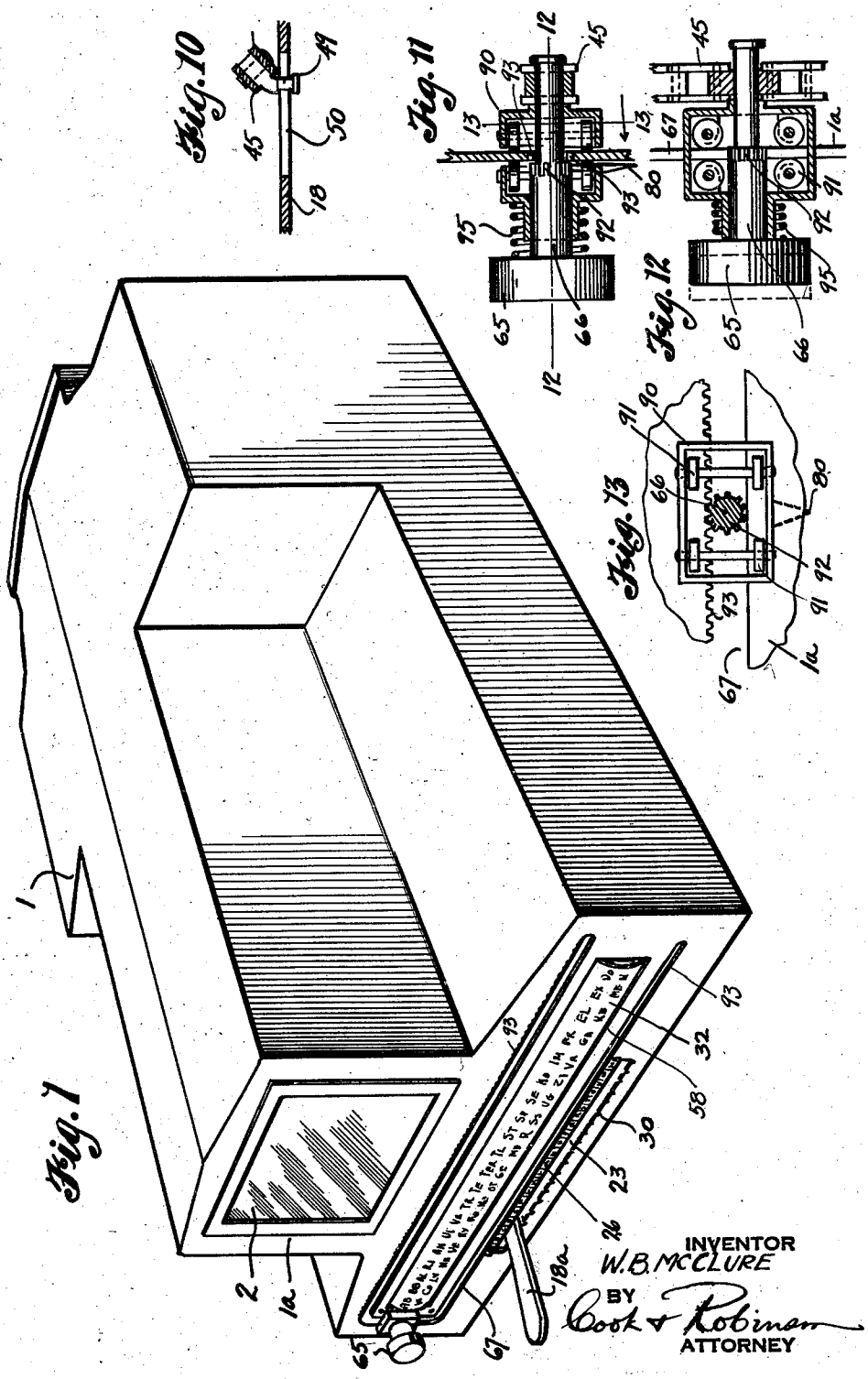
April 13, 1937. W. B. McCLURE 2,076,853

MEANS FOR PROJECTING AND ENLARGING CONDENSED INFORMATION

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MEANS