

Nov. 24, 1925.

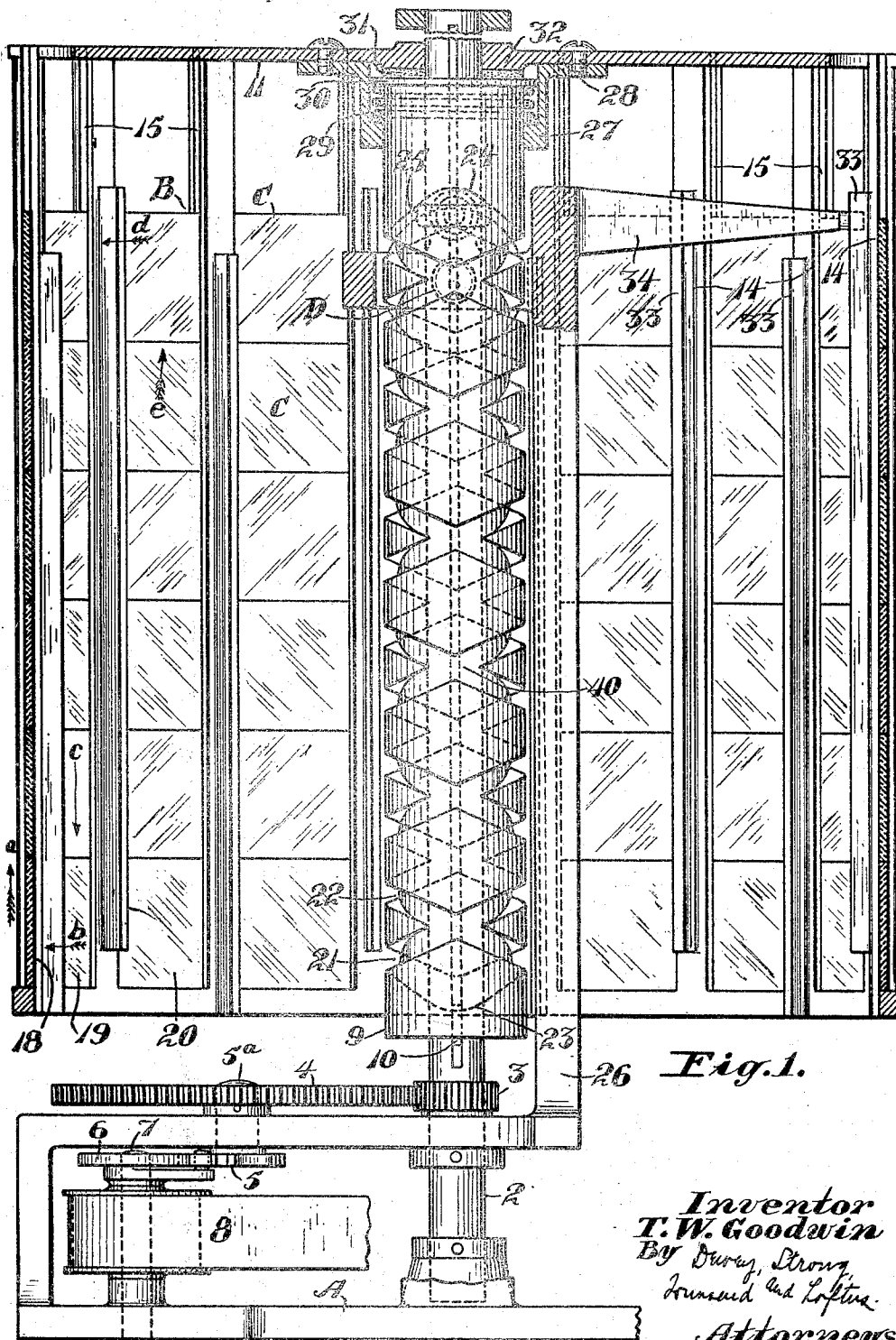
1,563,183

T. W. GOODWIN

PICTURE PROJECTING MACHINE

Filed May 31, 1922

2 Sheets-Sheet 1



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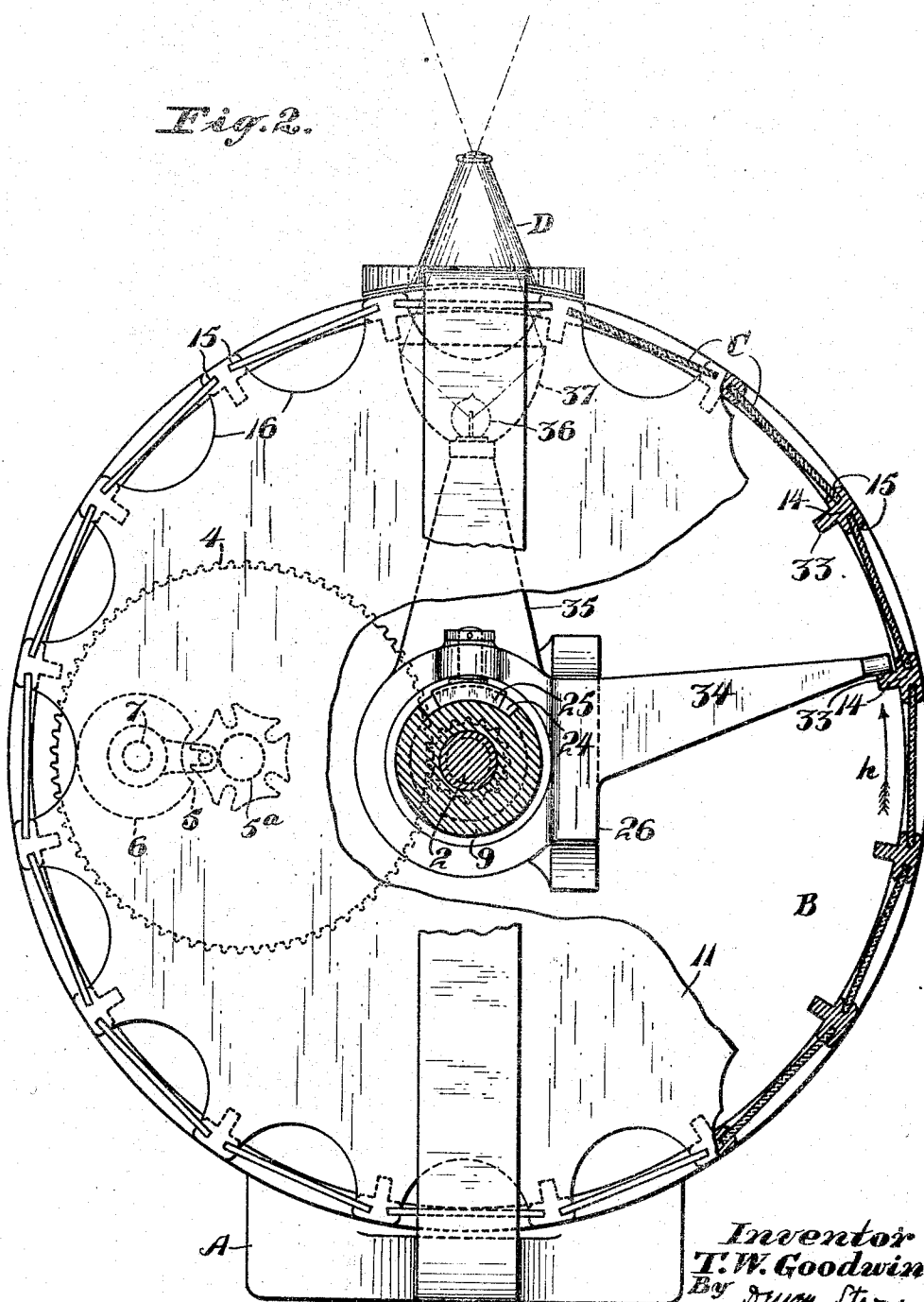
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Fig. 2.



Inventor
T. W. Goodwin
By **Dwight Strong**
Attorneys

UNITED STATES PATENT OFFICE.

THOMAS W. GOODWIN, OF BERKELEY, CALIFORNIA, ASSIGNOR OF ONE-FOURTH TO
H. E. MALMSTEN, OF BERKELEY, CALIFORNIA.

PICTURE-PROJECTING MACHINE.

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To all whom it may concern:

Be it known that I, THOMAS W. GOODWIN, a citizen of the United States, residing at Berkeley, county of Alameda, and State of California, have invented new and useful Improvements in Picture-Projecting Machines, of which the following is a specification.

This invention relates to a picture projecting machine and especially to an apparatus constructed and arranged to automatically and successively project pictures from a series of negatives or slides upon a screen, and to repeat and repeat the exhibition as long as the apparatus is in operation.

The object of the present invention is to generally improve and simplify projecting machines of the character described; to provide an elongated cylindrical magazine or holder capable of receiving and supporting a suitable number of slides; to provide means for intermittently imparting vertical and rotary movement to the magazine to successively align the slides with relation to the lens of a projecting machine, and to provide means for rendering the mechanism automatic in operation, and for repeating the exhibition as long as the machine is running. Further objects will hereinafter appear.

