April 17, 1928. 1,666,304

B. A. PROCTOR

PROJECTING MACHINE

Filed July 31, 1924

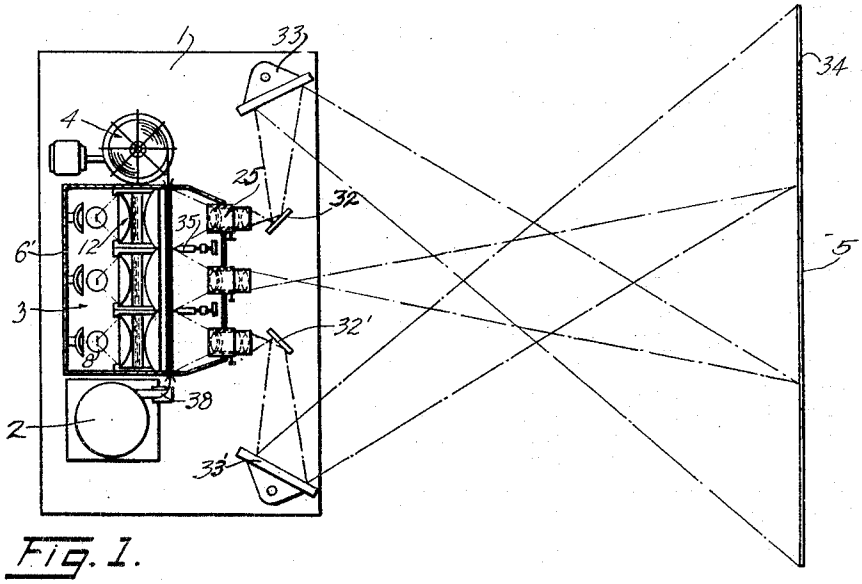


Fig. 1.

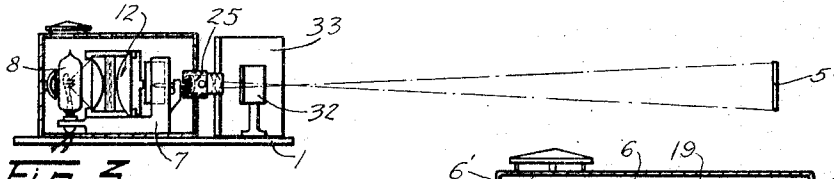


Fig. 3.

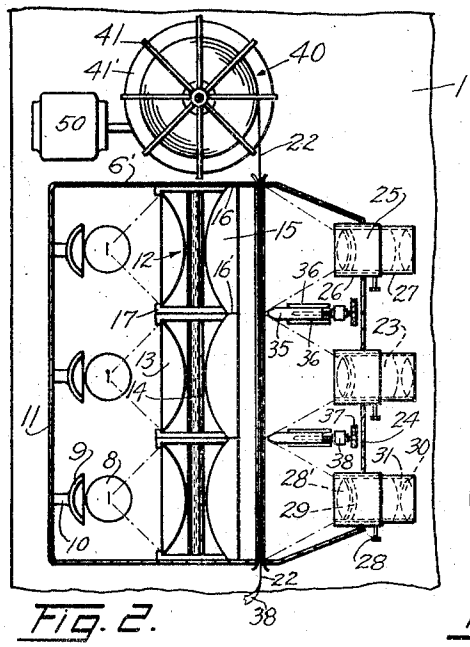


Fig. 2.

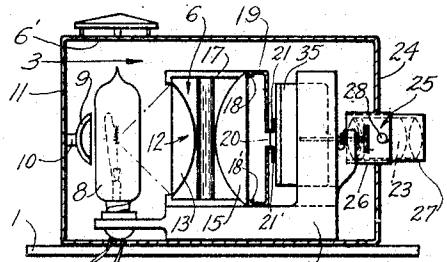


Fig. 4.

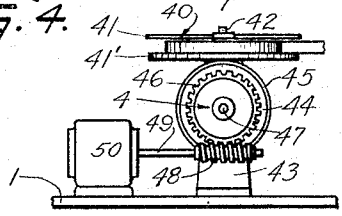


Fig. 6.