FOR PROJECTING AND ENLARGING CONDENSED INFORMATION

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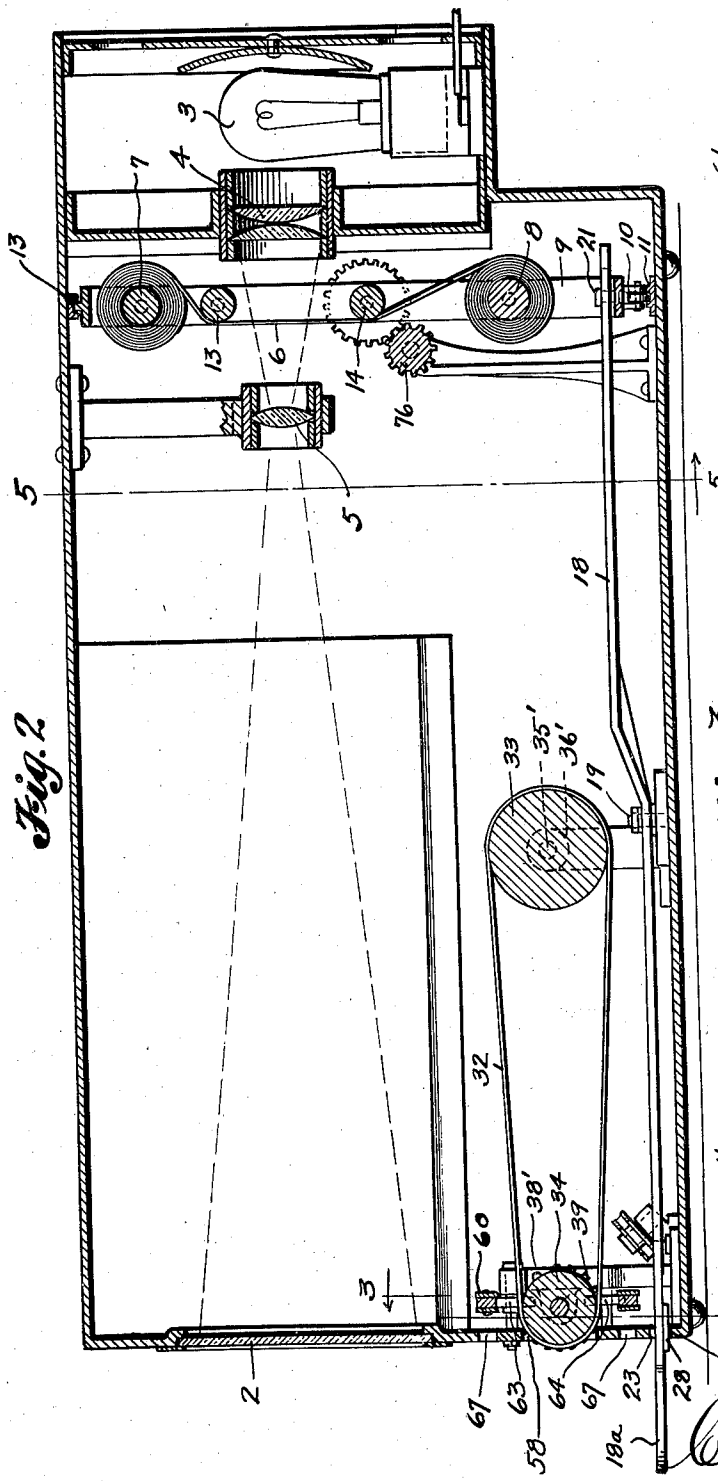


