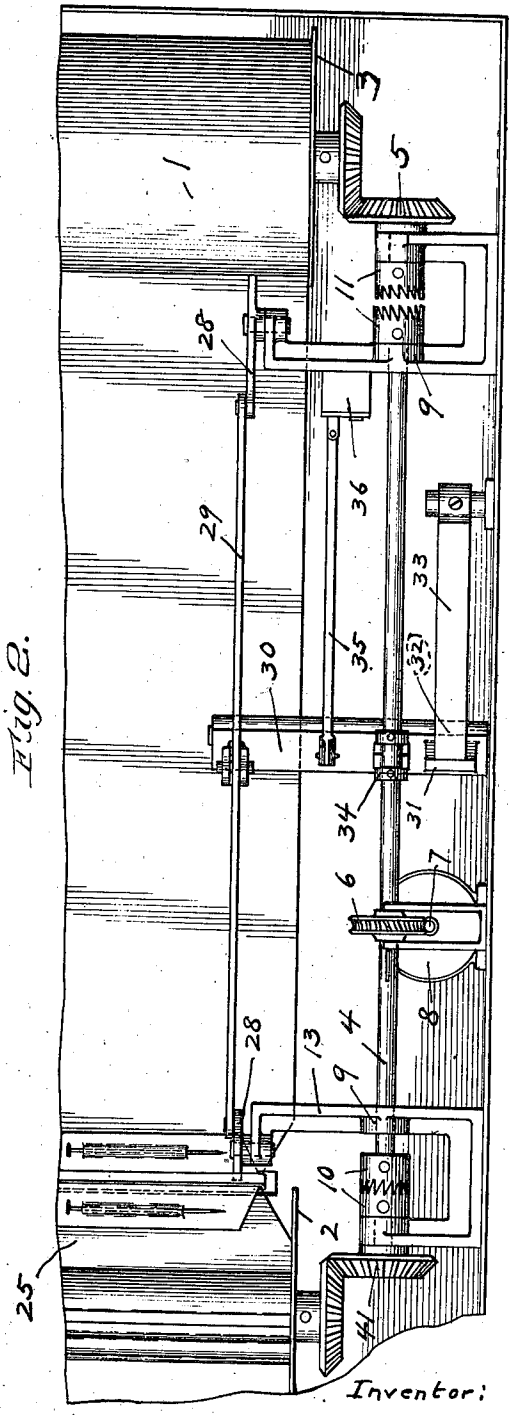



Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 9.

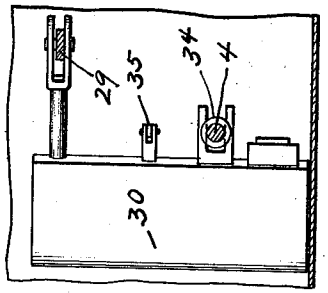



Fig. 3.




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3 SHEETS—SHEET 3.

Fig. 6.

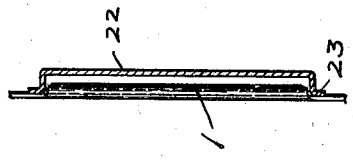



Fig. 7.

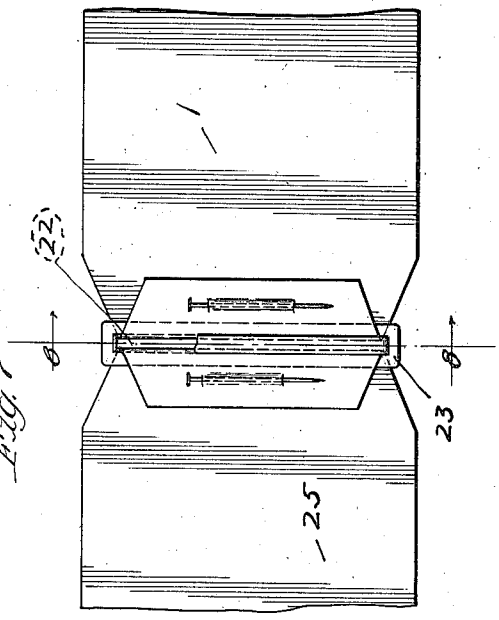



Fig. 4.

