

June 23, 1931.

E. R. WHEELER

1,811,770

PROJECTING APPARATUS

Filed July 23, 1929

2 Sheets-Sheet 1

Fig. 1.

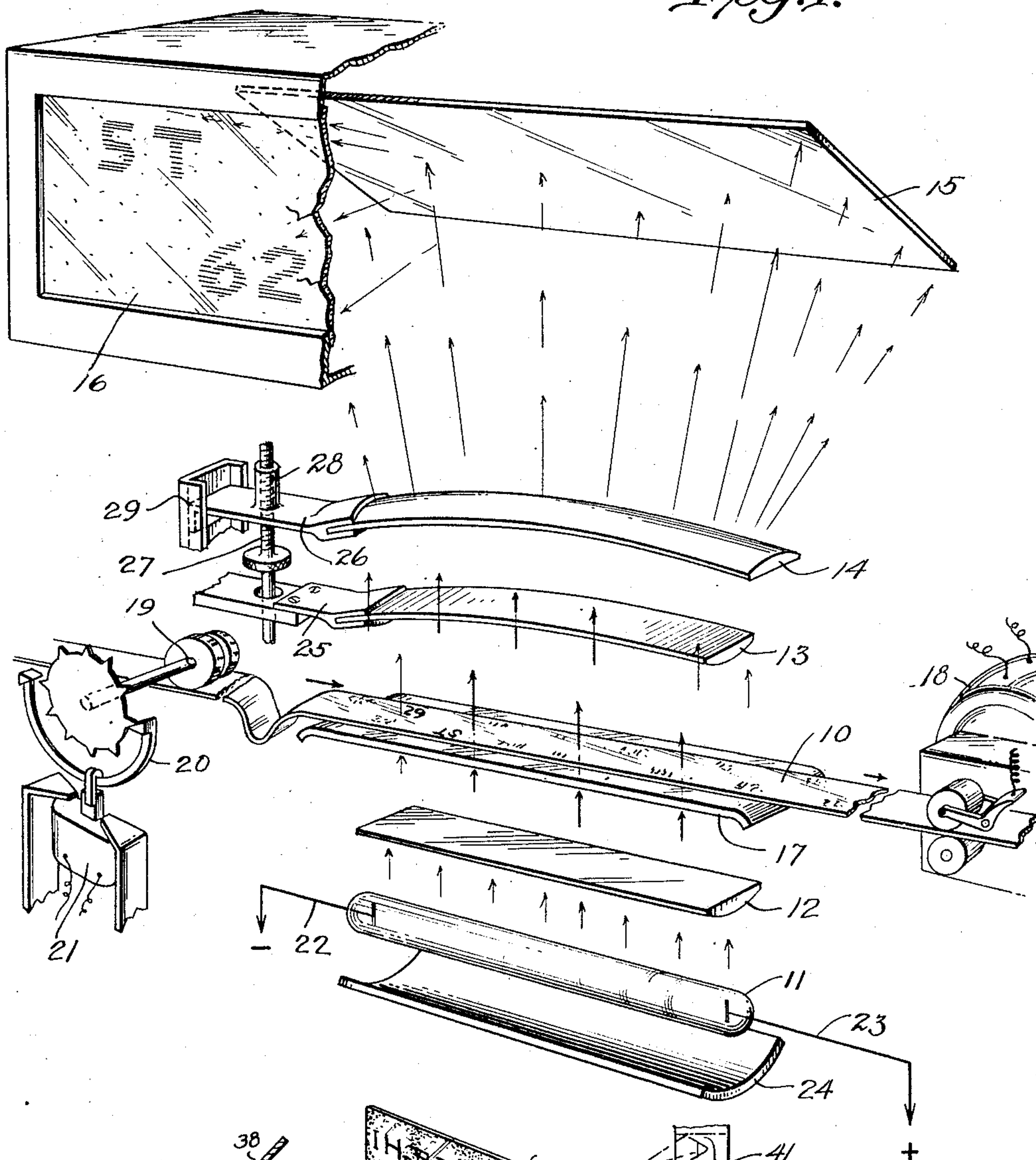


Fig. 2.