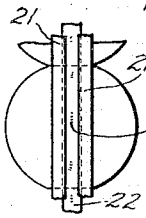


Fig. 5.

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UNITED STATES PATENT OFFICE.

BARTON A. PROCTOR, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO NEWS PROJECTION CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PROJECTING MACHINE.

Application filed July 31, 1924. Serial No. 729,308.

This invention relates to improvements in an apparatus for projecting a continuous or progressive length of material having configurations thereon upon a surface where said configurations will be visible in enlarged relation.

Among the objects of the invention it is aimed to provide means for projecting a series of progressive configurations simultaneously on a surface, means for projecting the respective sections of the configurations so as to produce on a surface a continuous progression of configurations in enlarged form, and in their original successive adjacent positions relative to one another, without indicating the line of demarkation of the respective sections, and means for drawing the length of material having the configurations thereon through the projector at any varying speed at which the sections of the material may be fed to the projector, and to maintain the length of material taut when the feeding is interrupted.

It is a purpose of this invention to provide means for projecting clear and non-superimposed enlargements of progressing configurations such as panoramic views, ticker tape quotations, sport results, et cetera, upon a screen.

Specifically it is aimed to provide an apparatus for projecting printed stock quotations from a ticker tape onto a translucent screen whereby the quotations will be visible in enlarged characters.

Further it is aimed to project a series of progressive printed stock quotations simultaneously on a screen so as to allow for relative comparison thereof in respect to the quotations immediately preceding or following.

Still further it is aimed to provide a series of projecting devices, simultaneously operative but so positioned as to project a continuous progression of stock quotations in their original successive adjacent positions in enlarged form without indicating the line of demarkation of the relative sections of the tape being drawn along and past the series of projecting devices.

It is further aimed to provide a friction drive for drawing the tape past the projecting devices at a speed controlled by the varying rate of feed of the ticker printing on the tape and free to slip when the feed is interrupted.

It is a further object of the present invention to provide means for winding up the tape after it has been fed past the projecting lenses which winding up means will automatically stop, start, and vary its speed according to the operation of the feeding means.

It is still further contemplated to provide novel shielding means in association with the projecting lens for limiting the divergence of the respective rays projected from the various lens whereby to prevent superimposition on the screen of one of the progressing configurations upon the other as they pass by the respective lens.

These and other advantages, capabilities and features of the invention will appear from the subjoined detail description of embodiments therefor illustrated in the accompanying drawings, in which

Figure 1 is a plan view of the completely assembled device;

Fig. 2 is an enlarged plan view of the projector;

Fig. 3 is a side elevation of the completely assembled device as shown in Fig. 1;

Fig. 4 is an enlarged side elevation of the projector as shown in Fig. 3;

Fig. 5 is an enlarged view of the condensers or lenses, showing the configuration thereof and the location of the moving tape and guide means therefor; and

Fig. 6 is a detail view of the take up mechanism for drawing the tape past the projector.

Referring now more particularly to the reference characters in the drawing, numeral 1 illustrates a table or stand upon which the ticker 2, the projecting apparatus 3, and the winding device 4 are supported. At a prerequisite distance from the projector there is located a translucent screen 5, upon which the configurations produced by the ticker are projected in enlarged form.

Referring to Figs. 1 to 5 inclusive, the projecting apparatus 3, consists of a plurality of individual projectors 6 each capable of acting as a complete projecting ap-

paratus of limited scope but so combined as will be disclosed as the description of the invention proceeds, as to produce an effect similar to one large projector, which obviously is impractical to construct and prohibitive in price for the purpose herein specified.