Fig. 2

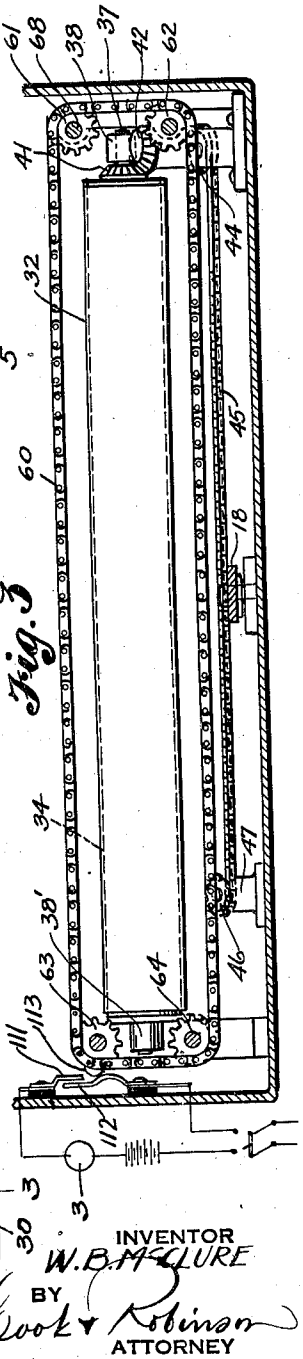


Fig. 3

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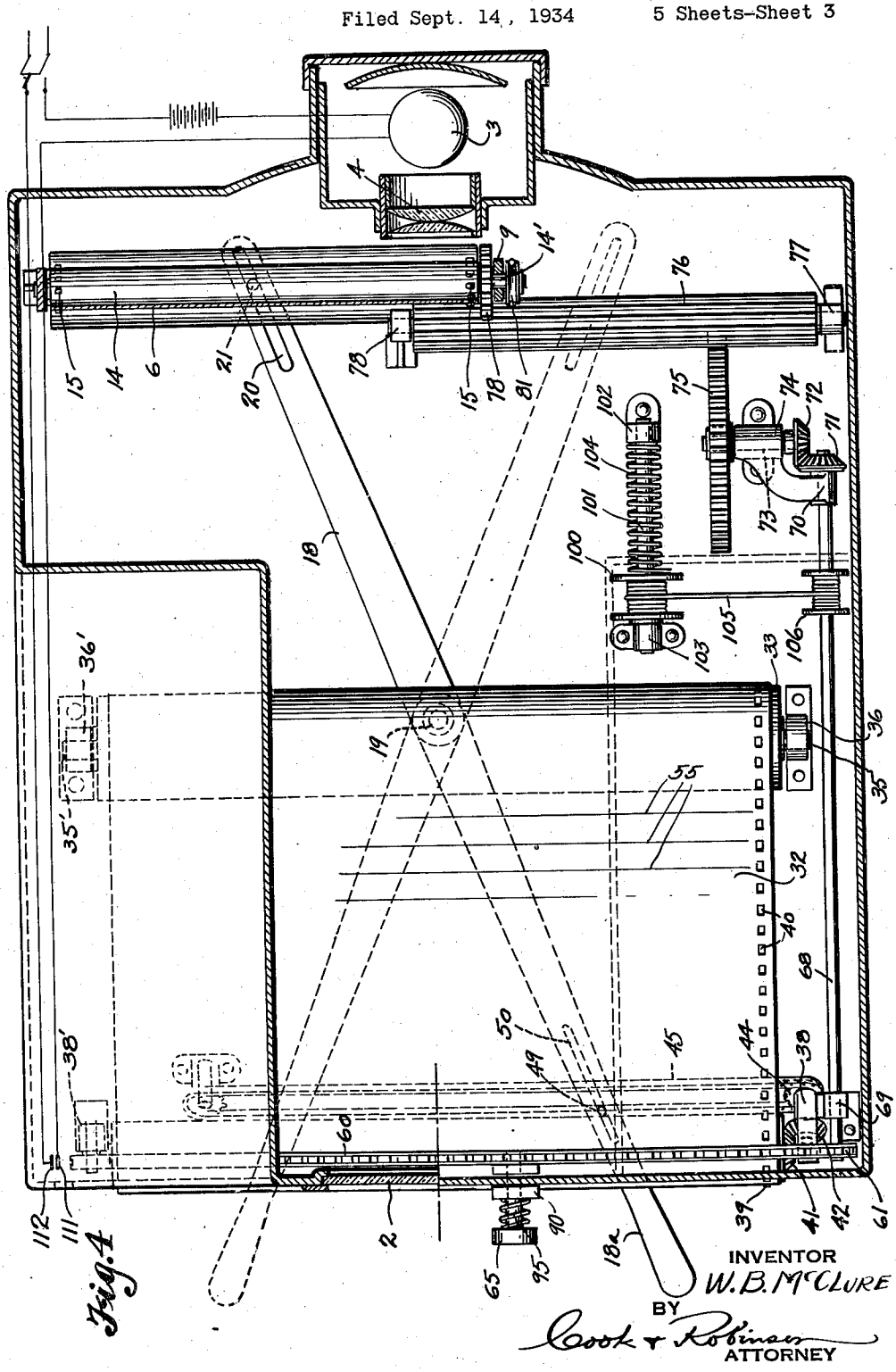