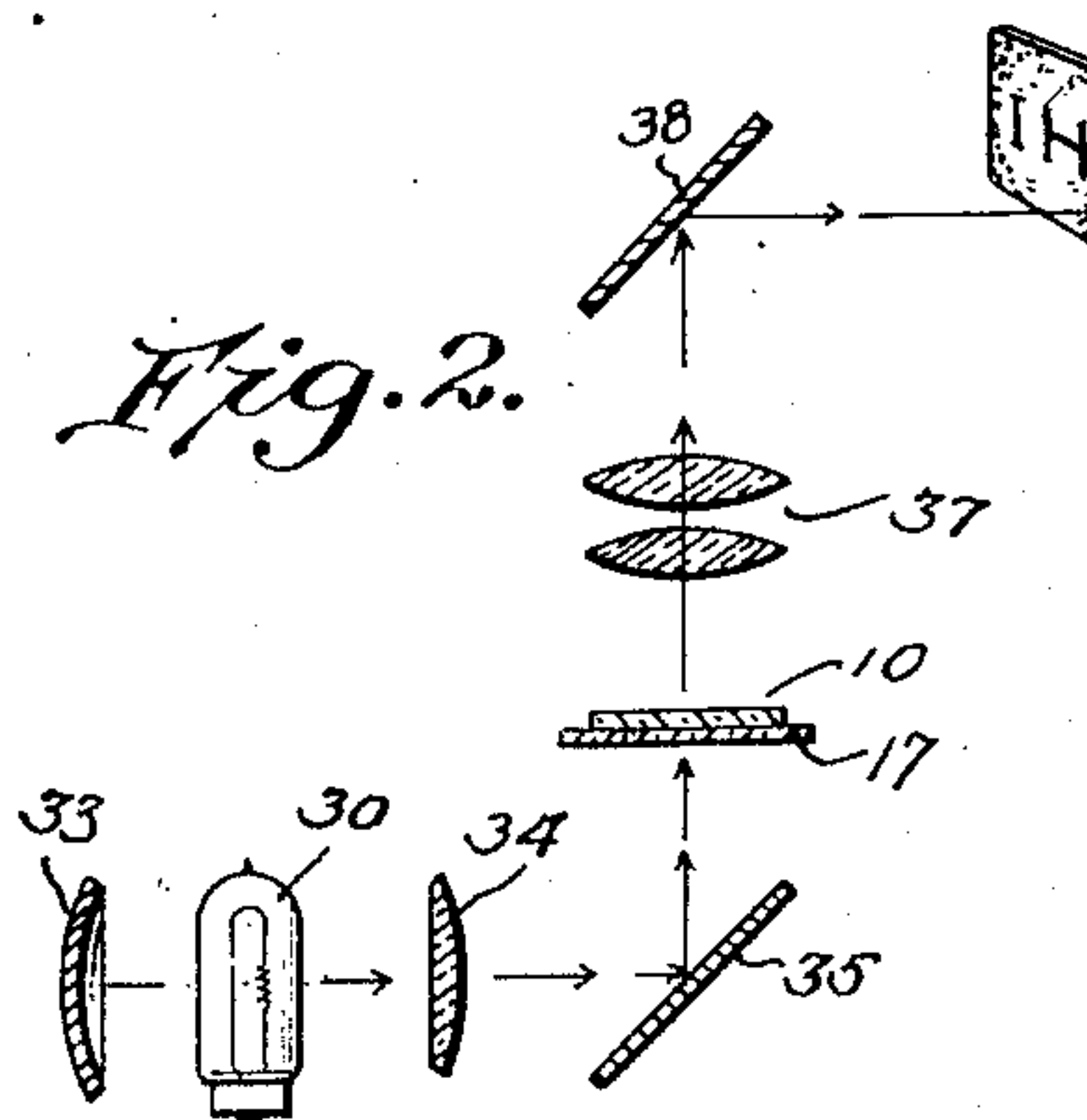
