

Oct. 20, 1925.

1,557,727

E. M. REYNOLDS

MOTION PICTURE MECHANISM

Filed May 2, 1923

3 Sheets-Sheet 1

Fig. 1

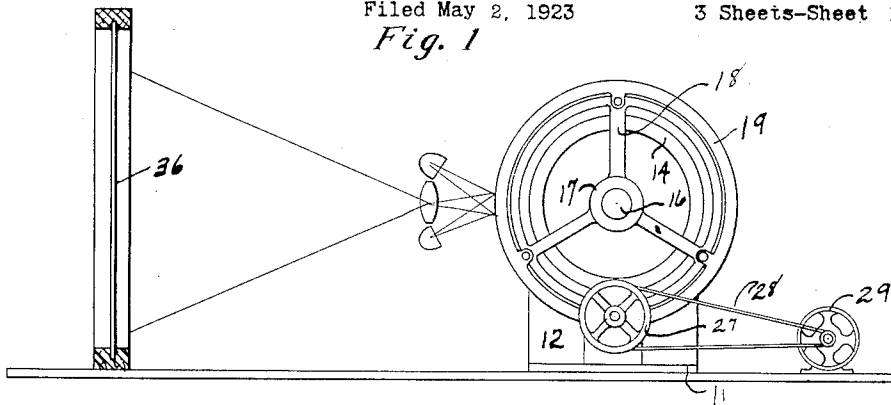


Fig. 3.

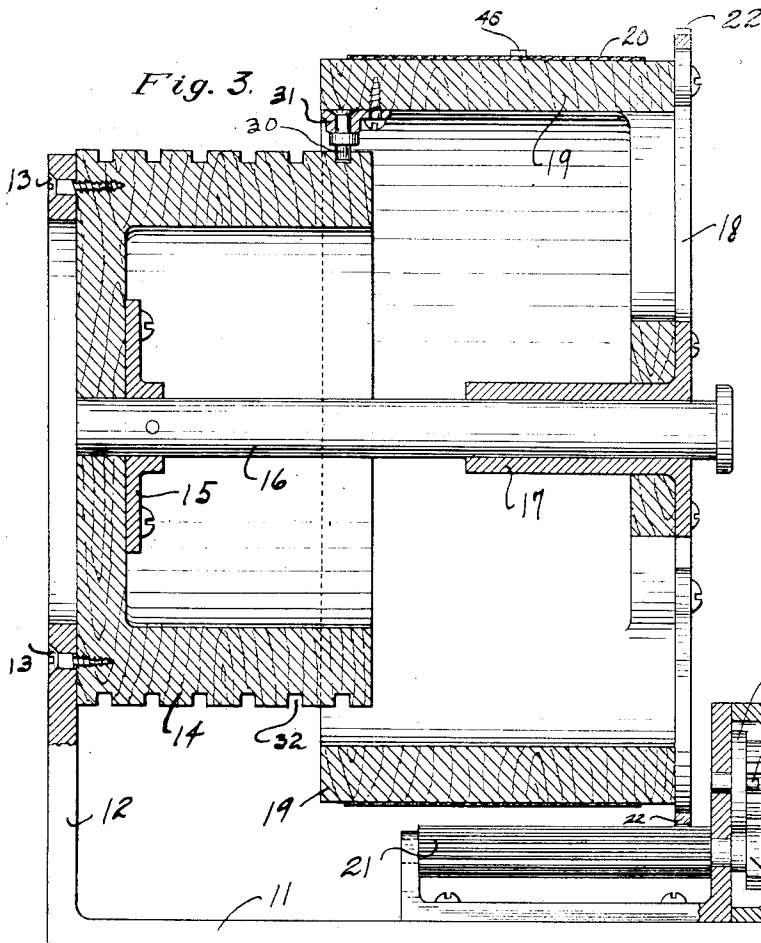
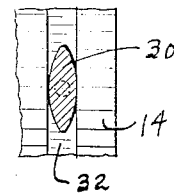