Fig. 4

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Fig. 6

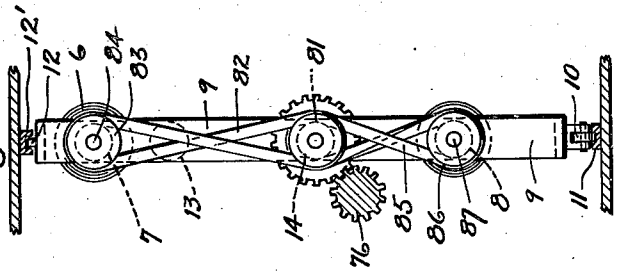


Fig. 5

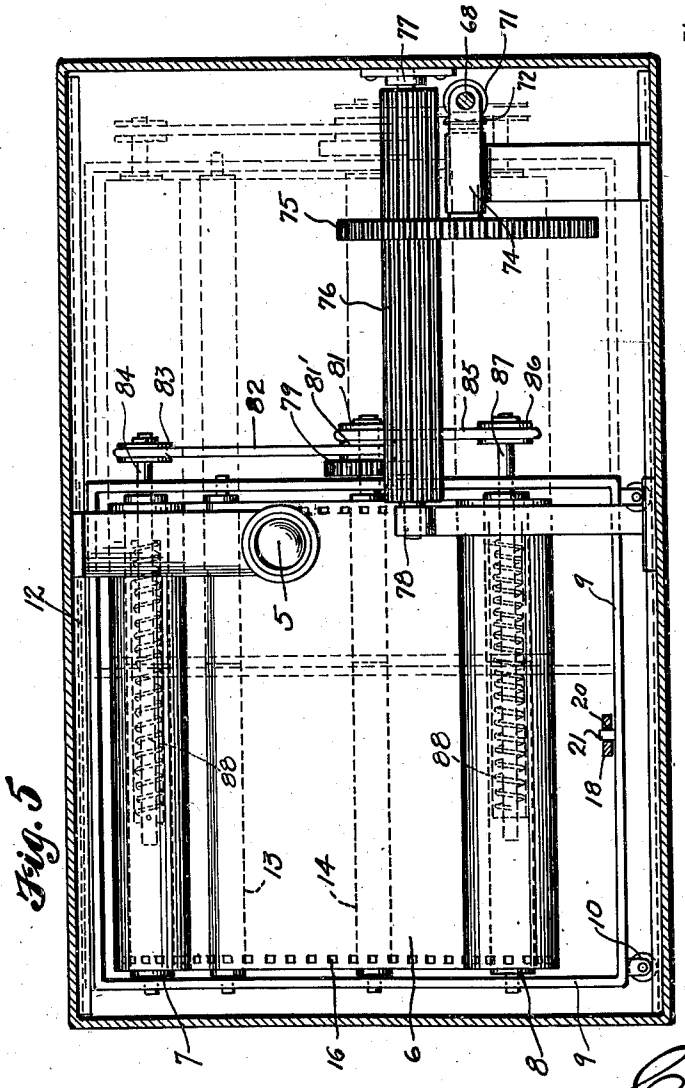
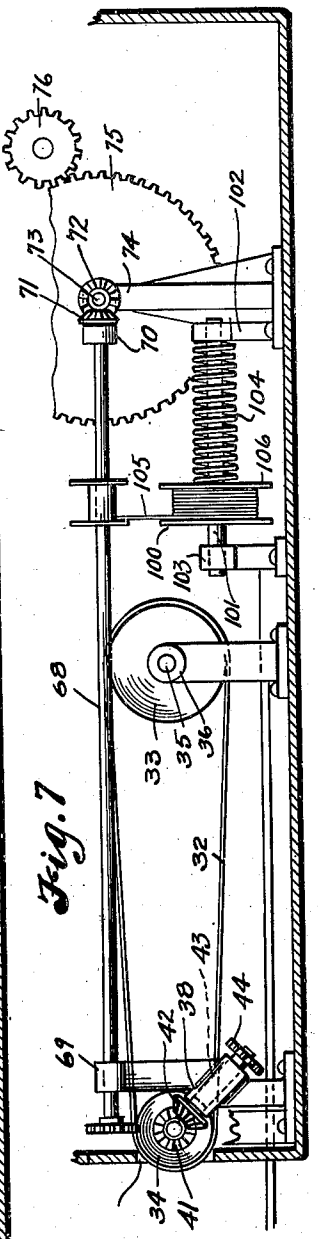