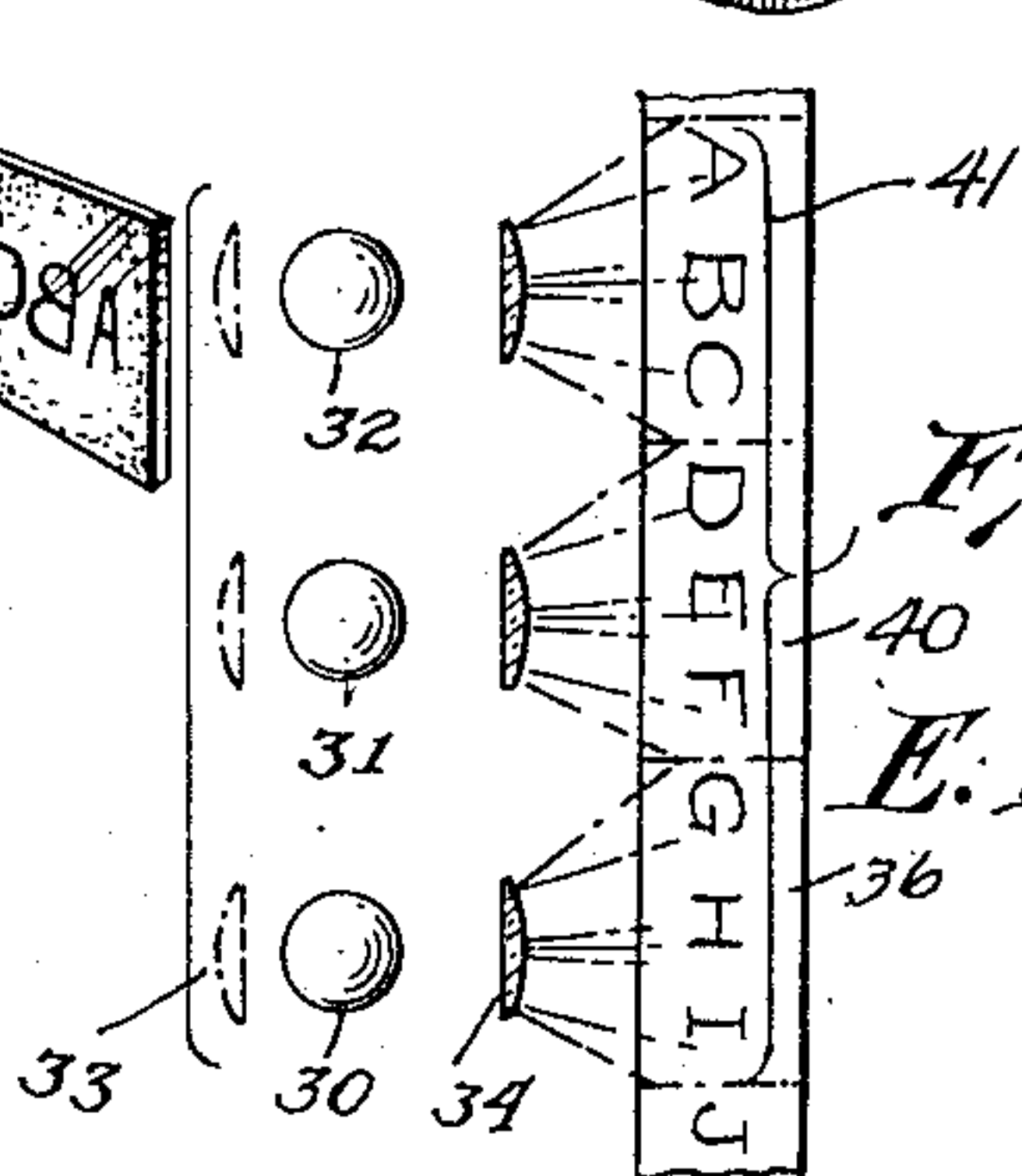