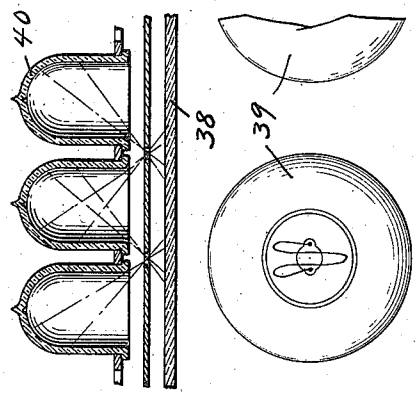



Fig. 6.

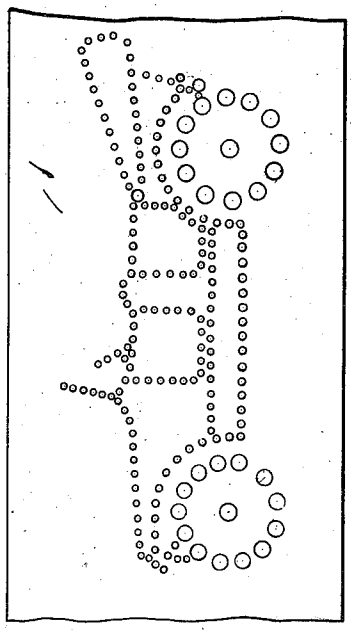
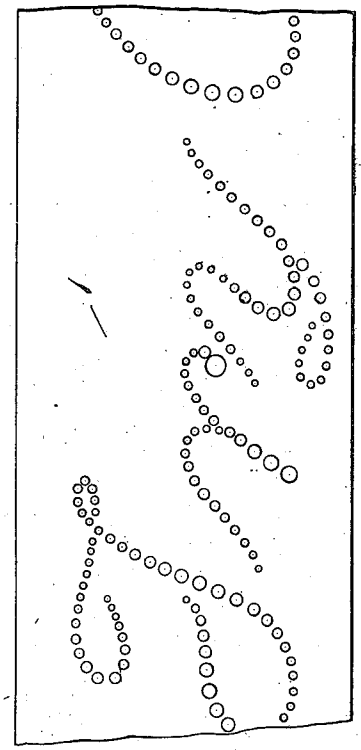



Fig. 5.




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# UNITED STATES PATENT OFFICE.

RALPH G. CARPENTER, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF AND OSCAR CEDERQUIST, BOTH OF CHICAGO, ILLINOIS, A PARTNERSHIP.

## SIGN MECHANISM.

1,310,689. Specification of Letters Patent. Patented July 22, 1919.

Application filed January 17, 1917, Serial No. 142,920. Renewed May 14, 1919. Serial No. 297,136.

*To all whom it may concern:*

Be it known that I, RALPH G. CARPENTER, citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Sign Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to illuminated signs of the traveling legend type, or signs in which the wording or illustrations are successively displayed, its general objects being to provide an unusually effective operating mechanism and to provide means for displaying lettering and illustrations composed of minute and irregularly spaced elements. More particularly, my invention aims to provide means for effectively displaying words or letters formed by perforations in an opaque film when the perforations do not match those of the sign front either in size or in spacing. In the drawings,

Figure 1 is a fragmentary horizontal section through a sign embodying my invention, taken from its rear and with the rear cover omitted of Fig. 2.

Fig. 2 is a fragmentary elevation of the mechanism of the same sign.

Fig. 3 is a rear elevation of another sign embodying certain features of my invention, with the rear plate of the sign casing removed and with certain parts in section.

Fig. 4 is an enlarged horizontal section through portions of the sign, showing the projection of the light rays.

Figs. 5 and 6 show fragments of films respectively having wording and illustrations adapted to be displayed according to the method of my invention.

Fig. 7 is a fragmentary view of one end of the film and of the means for connecting the same to a spool-ribbon.