Fig. 7



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Fig. 14

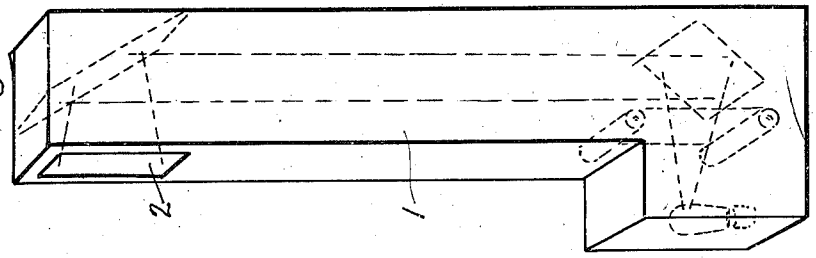


Fig. 8

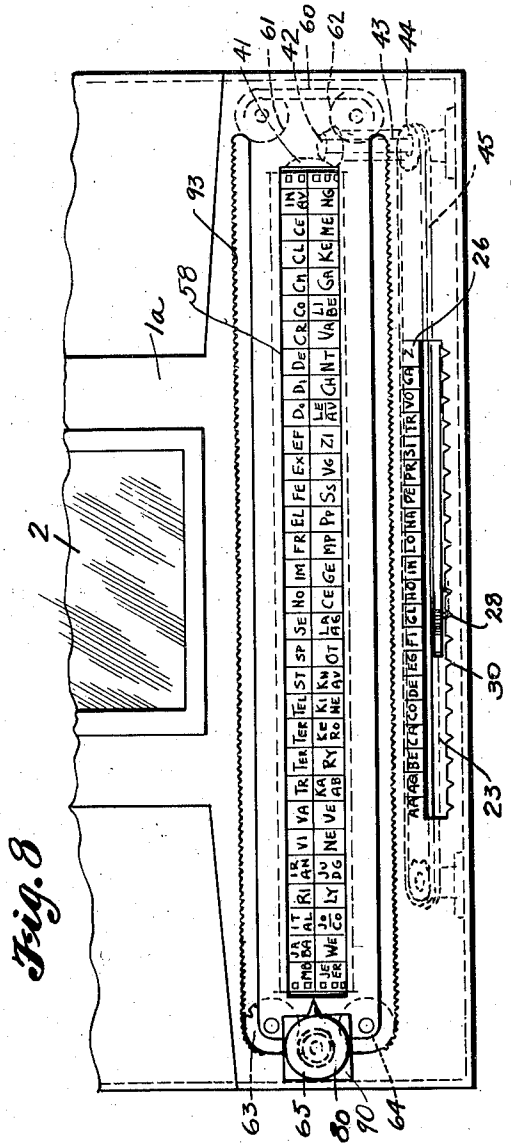
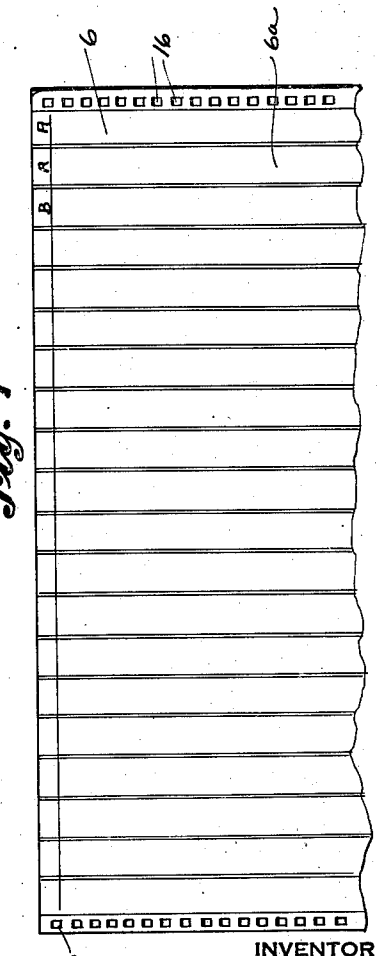


Fig. 9



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UNITED STATES PATENT OFFICE

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MEANS FOR PROJECTING AND ENLARGING CONDENSED INFORMATION

William B. McClure, Seattle, Wash.

Application September 14, 1934, Serial No. 744,025

5 Claims. (Cl. 88—24)

This invention relates to improvements in projection machines and more particularly to machines of that character whereby information, recorded on a transparent strip of film, may be brought into position for projection by a light beam onto a viewing screen; it being the object of this invention to provide a machine of the above character whereby information, as might be compiled in dictionaries, directories, reference works, periodical indexes and other works listed in alphabetical order and printed or photographically recorded in very minutely reduced form on the record strip, may be quickly and automatically brought into position and projected onto a viewing screen, in enlarged form for easy reading or viewing.

More specifically stated, the present invention resides in the provision of a machine of the above character wherein there is a record strip on which data or information is recorded in almost microscopic form in a plurality of columns extending lengthwise of the strip and wherein the strip is attached at its ends to rollers and may be wound from one onto the other in opposite directions to bring any desired portion of a selected column into alinement with the projecting beam. Also, the rollers are mounted in a frame which is laterally shiftable to bring any one of the several columns extending longitudinally of the film into registration with the projecting beam.

Other objects of the invention reside in the details of construction of the means for selecting and for automatically bringing any desired information or data of the record strip into position for projection.

Other objects reside in the details of construction and combination of parts, as will hereinafter be described.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein—

Fig. 1 is a perspective view of a machine embodying the present invention.

Fig. 2 is a cross section in a vertical plane lengthwise of the machine.

Fig. 3 is a cross section on line 3—3 in Fig. 2.

Fig. 4 is a sectional view in offset, horizontal planes showing the machine in plan.

Fig. 5 is a cross section in the vertical plane of line 5—5 in Fig. 2, particularly illustrating the shiftable frame and strip winding gear.

Fig. 6 is an end view of the film carriage; showing the film winding belts and sheaves.

Fig. 7 is a side view of the winding gear and index strip.

Fig. 8 is a front end view of the indexing means.

Fig. 9 is a short section of the record strip.

Fig. 10 is a detail showing the connection of the indexing lever with the sprocket chain belt whereby adjustment of the indexing strip is made.

Fig. 11 is an enlarged sectional view of the selecting knob and vernier adjustment means.

Fig. 12 is a horizontal section, on line 12—12 in Fig. 11.

Fig. 13 is a cross section, on line 13—13 in Fig. 11.

Fig. 14 is a side view of a device of an alternative form of construction.

Referring more in detail to the several views of the drawings—

1 designates, in its entirety, a housing containing the mechanism of the device. Set within the forward end wall 1a of this housing is a panel 2, of frosted glass, or other suitable material, onto which the data or information is projected for viewing. Located within the housing, at the end opposite the viewing screen, are the projecting devices including an electric lamp 3, a light focusing lens 4 and a projecting lens 5, arranged so as to cast a beam of light through the record strip presently described, and onto the viewing screen.

The record strip 6 is wound, as seen in Fig. 2, on vertically spaced horizontal rollers 7 and 8 which are revolubly supported in a rectangular carriage frame 9. This frame is shiftable transversely within the housing so that portions of the record film throughout its width may be brought into alinement with the projected light beam. As seen in Fig. 5, the frame 9 is supported at its lower edge by rollers 10 that follow a track 11, and at its upper edge it has a rib 12 movable in a guide channel 12' attached to the top wall of the housing.