Fig. 3.



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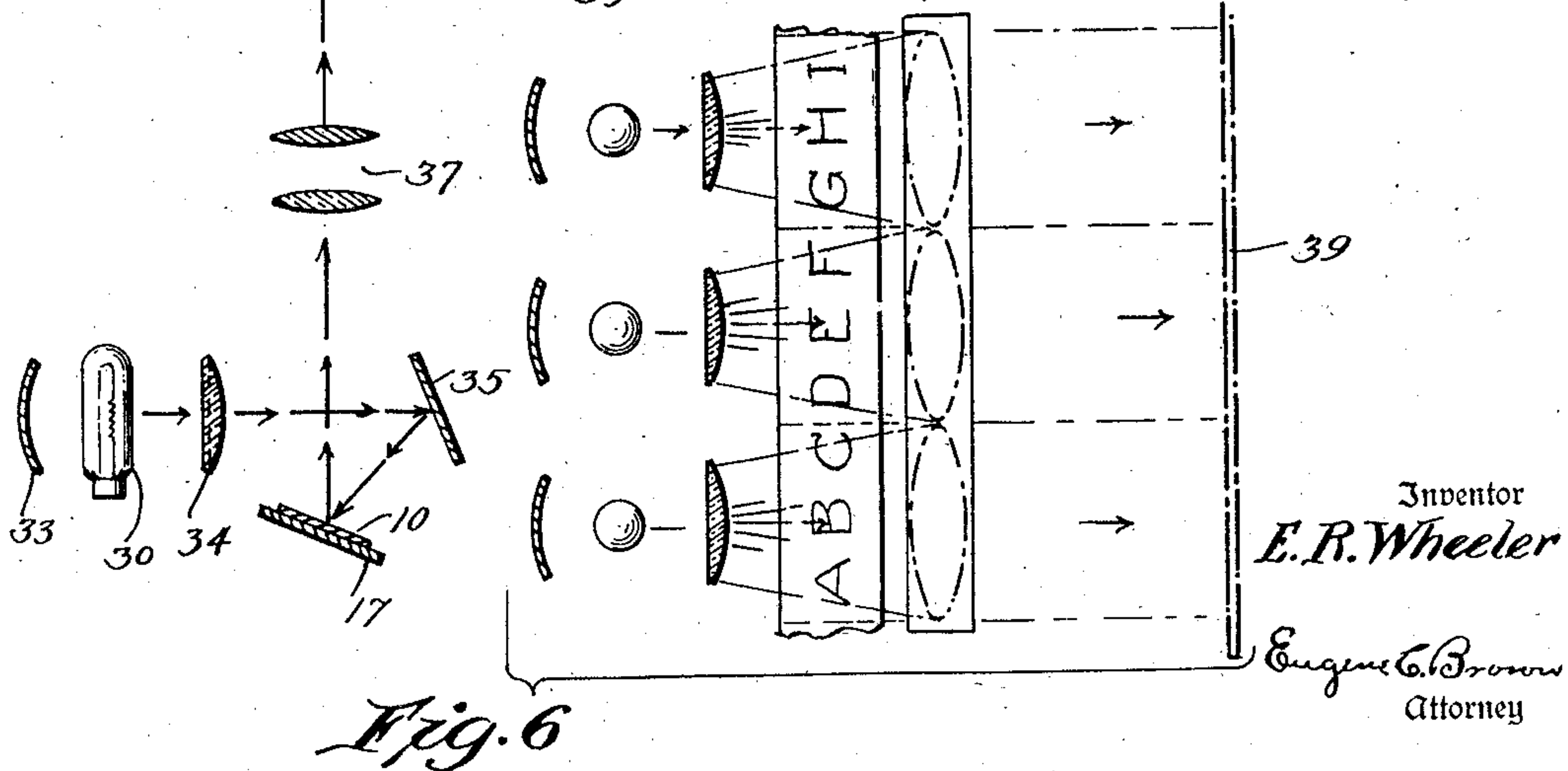
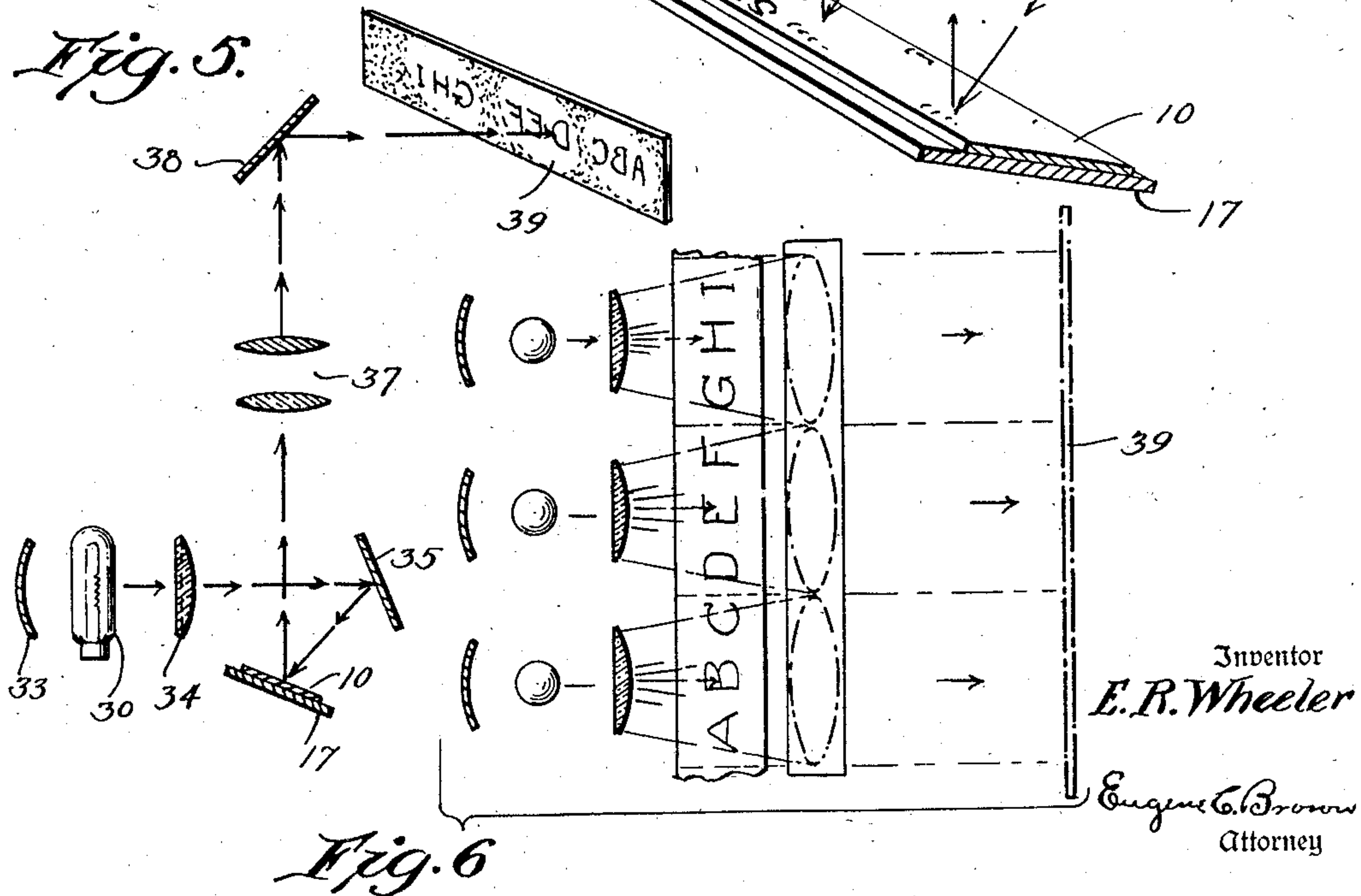