Each projector as shown in Figs. 1 to 4 inclusive is enclosed in position in the large cabinet or frame 6', the number of individual projectors being unlimited and dependent only upon the length of the ticker tape desired to be projected at one time on the screen. The projector consists of a base portion or support 7 upon which is carried a stereopticon lamp 8 which may be electrically or gas operated, or if desired of the carbon arc type. To the rear of the stereopticon lamp there is positioned a concave reflecting mirror 9 supported by a bracket 10 attached to the rear wall 11 of the cabinet 6'. This reflecting surface directs the light rays developed by the lamp 8 towards the condenser lens series 12 consisting of a plano convex lens 13, a water cell 14 of varying degree of thickness, and a plano-convex lens 15 having flattened portions 16 and 16' normal to the horizontal axis thereof. This condenser lens series 12 is contained in a lens holder 17, supported on the base 7, which holder partially covers the portions 18 and 18' of the lens 15 normal to the vertical axis of said lens.

The water cell 14 is so arranged as to allow for a definite amount of fluid contained therein for maintaining the required degree of coolness, or if desired, a continual circulation from an outside source may be arranged.

Attached to the lens holder frame 17 and arranged to rest on the base 7 in front of said holder, there is positioned a rectangular shield 19 having a rectangular slot or aperture 20 therein. This shield serves to block all rays diverging from the condenser lens except those directed towards the area covered by the aperture 20. Adjacent to and directly preceding the shield 19 at portions directly above and below the aperture 20 there are positioned guide strips 21 and 21' which are attached in any well known manner such as by rivets or by means of direct arc welding to the shield 19. In the space between the shield 19 and the guide means 21 and 21' a tape or carrier 22 having configurations such as printed numbers or symbols thereon is passed, the tape being directed by the shield and guide strips so as to pass directly in front of the aperture 20 on the shield whereby to be in the path of the rays diverging from the condenser lens 12. It is to be understood that the shield 19 is constructed to be of a length sufficient to cover the whole series of projection devices in the apparatus.

Arranged within the proper focal length from the condenser lens 12, there is positioned an objective lens series 23 in front of the projecting condenser series 12. This objective lens series 23 is fixed at the forward end 24 of the container 6, so as to be in direct line with the rays passing through the aperture 20. This objective lens series which is of the type usually adopted in screen projection consists of a collapsible holder 25 having sections 26 and 27 adjustably positioned by a set screw 28, each one of said sections containing a lens therein. In the rear section 26 of the holder there is positioned a combination of a flint glass convex lens 28' and crown glass concave convex lens 29, while the forward section contains a flint glass convex lens 30 in combination with a double concave lens 31. Since the function of this objective lens series is commonly known a detail description of their operation will not be necessary.

From this objective lens series the image projected from the tape is directed on the screen 5 which is composed of a translucent material, by a system of mirrors and a shield. Since the tape or carrier section 22 passes a series of these individual projecting devices, a novel means of synchronizing the projection simultaneously and clearly into one complete progression configuration of the various portions of the tape section 22 passing all the projecting devices will now be described.

In the table 1 at a predetermined prerequisite distance from each of the projecting objective lens series 23 except the center series, these are positioned mirrors 32 and 32' angularly displaced to direct the rays from the objective lens 23 to a second series of mirrors 33 and 33' pivotally mounted to the table 1. By means of this arrangement, the rays will be diverted from the objective lens 23 for example at the top of Fig. 1 to the mirror 32 from whence they are further diverted to the pivotally adjustable mirror 33 which subsequently directs and aligns the rays on the screen defining the image of the configuration 34 on the tape in enlarged form on the screen.

However the respective projecting condenser lens series would ordinarily divert the rays in juxtaposition upon each other, on their passage through the horizontally disposed aperture 20 in the shield 19. To prevent this there are preferably used a series of knife edged ray dividers or shields 35 which are fixed to the base 7 adjacent the guide strips 21 and 21'.

These knife edged ray dividers or shields 35 are preferably composed of blackened wood or metal colored with a dull shade, the dividers being cut off at their forward extremity to any desired angle whereby the rays tending to diverge beyond this angle

are cut off. The ray dividers are slidable in the guideways 36 mounted on the base 7, and are adjustably movable in a forward direction by means of a screw 37 fixed thereon and movable through a threaded bearing 38 mounted on said base 7 and offset from the guide sections 36.