The record strip 6 is transparent and has information, data, etc., printed or photographically recorded thereon, and this information is alphabetically arranged in the columns 6a that extend lengthwise of the strip, as seen in Fig. 9. The strip is drawn taut between the two rollers 7 and 8 on which it is wound and passes across two intermediate guide rolls 13 and 14 which are also revolubly supported in the frame 9. The roller 14 is the strip winding roller and has sprocket teeth 15 at its ends arranged to mesh within perforations 16 along the opposite edges of the strip.

In order that the frame 9 may be shifted transversely of the machine to bring any selected columns of the strip into alinement with the projecting light beam, there is provided a shifting lever 18 which is pivotally attached at a medial point, by a pivot stud 19, to the bottom wall of the housing, as seen in Fig. 4. At its rear end this lever 18 extends across the lower rail of frame 9 and has a longitudinal slot 20 into which a stud 21, fixed centrally to the lower rail of the frame 9 extends. The forward end of the lever 18 extends through a horizontal slot 23 in the front wall of the housing and provides a handle portion 18a by which it may be moved from side to side, as indicated in Fig. 4, thereby to shift the frame 9 accordingly.

Each column 6a of the record strip contains words, data or other information in alphabetical order. For example, refer to Fig. 9, the first two columns on the right contain words or information under the index letters AA and AQ; the third column contains words or information under the index letter B, etc., and in order that the user of the machine may shift the frame 9 to a position whereby a desired column may be brought into alinement with the projecting apparatus, I have made notations or indexes in spaces of a horizontal column 26 on the front wall of the housing adjacent the top edge of the horizontal slot 23 which correspond to the indexes of the various columns of the record strip. Thus, by adjusting the lever 18 into registration with any selected index letter in the column 26, the frame 9 will be shifted laterally within the housing to bring the corresponding column of the record film into alinement with the projecting beam.

In order that the lever 18 may be accurately positioned, it is provided on its under side and near the outer end, with a rib 28 that is adapted to engage within notches 30 located along the lower edge of slot 23 and spaced in accordance with the spacing of the divisions of the column 26. When it is desired to shift this lever, it is merely lifted to unseat the rib from a notch, then it is shifted one way or the other to the desired position and the rib again seated in a notch to hold the position.

Cooperating with the lever 18, as a means of selecting any desired information on the record strip 6, is an index belt 32, which, as seen best in Figs. 4 and 7, is mounted on supporting rollers 33 and 34; the roller 33 being mounted by end trunnions 35 and 35' revoluble in supporting bearings 36 and 36' and roller 34 being supported by its end trunnions 37 and 37' revoluble in bearings formed as parts of brackets 38 and 38'. The roller 34 is the driving roller for this index belt and it has sprocket teeth 39 at its ends adapted to mesh with perforations 40 in the edge portions of the belt, as seen in Fig. 4.

Fixed on the trunnion 37 of the roller 34, see Figs. 3, 4 and 7, is a bevel gear 41, and meshing with this is a driving bevel gear 42 on a supporting shaft 43 revoluble in the bearing bracket 38. On the lower end of shaft 43 is a sprocket wheel 44 and operating about this is a sprocket chain belt 45 which extends in a direction transversely of the housing and is supported also by a sprocket wheel 46 mounted by a bracket 47, as shown in Figs. 3 and 4. The lower run of this belt extends across the lever 18 and is operatively attached to the lever by means of a stud 49 that is fixed, as seen in Fig. 10, in a link of the belt and which extends into a longitudinal slot 50 in the lever. Thus, by lateral shifting of the lever 18, the sprocket chain belt 45 is moved accordingly, and this drives the sprocket wheel 44 and shaft 43 to rotate the roller 34 and thus to shift the index belt accordingly.