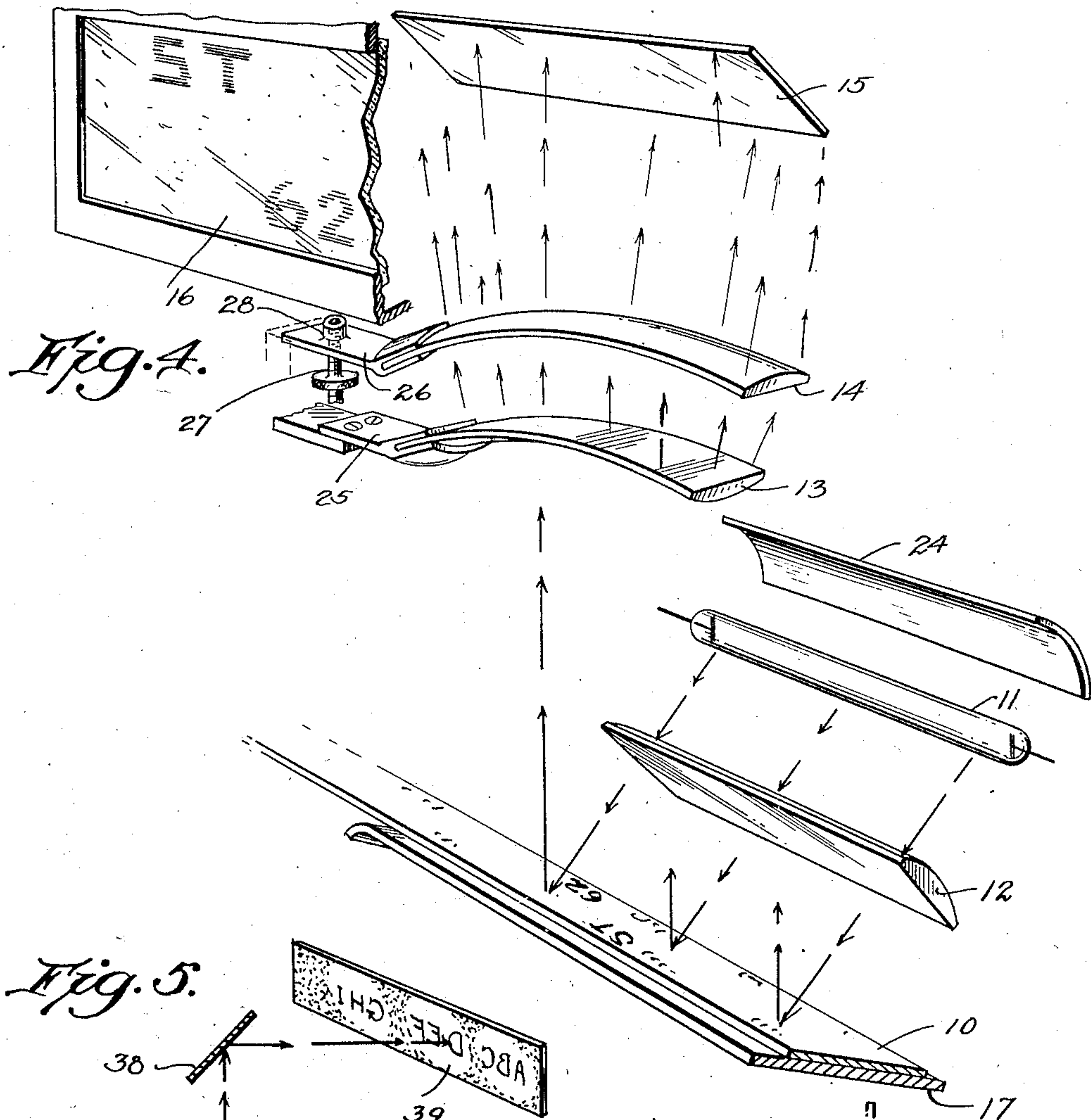
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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PROJECTING APPARATUS