The ticker tape after having the configurations 34 printed thereon by the mechanism of the ticker 2 is directed towards the projecting mechanism by an angled bend 38′ which locates the printed face of the tape towards the objective lens. From there the tape passes along the guide strips 21 and 21′ in front of the aperture 20 of the shield 19.

The blade 38^{a} indicated in Fig. 1 forms a guide for gradually bending the tape from a horizontal plane to a vertical plane and to twist the tape to the right of its original path of movement. In addition to forming a guide, the blade 38^{a} also forms an extended friction surface between the ticker 2 and the projecting position so that when the ticker resumes operation, after having been arrested, the resistance offered by the blade 38^{a} will be sufficient, initially to form a loop between the ticker 2 and the blade 38^{a} so that, the vibrations transmitted to the tape when the ticker operates will, at least partially, be absorbed by this loop, the re-wind reel 41 cooperating with the blade 38^{a} to maintain the tape taut during its passage through the projecting position. This friction creating surface also functions to prevent the sudden arrest of the tape upon the arrest of the ticker feeding means, cooperating with the tape, wind-up reel and driving means, gradually to bring the wind-up reel to rest and therewith gradually bring the tape to rest.

To draw the tape along at the rate with which it is fed from the ticker the winding means 4 is positioned adjacent the projectors 3. This winding means 4 consists of a horizontally positioned reel 40 having guide disks 41 and 41′ therein, the reel being rotated on a shaft 42 loosely mounted in the bearing 43. On the bearing 43 there is further mounted a disk 44 having a leather ring 45 mounted on its periphery and in frictional contact with the disk 41 of the reel 40. To this disk 44 there is fixed a worm gear 46, both disk and gear rotating on the shaft 47 fixed in the bearing bracket 43.

The gear 46 is driven by means of a worm 48 mounted on the shaft 49 which is directly rotatable with the motor 50 or any other suitable driving means.

The winding operation is carried out as follows. The motor 50 rotates the worm 48 at any predetermined speed, which motion is transmitted to the worm gear 46. This gear 46 is fixed to the disk 44 which consequently rotates therewith, carrying the leather ring 45 around towards the winding reel 42, with which the collar is in frictional contact. However since the contact of the leather ring 45 and the reel 42 is frictional the motion of the reel is dependent only upon the degree of slack of the tape being wound on said reel and allows the ring to slip when the feed of the tape is interrupted, taking place for instance, when no quotations are being transmitted. This frictional contact of course is adjusted so as to produce a rotation of the winding reel 42 only when the tape being wound thereon is slack. By this means the movement of the tape with the printed configurations thereon can be controlled to cooperate with the rate of printing and release of the tape from the ticker, and the wind up reel will be stopped, started, and its velocity changed to correspond to the operation of the feeding means. In other words, whenever there are no quotations transmitted and the ticker feeding means is thereby interrupted, tension will be created in the portion of the tape extending from the ticker feeding means to the wind up reel due to the briefly continued operation of the wind up reel, which tension will cause the wind up reel to be interrupted, and in turn, as the tension is relieved, upon the ticker feeding means again operating, the wind up reel will again be caused to operate.

Noting especially Fig. 5 of the drawings the condenser lenses 15 which are of the plano-convex type having flattened portions 16 and 16′ normal to the horizontal axis, it is to be seen that by flattening these portions 16 and 16′, that the appearance of three or more circles depending on the number of projectors in use, upon the series is prevented. By cutting off the end portions to make the flattened surface, the rays which ordinarily diverge through the extremities of the lens near the periphery are eliminated and clear images of the respective sections of the tape in position before the different lenses are projected on the screen.

The operation of the device proceeds as follows. The light from the stereopticon lamp 8 is directed forward through the condenser lens series 12. The light directed towards the rear of the lamp is reflected through the condenser lenses 12 by the mirror 9 and located at the rear of the lamp. The water cell 14 in the condenser series is used to cool the lenses as previously stated.

Since a shield 19 is disposed in front of the condenser lenses, the light passing therefrom is limited in its direction by the slot 20 contained in the shield. The tape is passed along this slot or aperture 20, the height and the positioning thereof being determined by the guide strips 21 and 21′ above and below the aperture 20 and directly preceding the shield 19.