One form which my invention may assume is exemplified in the following description and illustrated in the accompanying drawings, in which—

Fig. 1 is a central, vertical, longitudinal section of the projecting machine.

Fig. 2 is a cross section of the same partly broken away.

Referring to the drawings in detail, A indicates a base member of suitable construction, and vertically disposed with relation to the base and journaled therein is a driving shaft 2. This shaft is driven in one direction, but is intermittently rotated and such rotation is imparted by a pair of gears 3 and 4 and a Geneva movement 5. The continuous rotor of the Geneva movement which is indicated at 6 is carried by a shaft 7, and this shaft 7 is rotated by a pulley and belt as at 8 which is driven from any suitable source, as an electric motor or the like not shown. Adapted to turn in unison with the shaft 2 is a tubular or sleeve-like shaft 9. This shaft is also vertically movable on the shaft 2 and is accordingly splined

to the shaft as indicated at 10. Supported by the upper end of the sleeve or shaft 9 is a head member 11, and suitably secured thereto or formed as an integral part thereof is a cylindrical shaped magazine generally indicated at B. This magazine is rotated in unison with the sleeve shaft 9 and it is also moved vertically in unison with the same and this is accomplished as will hereinafter be described.

The magazine proper is provided for the reception of magic lantern slides, as generally indicated at C. The slides are arranged in vertical and horizontal row formation as shown in Figs. 1 and 2, and means are employed for successively aligning the slides with the lens of a picture projecting machine, generally indicated at D. Each horizontal row of the magazine contains sixteen slides and each vertical row contains six, and as six times sixteen equals ninety-six, it can be seen that the number of slides contained in the present machine is ninety-six. This number may however be increased or decreased as the number of slides employed in the vertical and horizontal rows may be varied to suit the particular purpose of the machine.

The exterior surface of the cylindrical magazine consists of a series of vertical bars 14 which are tied with relation to each other in any suitable manner to maintain parallelism. The opposite sides of the bars are grooved, as at 15, and form channels or guides for the reception of the slides C. The head member 11, to which the drum or bars 14 are secured, are cut out adjacent the outer edge, as at 16, and the respective slides may thus be readily grasped when they are being removed or inserted. Any suitable method of supporting and securing the slides may however be employed as this does not form any important feature of the present invention.

The slides, as previously stated, are arranged in vertical and horizontal row formation and they are successively displayed during the operation of the machine. The magazine is raised and lowered vertically through a step by step movement when the exhibition is going on, and it is also turned horizontally about its longitudinal axis when changing from row to row, that is the pictures in each row are individually exhibited and the magazine

will during this movement move in a vertical direction only. After one row has been completed, the magazine is automatically rotated about its axis until the next row comes into position and it is again moved vertically until the second row has been completed; the movement of the magazine being in the direction of arrows, *a, b, c, d, e*, etc. By referring to Fig. 1, it will be seen that the magazine will first lift vertically through a step by step movement, for instance until all of the pictures in the row 18 have been exhibited. It will then turn horizontally about its longitudinal axis in the direction of arrow *b* until the row 19 aligns with the lens D. The magazine will then be lowered vertically through a step by step movement until all the slides in row 19 have been exhibited and a horizontal movement will be imparted in the direction of arrow *d* until row 20 moves into alignment with the lens, and the cycle of operation will thus be repeated. This movement is transmitted to the magazine in the following manner:

Cut in the exterior surface of the sleeve shaft 9 is a pair of helical grooves as indicated at 21 and 22, one groove having a right hand pitch and the other a left hand pitch. These grooves are connected at their respective ends as at 23 and 24 so as to form a continuous groove. Projecting into the groove is a shoe 25. This shoe is pivotally supported on a stationary standard 26 and will, due to its stationary position, impart a vertical movement to the sleeve shaft and the magazine first in a vertical upward direction; this movement being imparted through step by step stages and during the intermittent revolution of the shaft 10 and the sleeve shaft 9. The magazine however is secured against rotary movement in unison with the shafts 2 and 9, except after the completion of each row of slides, and the rotary movement imparted is therefore intermittent. No positive connection is formed between the upper end of the sleeve shaft 9 and the head 11 of the magazine, but a friction drive connection is formed by an inverted collar 27 secured to the drum, as at 28, a spring 29, a collar 30 and a friction washer 31, that is a hub 32 on the drum fits loosely over the upper end of the shaft 2 and is turnable with relation thereto, and as this is the case the weight of the drum and the head 11 will be exerted on the friction washer 31 and the collar 30, which is formed integral with the upper end of the sleeve shaft; this friction being further increased by the interposition of the spring 29 between the collar 27 and the collar 30. Thus as the shafts 2 and 9 rotate, a continuous friction is exerted between the washer 31 and the head 11 to rotate the head 11 and