Application filed July 23, 1929. Serial No. 380,387.

This invention relates to exhibiting apparatus for projecting written or printed matter from a stationary or movable tape upon a screen in enlarged characters and more particularly to such apparatus adapted to simultaneously project the markings from a relatively long length of tape as a single image.

In a Patent No. 1,684,309 to R. F. Dirkes, granted September 11, 1928, entitled Method of and means for feeding tape and projecting data therefrom, and assigned to the Western Union Telegraph Company, a tape projecting apparatus is disclosed, utilizing a single concentrated filament type incandescent lamp for projecting the markings of the tape onto a screen in enlarged forms. The use of a single concentrated light source of this nature restricts the apparatus to the projection of relatively short lengths of tape, at any instant, since if the light source is positioned sufficiently far away from tape to illuminate a long length of tape the intensity of the illumination is low and uneven and the apparatus is rendered unduly large. The use of a more intense light source is objectionable as it requires a much larger amount of heat to be dissipated.

It has been proposed to overcome this difficulty by employing a number of concentrated filament lamps with a separate lens system for each lamp, each lens system projecting the markings from a definite section of the tape, side by side, upon the screen so as to form a continuous image. In this system the disadvantage is encountered that either there may be an overlapping of the separately projected images or a definite line of demarcation therebetween.

It is one of the objects of the present invention to overcome these difficulties and to provide an illuminating and projecting system for simultaneously projecting the markings from a long length of tape upon a screen in enlarged form, in which there will be a substantially uniform illumination of the entire screen and perfect continuity of the image upon the screen.

In accordance with my invention I utilize a single continuous, substantially linear light

source which is coextensive with the length of tape, the markings of which it is desired to project at any instant, in combination with a lens system having a linear dimension of such magnitude that the entire illuminated length of tape may be projected through the single lens system upon the screen. The tape may be moved continuously through the projecting apparatus and a continuously moving enlarged image formed on the screen. The invention is applicable either to the projection of the image by light transmitted through a transparent tape or by reflection from the surface of the tape, and while it will be described with particular reference to the projection of stock quotations and other data transmitted by a ticker telegraph system, it is not limited thereto but may be used as an advertising medium, for news and various other purposes.