The plurality of projectors simultaneously produce images of the tape passing by the aperture 20, but tend to direct their rays so that the image of the ends of the tape with regard to the ends of each projector section will generally be superimposed upon one another. To correct this difficulty the knife edge guide shields 35 are located at a point adjacent the extremity of the respective lenses 15. These knife edge shields which are adjustable to any desired position with relation to the respective lenses 15 prevent the passage, by means of the angular configuration of their front faces, of the rays carrying the image of the printed portions of the tape which would tend to become superimposed upon one another in the objective lens and subsequently on the screen in enlarged form. As the rays strike the respective knife edge shields, the sections thereof tending to spread beyond the angle of the front face of the shield, are cut off by the shield with the result that the rays of each respective condenser lens section are forced to pass directly into the corresponding member of the objective lens series 23 without any superimposition of one upon the other.

The image projected into the respective objective lens is reflected onto a mirror 32 angularly disposed upon the rear frame 1 so as to further reflect the image on the movable mirror 33 angularly disposed to the mirror 32 and pivotally mounted on the main frame for adjusting the location of the image when thrown onto the screen. The objective lens at the center of the projecting device naturally does not require a mirror for reflecting and directing the image forward therein upon the screen.

The tape as previously stated is carried along the slot or aperture 20 between the guides 21 and 21′ by the winding reel 42 which is operable by the friction of the leather ring 45 rotating against the disk thereon. If the ticker does not produce or feed the tape, which subsequently becomes taut between the ticker and the winding reel, the motion of the winding reel is stopped while the leather ring 45 on the periphery of the disk 44 continues to rotate along being frictionally in contact with the disk, until a slack is formed again by the resumption of the feed of the ticker at which time the winding reel is again rotated by the frictional contact with the leather ring. It is to be noted that by this means the winding can be automatically adjusted to any variable speed of the ticker at any movement in operation of the latter and furthermore, that the slippage will compensate for the increasing speed transmitted to the tape as the tape wound on the wind-up reel 4 forms a roll of increasing diameter.

It is obvious that various changes and modifications may be made to the details of construction without departing from the general spirit of the invention as set forth in the appended claims.

I claim:

1. In a device of the class described, the combination with a length of material having configurations thereon, of a plurality of lenses disposed in a row substantially parallel to and in front of said length of material and spaced therefrom and from one another for simultaneously projecting said length of material in separate successive adjacent positions, a screen spaced from the front of said lenses the distance required to receive the images of the successive adjacent portions of the length of material being projected in their original successive adjacent positions relative to one another, and a shield positioned in front of the length of material and between the optical axes of adjacent lenses to limit the direction of the rays carrying the images projected therefrom.

2. In a device of the class described, the combination with a length of material having configurations thereon, of a plurality of lenses disposed in a row substantially parallel to and in front of said length of material and spaced therefrom and from one another for simultaneously projecting said length of material in separate successive adjacent positions, a screen spaced from the front of said lenses the distance required to receive the images of the successive adjacent portions of the length of material being projected in their original successive adjacent positions relative to one another, a shield positioned in front of the length of material and between the optical axes of adjacent lenses to limit the direction of the rays carrying the images projected therefrom, and means for spacing the shields a greater or less distance from said length of material according to the focus of the lenses relative to the length of material.

3. In a device of the class described, the combination with a stock quotation tape having quotations printed thereon, of means for projecting said quotations, a ticker having a printer and feeding means for feeding the tape to said projecting means as the printer operates, said projecting means projecting said quotations both when said tape is moving during the feeding action and while it rests when the printer is at rest, a wind-up reel, means for winding up the tape onto said reel after it has been delivered by said ticker feeding means, said wind-up reel cooperating with said ticker feeding means to create an increased tension in the portion of said tape between said ticker feeding means and said wind-up reel when the operation of said ticker feeding means is discontinued while said wind-up

reel continues to operate, and means sensitive to said increased tension to cause the operation of said wind-up reel to be stopped by the increased tension thus created.