Printed, or otherwise recorded on the index belt 32, in transverse columns 55, as shown in Fig. 4, are the indexes for subject matter or information contained in the various longitudinal columns 6a of the record strip 6. The roller 34 is located adjacent a relatively wide horizontal opening 58 in the front wall of the housing and the columns 55 of notations or indexes on the index belt 32 are brought into view within this horizontal opening, as shown in Figs. 1 and 8. Thus, when the lever 18 is shifted to a position to bring any desired column of the record strip into alinement with the projecting beam, it simultaneously causes the roller 34 to rotate to a position whereby the columns 55 of indexes on the index belt corresponding to the selected column on the record strip, will be brought into view in the horizontal opening 58, then, with the indexes in view, it is only necessary to wind the record strip on the rollers 7 and 8 to a position to bring the desired information into view. The means provided for thus winding the record strip comprises a sprocket chain belt 60 that is mounted, as seen in Figs. 3 and 8, about supporting sprockets 61 and 62 at one side of the housing and sprocket wheels 63 and 64 at the other side, so that the upper and lower runs of this belt extend across the housing along upper and lower edges of the horizontal opening 58. Fixed to this sprocket chain belt is a knob 65 on a supporting stem 66 that extends through a slot 67 in the housing. By grasping the knob 65, the chain belt 60 may be shifted in either direction. The sprocket wheel 61 is fixed on a supporting shaft 68 that extends rearwardly in the machine, through supporting bearings 69 and 70, and at its rear end has a bevel gear 71 fixed thereon in mesh with a bevel gear 72 on a shaft 73 revolubly supported on a bracket 74. Fixed on shaft 73 is a relatively large gear 75 which meshes with an elongated gear wheel 76 which, as seen in Figs. 4 and 5, is supported at one end in a bearing 77 and at its other end is supported by a bracket bearing 78, mounted on the bottom wall of the housing. The supporting shaft 14' of roller 14 has a gear wheel 79 fixed thereon and this meshes with the gear 76 at all times.

This arrangement of connecting gear provides that, after the frame 9 has been shifted by means of lever 18 to a position at which a selected column 6a of the record strip 6 has been brought into alinement with the projecting beam, and the index belt 32 has been positioned to show columns of indexes for that particular column, within the horizontal opening 58, then the operator, by grasping the knob 65 and shifting it to a position at which a pointer 80 carried therewith, is brought into alinement with the desired index letter on the exposed columns; this, through the mediacy of the gearing just described, winds the record strip 6 from one of its supporting rollers onto the other to bring the selected portion of the column into position for projection onto the panel 3 for viewing.

Winding of the record strip from roller 7 to roller 8 and vice versa, is effected by operatively connecting these rolls with the shaft 141 of the driving roll 14. As seen in Fig. 5, there are belt sheaves 81 and 81' fixed on the supporting shaft 14' of roller 14. A belt 82 operates about the sheave 81' and a sheave 83 fixed on the support-

ing shaft 84 of roller 8. Likewise, a belt 85 operates about sheave 81 and a sheave 86 on the supporting shaft 87 of roll 8. The shafts 84 and 87 are connected with their respective rolls through the medium of coiled springs 88 which, at all times, maintain the record strip 6 under tension between the rolls 7 and 8 and compensate for change in diameter of the rolls due to winding of the strip from one to the other.

The belt shifting knob 65 is supported by the stem or shaft 66 and this is arranged, as shown in Figs. 11, 12 and 13, to support a cage 90 in which rollers 91 are contained to engage opposite sides of the housing wall as a guide to hold the knob against binding. The stem is longitudinally movable and at its inner end slides through the sprocket chain link and it has teeth 92 thereon to be engaged with teeth 93 along one edge of the slot 67. Thus, after the knob has been adjusted to the approximate position, it is pushed inwardly to engage the teeth 92 with teeth 93 so that by a slight rotative adjustment of the knob, the chain belt will be adjusted to obtain a sort of vernier adjustment of the belt 32. A coiled spring 95 that is disposed between the knob and cage 90 normally holds the teeth disengaged. This vernier action is to provide a slow motion to the record strip 6, making it possible to read image and make final adjustment on desired data.

After the knob 65 has been adjusted to any position along the slot 67 and the desired information has been brought into view, it is manually retained there while the information, as cast on the viewing plate 3 is read. Then, on release of the knob, the record strip 6 is automatically moved back to what is termed the neutral position, as shown in Fig. 1; this being its central position. The means for so adjusting the strip is shown best in Fig. 4 and it comprises a winding drum 100 on a winding shaft 101 supported by brackets 102 and 103. A coiled spring 104 surrounds the shaft and is attached at its opposite ends to the drum and to the bracket 102. A cable 105 is attached to the drum 100 and to a drum 106 fixed on shaft 68. Thus, when shaft 68 is revolved by adjustment of the knob along slot 67 away from its neutral position, it causes the cable 105 to be wound onto drum 106 and off of drum 100, and thereby increases the tension of spring 101. When the knob is released, the tension of the spring, applied through the connecting cable, shaft and gearing disclosed, unwinds the cable 105 from drum 106 and thus returns the knob to the neutral position.

The lamp 3 for the projecting means is in an electric circuit including a switch 100 located at one end of the sprocket chain belt 60, and including a fixed contact 111 and a yieldable contact 112, as seen in Fig. 3, against which a lug 113 on the chain engages when the knob is in neutral position, thereby to disengage the contacts to open the circuit to the lamp. This switch closes the circuit incident to movement of the knob.