the magazine carried thereby, but such frictional turning movement is prevented by employing a series of vertical guides as indicated at 33, that is an arm 34 formed as a part of the stationary standard 26 projects radially against the inner surface of the magazine and here alternately engages the vertical guides 33. These guides are equal in length, as shown, but they are staggered with relation to each other, thus each alternate guide will present a high end at the upper end and a low end at the opposite end, and this staggered or step-like formation permits alternate engagement of the arm 34 with the guides and these guides in turn serve the function of securing the drum and magazine against rotation except when a guide 33 moves out of engagement with the arm 34, as will be described.

Any suitable type of picture projecting machine may be employed and this is preferably positioned within the drum; the projector being supported by the stationary standard 26 by means of an arm 35. The projector employed in this instance consists of a lamp 36, a reflector 37, by which the rays of the lamp are concentrated and projected through the slides, and it furthermore consists of a projecting lens D, which is suitably supported exterior of the magazine as shown in Fig. 2. During the operation of the machine the slides successively register with the reflector 37 and the lens D and they remain stationary when so registering for a predetermined period. The following slide is then moved into alignment and exhibited, and this operation is repeated and repeated as long as the machine is in operation.

In actual operation power is transmitted to shaft 7 by any suitable means or as here indicated by the belt 8. The rotor of the Geneva movement will thus be continuously rotated and an intermittent movement will be transmitted to shaft 5^a, upon which gear 4 is secured. This gear is intermittently rotated five steps to complete one revolution and each step or partial revolution of this gear is transmitted to the gear 3 and the shaft 2; the gear ratio being such that for each partial revolution of gear 4 one complete revolution will be transmitted to the gear 3 and the shaft 2. This movement is also transmitted to the sleeve shaft 9 as it is splined, as at 10, to shaft 2, and the sleeve shaft will consequently rotate one revolution in unison with shaft 2 and then come to a rest period. It will then again be rotated in unison with shaft 2 through the action of the Geneva movement and gears 3 and 4, and this intermittent rotation will continue as long as the machine is in operation. The pitch of the helical grooves 21 and 22 is such that one revolution of the shaft 9 will move the sleeve 9 and the magazine B the

vertical height of one slide, and such vertical movement is imparted to the sleeve shaft and the magazine through the medium of the stationary shoe 25. By referring to Fig. 1 it will be seen that the shoe 25, together with the projecting reflector and lens D, are positioned at the upper end of the magazine and that the magazine in turn has been lowered to its extreme limit, where it is exhibiting or projecting the uppermost slide in one of the vertical rows. As this is the case arm 34 will engage one of the vertical guides 33 and rotary movement of the magazine will be prevented during each revolution of the shafts 2 and 9, thus during each intermittent rotation, magazine B and sleeve shaft 9 will be raised so that one slide after another will successively register with the reflector and the projecting lens D, and this will continue until the lowermost slide is reached. The vertical guide 33 will at this point move out of register with the lower end of the guide and during the next revolution of shafts 2 and 9 turning movement will also be imparted to the head 11 and the magazine proper. This turning movement however, will only be one-sixteenth of a complete revolution for each of the similar sixteen vertical rows of slides. The succeeding guide 33 is lower than the guide which has just moved out of engagement with the arm 34, and this guide will thus engage the arm 34 when one-sixteenth of a revolution has been imparted to the magazine, and further turning movement will be prevented. The next turning movement of the shafts 2 and 9 will thus impart vertical movement to the magazine and the sleeve shaft and the row which was last brought into alignment with the reflector and the projecting lens will now move downwardly in a vertical direction and each slide contained in this row will move into alignment in successive order. The uppermost slide will finally be reached and the upper end of the guide 33 will then move out of alignment with the arm 34 and a horizontal turning movement will be transmitted to the magazine to the extent of one-sixteenth of a revolution. The succeeding vertical guide 33 extends above the one which just moved out of register with the arm 34, and further turning movement will thus be prevented. This cycle of operation will be repeated and repeated and the magazine will continue to intermittently rotate in the direction of arrow *h* as long as the machine is in operation, each step of the partial rotation amounting to one-sixteenth of a revolution as in this instance sixteen vertical rows of slides are employed. However if twelve rows are employed, each partial revolution will be one-twelfth of a revolution, and so on.