4. In a device of the class described, the combination with a length of stock quotation tape having configurations thereon, of means for projecting images of said configurations, a ticker having a printer and feeding means for feeding the tape to said projecting means, said projecting means projecting said quotations both when said tape is moving during the feeding action and while it rests when the printer is at rest, a wind-up reel, and frictionally operable driving means cooperating with said wind-up reel for drawing the tape past the projecting means at the rate developed by the feeding means and winding up the tape on said wind-up reel, said driving means being free to slip relative to said wind-up reel when an increased tension is created in said tape upon the arrest of said feeding means thereby causing the wind-up reel to stop until the tension is again relieved.

5. In a device of the class described, the combination with a stock quotation tape having quotations printed thereon, of means for projecting said quotations, a ticker having a printer and feeding means for feeding the tape to said projecting means as the printer operates, said projecting means projecting said quotations both when said tape is moving during the feeding action and while at rest when the printer is at rest, a wind-up reel, means for actuating said wind-up reel independent of said feeding means to wind the tape up onto said reel after it has been delivered by said ticker feeding means, said actuating means cooperating with said feeding means to create an increased tension in said tape when the operation of said ticker feeding means is discontinued while said wind-up reel continues to operate, and means sensitive to said increased tension to cause the operation of said wind-up reel to be stopped by the tension thus created.

6. In a device of the class described, the combination with a screen, of a partition parallel to and in back of said screen and having an elongated aperture therein, a length of material having configurations thereon, means for feeding said length of material adjacent to said partition and past said aperture, three condensing lenses disposed in a row parallel to and in back of said length of material for projecting light rays through said aperture and through the length of material passing said aperture, three objective lenses disposed in a row parallel to and in between said length of material and said screen and spaced from one another and from said length of material and said screen, the intermediate of said objective lenses projecting the images of the configurations on the intermediate portion of the length of material directly onto the screen, and mirrors for deflecting the images of the configurations from the two end objective lenses onto the screen in successive relation with the intermediate portion whereby to have a continuous progression of successive adjacent portions of said length of material, said screen being spaced from said objective lenses and said mirrors the distance required to receive the successive adjacent portions of the material projected in their original successive positions relative to one another in enlargement.

7. The combination with a ticker having a printing mechanism for printing news items on a tape and a feeding mechanism for imparting a feeding impulse to the tape after each printing impression, of a projecting mechanism to which the tape is fed by said feeding mechanism, a wind-up reel for winding up the tape after it has been delivered from said projecting mechanism, and drive means independent of said feeding mechanism and operating at a uniform rate of speed for driving said wind-up reel to wind up the tape as the same is fed thereto by the feeding means, said drive means being free to slip relative to said wind-up reel so that the slippage will compensate for the increasing speed transmitted to the tape as the tape wound on the wind-up reel forms a roll of increasing diameter and being operable after said feeding mechanism comes to rest to take up the slack in said tape and cause said wind-up reel thereupon to come to rest.

8. The combination with a ticker having a printing mechanism for printing news items on a tape and a feeding mechanism for imparting a feeding impulse to the tape after each printing impression, of a projecting mechanism to which the tape is fed by said feeding mechanism, a wind-up reel for winding up the tape after it has been delivered from said projecting mechanism, and drive means independent of said feeding mechanism and operating at a uniform rate of speed for driving said wind-up reel to wind up the tape as the same is fed thereto by the feeding means, said drive means being free to slip relative to said wind-up reel so that the slippage will compensate for the increasing speed transmitted to the tape as the tape wound on the wind-up reel forms a roll of increasing diameter.

9. The combination with a ticker tape having printed thereon a single row of successive configurations, of a plurality of adjacent light apertures disposed to the rear of said tape so that the light rays from said apertures will simultaneously be projected through successive adjacent portions of the

tape and project images of the printed matter formed on said tape, a lens for each light aperture to receive the images projected from its light aperture, a screen for receiving the images of the printed matter so projected, and means for preventing the superimposition upon said screen of any image upon another image including reflecting means for intercepting the images projected from some of said lenses and directing them onto said screen to reproduce the printed matter on said tape in its original order of printing.

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