Assuming the device to be so constructed, its operation briefly described is as follows:

If it is desired to look up any certain information the operator first moves the lever 18 to a position at which it will be in registration with the index letter in the column 26: that is, if he desires to find the definition of the word "cane" he shifts the lever 18 into alinement with the letters CA in the column 26 which is above the slot through which the lever extends. This shifting of the lever moves the carriage 9 to a position at which the column on the record film corresponding to this index letter is brought into alinement with the projecting apparatus. At the same time it adjusts the index belt to bring the index columns thereon corresponding to the column on the record strip into the horizontal opening 58. He then grasps the knob 65 and moves it from the neutral position in which it is shown in Fig. 8 to a position at which the pointer 80 will be alined with the index letters NE in the column then exposed in the opening 58. As soon as the pointer is moved from neutral position, a circuit is closed through the lamp and the information, exposed on the record strip in the line of the projecting beam, will be cast on the screen 2 in an enlarged form suitable for reading. If it is not possible to bring the information desired exactly into the panel by setting of the knob as above described, the vernier adjustment may be employed: that is, the knob may be pushed in to engage the teeth on its shaft with the teeth along the edge of the slot 93, and then by a slight rotation of the knob the record strip will be slightly moved to the extent desired.

Devices of this character may be made in various forms without departing from the spirit of the invention. For instance, the device may be in an upright form, as shown in Fig. 14, wherein the viewing screen is at the upper end of the machine and the operating mechanism at the lower end.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is—

1. A machine of the character described comprising a projection screen, a source of light, means for projecting a beam of light therefrom onto the screen, a record film strip having information arranged thereon in separate columns lengthwise of the film, and each column containing information under one index character and in items arranged in order lengthwise of the column, a primary reference index for individual column selection, movable secondary indices for the items of the individual columns, and a relatively movable column selecting means associated with the primary index and operatively connected to effect a relative movement of film and light source for projection from the column designated by the selecting means with reference to the primary index and to simultaneously bring the corresponding secondary index into item selecting position, and an item selecting means associated with the secondary indices and movable relative thereto to effect a longitudinal movement of the film for the projection of an item designated by the second selecting means with reference to the secondary index.

2. A machine of the character described comprising a projection screen, a source of light, means for projecting a beam of light therefrom onto the screen, a record film strip having information arranged thereon in columns lengthwise of the strip; each column containing items of information all under a common index character and having the items thereof in a predetermined sequence lengthwise of the column, a stationary primary reference index for the individual columns, a movable index carrier comprising individual index columns for all of the columns of the film strip, a column selecting means associated with the primary index and relatively movable therealong and operatively connected for effecting a relative movement of the film strip and light in a direction transversely of the film for projection from a desig-

nated column, and operatively connected for effecting an adjustment of the movable index carrier to bring an item index for that particular column into a designated position, and an item selecting means adjustable along the positioned item index and operatively connected for moving the film strip lengthwise relative to the light for projection from the column of that item designated by the item selecting means with reference to the item index.

3. A machine of the character described comprising a housing, a projection screen fitted in a wall opening thereof, a source of light, a means for projecting a beam of light therefrom onto the screen, a film carriage, a record film strip thereon having itemized information arranged in columns lengthwise of the strip; each column containing items under a common index character and different from the others and each column having the items thereof in alphabetical order, a column selecting index on the housing wall, a selector mechanism mounted in the housing with a part movable along the column selecting index and operatively connected with the carriage to shift the film relative to the light beam transversely for column selection, a secondary selector movable along a definite path, and a secondary index comprising a movable surface on which are columns of item indices individually for each of the columns of the strip, means operatively connecting the secondary index for movement by the selector mechanism to automatically locate the item index for any selected column adjacent the path of movement of the secondary selector, and means operatively connecting the secondary selector with the film for moving the latter lengthwise relative to the light beam for projection of that item on the film corresponding to that designated by the secondary selector with reference to the secondary index.

4. A machine of the character described comprising a housing, a projection screen fitted in a wall opening thereof, a source of light, a means for projecting a beam of light therefrom onto the screen, a film carriage, a guide therefor, a record film strip wound on spools mounted by the carriage, and supporting the strip in the path of the light beam, a winding means for moving the strip lengthwise; said film strip having itemized information arranged thereon in columns lengthwise of the strip; each column containing items under a common index letter and each column having the items thereof in alphabetical order; said housing having a wall slot and an index viewing opening, a column selecting index adjacent said slot, a selector lever mounted in the housing and manually movable along the slot relative to the index, and operatively connected with the carriage to shift the film relative to the light beam for column selection, a selector pointer movable along the said index viewing opening, a secondary index comprising a movable belt, on which are columns of item indexes for each of the individual columns of the film strip, means operatively connecting the said selector lever for an automatic adjustment of the secondary index to bring the item index for a selected column into view in said viewing opening, and means operatively connecting the selector pointer and film winding means for moving the film lengthwise for item selection corresponding to the position of the pointer relative to the item index in said viewing opening.

5. A machine of the character described including a projection screen, a record film strip having a column of items of information lengthwise thereof, a source of light, means for projecting light from said source through the film strip onto the screen, and an index for the column comprising individual indices for the items in the column, a selector mechanism movable along the index and means operated by the selector mechanism for moving the strip into position for projection onto the screen of an item corresponding to the selected index.

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