In order that the invention will be more fully understood reference is had to the accompanying drawings in which:

Fig. 1 is an illustrative perspective view of apparatus embodying my invention in which the characters on the tape are projected by light transmitted through the tape;

Figures 2 and 3 are elevation and plan views respectively showing the essential features of a previously proposed scheme employing a plurality of concentrated light sources;

Fig. 4 is a perspective view of apparatus embodying my invention in which the projection is accomplished by reflection of light from the tape; and

Figures 5 and 6 are elevation and plan views, respectively of a system similar to that of Figures 2 and 3 employing a plurality of concentrated light sources and projecting the image by reflected light from the tape.

The apparatus illustrated in Figure 1 comprises a tape 10, having markings thereon which it is desired to project in enlarged form upon a suitable screen, a source of light 11, a condensing lens 12 of plano-convex form interposed between source of light and the tape, an objective lens system consisting

of two plano-convex lenses 13 and 14, a reflector 15 and a translucent screen 16.

The tape 10 is supported upon a transparent plate 17 across which it is moved continuously by a suitable motor 18. The projecting apparatus is illustrated in connection with the usual form of stock ticker the principal elements only of which have been illustrated such as the printing wheel 19 having on its periphery the letters and character to be reproduced upon the tape. The printing wheel is under the control of escapement 20 which is oscillated by the magnet 21 in the ticker circuit.

The apparatus employed for feeding the tape across the supporting plate 17 constitutes the subject matter of the patent to Dirkes mentioned above, and since it forms no part of the present invention, it will not be described in further detail.

The light source 11 may consist of a gaseous discharge lamp such, as the ordinary positive column neon lamp or it may be of any other suitable form having a linear light source such as a mercury vapor lamp or an incandescent filament lamp having a filament of a length substantially equal to the length of the tape to be projected at any instant. Current is supplied to the lamp 11 by conductors 22 and 23. A reflector 24 is disposed to one side of the light source for concentrating the light upon the lens 12. The light source 11 and the lens 12 have a linear dimension which is substantially co-extensive with the length of the tape to be projected at any extent, and thus serve to uniformly illuminate the tape over the entire area which is to be projected upon the screen. The lenses 13 and 14 are also co-extensive with the illuminated length of the tape so as to project a single image of the entire illuminated length of tape, upon the reflector 15. These objective lenses are curved in three dimensions, that is they are arched toward the reflector 15 in the direction of their longest dimension and are convex on one side transversely thereof in order to form an enlarged image on the screen both transversely and longitudinally and are supported by bracket members 25 and 26. The lense 14 is rendered adjustable by an adjusting screw 27 engaging with a threaded collar 28 forming part of the bracket 26. The bracket 26 is supported in a guideway 29 which allows vertical movement thereof.

Referring to Figures 2 and 3 for the purpose of comparison of the present invention with the prior art, I have shown a system employing a plurality of concentrated filament lamps designated as 30, 31 and 32. Each of these lamps is adapted to illuminate a definite portion only of the total length of the tape to be projected. For instance, the lamp 30 is disposed in connection with a reflector 33, condensing lens 34 and reflector 35

so as to illuminate a restricted portion 36 only of the total length of tape to be projected at any instant; this restricted portion of the tape being projected through a lens system 37 upon the reflector 38 from which it is reflected upon the translucent screen 39. The separate sections 36, 40 and 41 of the tape are each projected upon the reflector 38 by a separate system of lamps and lenses and recombined up on the screen so that when all of the lens systems are properly adjusted, they will simultaneously project the entire length of tape in separate successive adjacent positions upon the screen. Difficulty is experienced with this system however, in projecting the separate sections in their proper relative positions on the screen. In Fig. 2, I have shown the two end sections, bearing the characters A B C and G H I respectively, projected on the screen in such a way as to be shifted from their correct position towards the central section. As will be observed the adjacent letters of each section run into each other and where the sections overlap there will be a distortion or jumbling of the characters.

In Fig. 5, I have shown the projected image of the first and last sections of the tape shifted away from the central section, thus leaving a distinct line of demarcation between the separately projected sections.