Fig. 8 is a vertical section through Fig. 7 along the line 8—8.

Fig. 9 is a side elevation of the throwover member of the mechanism, viewed from the left of the motor in Fig. 1.

In carrying out the various purposes of my invention, I preferably employ a film made of substantially opaque material and having the legends upon the same formed of perforations or relatively translucent film portions, this film 1 being stretched between two spools 2 and 3 adapted to be driven in opposite directions through gears 4 and 5 respectively. The latter gears are in axial alinement with each other and with a shaft 4, which shaft is splined to a worm-wheel 6 driven by a worm 7 on the shaft of a continuously running electric motor 8. Owing to this spline connection, the shaft may be moved endwise in the bearings 9 without disturbing its continued rotation, and when thus moved in one direction or the other it is adapted to connect either with the gear 4 or the gear 5 through the clutches 10 and 11 respectively. Consequently, a movement of the shaft 4 to its extreme limit of travel in either direction will reverse the motion of the spools and hence reverse the movement of the film. To insure a rapid and positive action of the reversing mechanism, I preferably use snap-over means based on the use of two-spring-pressed elements, one of which is wedge-shaped, while the other is adapted to ride up the incline of the wedge and to snap over the latter when it has passed the apex of the wedge. Thus, in applying this principle to mechanism allied to that shown in my copending application, filed Nov. 2, 1916 as Serial No. 129047, I mount a wedge 12 rigidly on the bracket 13 which partially supports both the main shaft 4 and a slidable thrust-rod 14. The rod 14 carries rollers 15 at its opposite ends, which rollers bear respectively against the two film rolls, the rod being extensible by means of a coupling 16 in the same, so as to adjust its effective length to different lengths and thicknesses of the film. Fast upon the rod 14 is a bracket 17 having a slot housing a pin on a slide 18, which slide is mounted on the shaft 4 and limited in its movement with respect to the latter by stop collars 19. The slide 18 carries a plunger 20 continuously urged in one direction by a spring 21, and this plunger carries a wheel 22 disposed close to the wedge 12 and adapted to ride up and over the incline of the latter when the slide 18 is moved in one direction or the other longitudinally of the shaft 4. With the parts in the position of Fig. 3, a continued winding of the film upon the right hand spool will move the thrust-rod 14 to the left, drawing the slide 18 with it and therefore causing the spring-pressed wheel 22 to climb up the incline of the wedge 12 until the wheel passes the tip of

the wedge. Then the pressure of the spring 21 will cause the wheel to move up the left-hand slope of the wedge, thus forcing the plunger 20 and the slide 18 to the left and consequently moving the shaft 4 longitudinally. Owing to the lost motion between the slide 18 and the stops 19, the coacting of the slope of the wedge with the pressure of the spring enables the slide 18 to "snap over" and start its rapid lateral movement unimpeded by the power required for disconnecting the interlocked pair of clutches and moving the shaft 4 endwise. Hence the slide 18 will acquire a sufficient momentum by the time it engages the left-hand stop 19, so that it will move the shaft almost instantaneously, thereby starting an oppositely directed rotation of the left-hand spool and hence reversing the movement of the film.

However, I have found that while such a use of a wedge insures a quick and positive reversing of the mechanism, the film is apt to vary in thickness and to wrap with irregular tightness on the spools, thereby altering the point at which the thrust-rod actuates the reversing means. I therefore preferably control this reversing, not by the thickness of the film on the spools, but by an element carried on a terminal strip or the like to which one end of the film is secured, and preferably by the element which also serves to secure the film to the terminal strip. Thus, in the preferred form of Figs. 1 and 2 each spool has a relatively short piece of leather or the like secured to it, the tip of this leather 25 being looped through the aperture formed by punching a bridge-piece 22 from a metal strap 23, and the adjacent end of the film 1 being likewise looped through the same aperture as shown in Fig. 7. The core 26 of each spool has a lateral recess 27 so positioned as to receive the strap 23, so that the latter will not interfere with the smooth winding of the film over the leather on this core. When the film is all unwound from the spool, the bridge-piece 22 on the unwound film end engages the tip of a lever 28 connected by a link 29 to a rocker arm 30, which rocker arm has a wedge 31 fast upon it and opposed to a companion wedge 32 carried by a flat spring 33. Consequently, the movement of the lever 28 by the bridge-piece 22 will move the rocker arm until the tip of its wedge snaps over the tip of the opposed wedge 32, whereupon the pressure of the spring 33 will force the wedge 31 still farther, or until it occupies a position opposite to that shown in Fig. 1. In so doing, the rocker arm engages a stop 34 on the shaft and slides the latter so as to shift the driving connection to the right-hand spool, while a link 35 also connected to the rocker arm actuates a switch 36 and thereby controls the lighting of the sign.