The joining of the right and left hand helical grooves indicated at 21 and 22, at

the points indicated at 23 and 24, is of importance as it automatically reverses the vertical movement of the magazine and the sleeve shaft 9, and the length of the shoe 25 employed is also of importance as it must be sufficiently long to straddle the intersecting points of the right and left hand helical grooves indicated at 40, that is the shoe must be of such length as to bridge the gaps or intersecting points 40 as an interlock might otherwise be produced, and it is furthermore of importance that the shoe is pivotally supported as the shoe assumes one incline when the sleeve shaft and magazine are travelling upwardly and an opposite incline when they are travelling downwardly. The machine illustrated in the present instance is particularly adapted for advertising purposes and the like. It is entirely automatic in operation and requires no attention once set in operation, and to either stop or start the same it will only be necessary to open or close the circuit through the motor by which belt 8 is driven. The slides may contain pictures, advertisements, or whatever may be desired, and these may be readily changed from time to time as any slide in the vertical row may be readily removed and replaced.

The mechanism employed is exceedingly simple in construction and the apparatus as a whole is small and compact when the number of slides contained is considered. The amount of power required to operate the apparatus is small and as no attendant is required, it can readily be seen that the cost of operation need hardly be considered.

While certain features of the present invention are more or less specifically illustrated, I wish it understood that various changes in form and proportion may be resorted to within the scope of the appended claims, similarly that the materials and finish of the several parts employed may be such as the experience and judgment of the manufacturer may dictate or various uses may demand.

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

1. In a picture projecting machine of the character described a vertically disposed shaft, a sleeve shaft splined thereto and vertically movable thereon, an elongated cylindrical magazine supported by the sleeve shaft and movable vertically in unison with the same, means for intermittently rotating the first named shaft and the sleeve shaft in unison, means for imparting a vertical movement to the sleeve shaft and the magazine in unison during rotation of the first named shaft and the sleeve shaft, and means for imparting a partial rotary movement to the magazine at the end of a predetermined number of vertical movements.

2. In a picture projecting machine of the character described a vertically disposed shaft, a sleeve shaft splined thereto and vertically movable thereon, an elongated cylindrical magazine supported by the sleeve shaft and movable vertically in unison with the same, means for intermittently rotating the first named shaft and the sleeve shaft in unison, means for imparting a predetermined number of step by step vertical movements to the sleeve shaft and the magazine both in an upward and in a downward direction, and means actuated by the turning movement of the sleeve shaft and the first named shaft for imparting a partial turning movement to the magazine at the end of each predetermined number of step by step vertical movements.

3. In a projecting machine of the character described a vertically disposed shaft, a sleeve shaft surrounding the same and vertically movable thereon, means for imparting an intermittent rotary movement to the two shafts in unison, a stationary support adjacent the sleeve shaft, a connected right and left hand helical groove formed in the surface of the sleeve shaft, and a member on the support projecting into the helical groove to impart a vertical movement to the sleeve shaft during turning movement thereof.

4. In a projecting machine of the character described a vertically disposed shaft, a sleeve shaft surrounding the same and vertically movable thereon, means for imparting an intermittent rotary movement to the two shafts in unison, a stationary support adjacent the sleeve shaft, a connected right and left hand helical groove formed in the surface of the sleeve shaft, a member on the support projecting into the helical groove to impart a vertical movement to the sleeve shaft during turning movement thereof, a cylindrical shaped magazine supported by the sleeve shaft and movable vertically in unison with the same,

a friction drive interposed between the sleeve shaft and the magazine normally tending to rotate the magazine, and means securing the magazine against rotation except after predetermined vertical movement thereof.

5. In a projecting machine of the character described a vertically disposed shaft, a sleeve shaft surrounding the same and vertically movable thereon, means for imparting an intermittent rotary movement to the two shafts in unison, a stationary support adjacent the sleeve shaft, a connected right and left hand helical groove formed in the surface of the sleeve shaft, a member on the support projecting into the helical groove to impart a vertical movement to the sleeve shaft during turning movement thereof, a cylindrical shaped magazine supported by the sleeve shaft and movable vertically in unison with the same, a friction drive interposed between the sleeve shaft and the magazine normally tending to rotate the magazine, a series of vertical guides secured to the magazine, and a stationary arm engageable therewith, said arm normally securing the magazine against rotary movement, and said vertical guides being staggered to permit them to travel into and out of engagement with the stationary arm during vertical movement of the magazine.

6. In a machine of the character described the combination with a cylindrical shaped magazine and the means for imparting a vertical upward and downward movement thereto, of a series of vertical guides carried by the magazine, said guides being staggered vertically with relation to each other to present alternate high and low points at their opposite ends, and a stationary arm projecting into the path of said vertical guides and alternately engageable with the respective guides.

THOMAS W. GOODWIN.