It will be noted that with the apparatus which I have illustrated in Fig. 1, the light source and each of the lenses is coextensive with the full length of the tape to be projected at any instant and the entire length of tape is projected as a single image thus eliminating any possibility of overlapping of the characters. It will be understood that the objective lens system produces the image upon the reflector in enlarged or magnified form.

In Fig. 4 I have shown an embodiment which is similar to that shown in Figure 1 except that the light source 11, condensing lens 12 and reflector 24 are disposed above the tape and to one side thereof so as to project the characters on the tape through the objective lens system by reflection from the surface of the tape rather than transmission of the light through the tape.

Figures 5 and 6 show a system similar to that disclosed in Figures 2 and 3 but in which the separate sections of the tape are independently projected upon the screen by reflection from the tape. In these figures the light source is disposed with respect to the mirror 35 in such manner that the light is directed on to the face of the tape so as to be reflected therefrom through the lens system 37 and thence projected upon the reflector 38 and screen 39.

It is to be understood, that by the term linear source of light, I do not desire to be restricted to the use of a single lamp but

may employ a number of separate lamps disposed close together or associated with diffusing lenses, or otherwise arranged so as to constitute, in effect, a substantially continuous linear source of light.

It will be further understood that the apparatus which I have described may be incorporated in any suitable cabinet, such as that illustrated in the patent to Dirkes, and that many changes and modifications may be made therein without departing from the invention and therefore I do not desire to be limited to the details shown and described except in accordance with the appended claims.

What I claim is:—

1. In a projecting apparatus, the combination with a tape having markings thereon, of a source of light substantially coextensive with the length of tape to be projected at any instant, means for projecting said light upon said tape, a reflector, a lens interposed between the tape and reflector for projecting the markings of the tape upon the reflector, and a screen disposed so as to receive the image from said reflector, said lens having a linear dimension substantially coextensive with the light source and being convex towards said reflector along said linear dimension.

2. In a projecting apparatus, the combination with a tape having markings thereon, of a source of light substantially coextensive with the length of tape to be projected at any instant, a lens coextensive with said light source for projecting said light upon said tape, a reflector and a plurality of lenses disposed parallel to each other and interposed between said tape and said reflector for projecting the markings of said tape upon the reflector, each of said parallel lenses having a linear dimension substantially equal to the length of tape to be projected at any instant and being convex towards said reflector along said linear dimension.

3. In a projecting apparatus the combination with a tape having markings thereon, of a linear source of light substantially coextensive with the length of tape to be projected at any instant, a single lens coextensive with said light source for projecting said light upon said tape, a reflector, and a plurality of lenses disposed parallel to each other and interposed between said tape and said reflector for projecting the markings of the tape upon the reflector, each of said parallel lenses having a linear dimension substantially equal to the length of tape to be projected at any instant and said parallel lenses being convex towards said reflector along their linear dimension of greatest magnitude.

4. An apparatus for projecting markings from a tape, comprising a transparent support for the tape, means for advancing the tape across said support, a source of light disposed to one side of said support, a col-

lecting lens intermediate said light source and said support for directing the light through the tape, a screen, and a magnifying lens interposed between said screen and said support, said magnifying lens having a linear dimension substantially coextensive with said support for simultaneously projecting markings from a long length of tape upon said screen as a single image and being curved so as to magnify said markings both transversely and longitudinally.

5. An apparatus for projecting markings from a tape, comprising a support for the tape, means for advancing the tape across said support, a source of light disposed to one side of said support, a lens intermediate said light source and support for directing the light upon the tape, a screen, and a lens system interposed between said screen and said support, said lens system having a linear dimension substantially coextensive with said support and being curved in three dimensions for simultaneously projecting markings from a long length of tape upon the screen as a single image enlarged both transversely and longitudinally of the tape.

6. An apparatus for projecting markings from a length of tape, comprising means for supporting said tape, a light source having a substantially uniform intensity over the entire area of said tape to be projected at any instant, a plano-convex lens having a linear dimension substantially equal to the projected length of tape interposed between said light source and said tape for projecting light upon the tape, an objective lens system comprising a plurality of parallel lenses of plano-convex form, each having a linear dimension substantially equal to the projected length of the tape for receiving the image from said tape and a screen disposed so as to receive the image upon its surface in enlarged characters said parallel lenses being convex toward said screen.

In testimony whereof I affix my signature.
EVAN R. WHEELER.

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