The wording, pictorial representations, or other sign legends upon the film are preferably constituted by perforations in the film, and the sign front preferably includes an opaque sheet 37 (of metal or the like) having uniformly spaced perforations through which the rays of light may issue after passing through the perforations in the film. However, any attempt to confine the sign legends to matter displayed by perforations corresponding in size and spacing to the perforations in the sign front would greatly limit the character and attractiveness of the signs, hence I preferably interpose a translucent diffusing screen 38 (of ground glass or the like) between the film 1 and the lamps 39. Such a screen will readily diffuse the light at widely varying angles, so that even with quite small perforations in the film, some of the diffused light rays passing through any one perforation will simultaneously be emitted through two consecutive apertures in the sign front, as shown in Fig. 4. Consequently, by using a diffusing medium in conjunction with the film and by suitably spacing the latter from the perforated sign front, I am able to obtain a clearly defined "traveling" effect with legends marked by film perforations of the size of ordinary pin-holes, and hence am able to present signs including such artistic and novel representations as those shown in Figs. 5 and 6, although employing sign-front perforations of relatively large diameter, as shown in Fig. 4.

The effect thus produced may be further enhanced by mounting glass bulbs 40 in the perforations of the sign front, and if these have projecting teats simulating the tips of incandescent lamp bulbs, the resulting effect closely simulates that which would be produced by the use of the same number of miniature incandescent lamps, even though both the diameter and the spacing of the perforations in the sign front are many times greater than those of the perforations in the film. In other words, I am able to employ a convenient and easily manufactured size and spacing of the translucent portions of the sign front in connection with films having perforations much smaller in size and much more closely spaced. Moreover, these perforations need not themselves be uniform in size and spacing, but may be considerably varied in both respects as shown in Figs. 5 and 6, thus enabling me to secure sign effects which could not be produced in a relatively small compass by the appliances heretofore employed. Thus, I am able to produce a traveling sign equally marvelous and pleasing in its effect to that afforded by the use of hundreds of separate lamps and complicated switching mechanism, although only employing a film of cheap material and one in which the legend may be cheaply and

easily punched. However, while I have described bulbs 40 as used in connection with the sign front, and a flat spring 33 as carrying one of the wedges, I do not wish to be limited to these or other particulars of my disclosure, it being obvious that the same might be modified in many ways without departing from the spirit of my invention.

I claim as my invention:

1. In an electric sign, a front having uniformly sized and spaced translucent portions, an opaque film having legends formed thereon by perforations smaller in size and more closely spaced than the said translucent portions of the sign front, and lighting means arranged for simultaneously projecting light through one of the said perforations and two adjacent translucent portions.

2. In an electric sign, a front having uniformly sized and spaced translucent portions, an opaque film having legends formed thereon by perforations smaller in size and more closely spaced than the said translucent portions of the sign front, lighting means behind the film, and light-refracting means between the film and the lighting means for projecting light simultaneously through one of the said perforations and two adjacent translucent portions.

3. In an electric sign, a front having uniformly sized and spaced translucent portions, an opaque film having legends formed thereon by perforations smaller in size and more closely spaced than the said translucent portions of the sign front, and a light-refracting medium interposed between the film and said front and spaced from both of the latter.

Signed at Chicago January 6th, 1917.

RALPH G. CARPENTER.