Fig. 6



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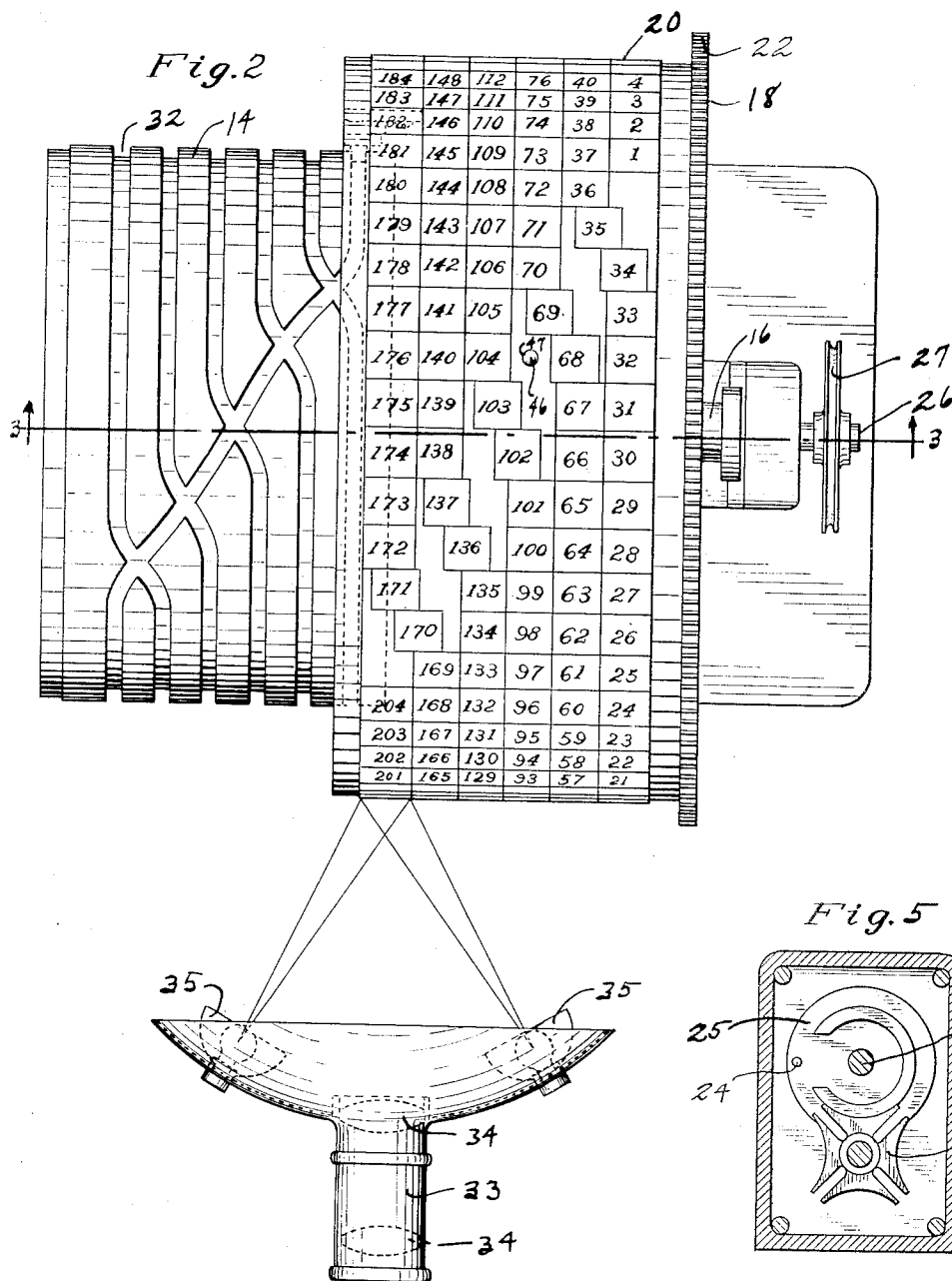
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Fig. 4.

183	147	111	75	39	3
182	146	110	74	38	2
181	145	109	73	37	1
180	144	108	72	36	
179	143	107	71	35	
178	142	106	70		34
177	141	105	69		33
176	140	104	68		32
175	139	103	67	31	
174	138		102	66	30
173	137		101	65	29
172		136	100	64	28
171		135	99	63	27
	170	134	98	62	26
		169	133	97	25
204	168	132	96	60	24

186	150	114	78	42	6
185	149	113	77	41	5
184	148	112	76	40	4

Fig. 8

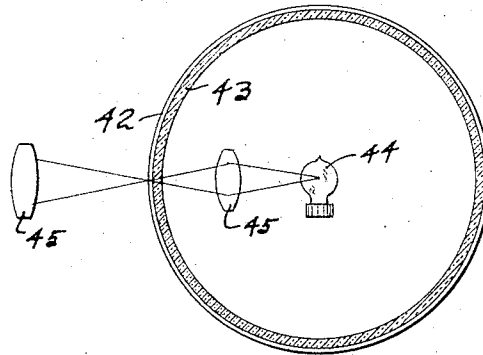
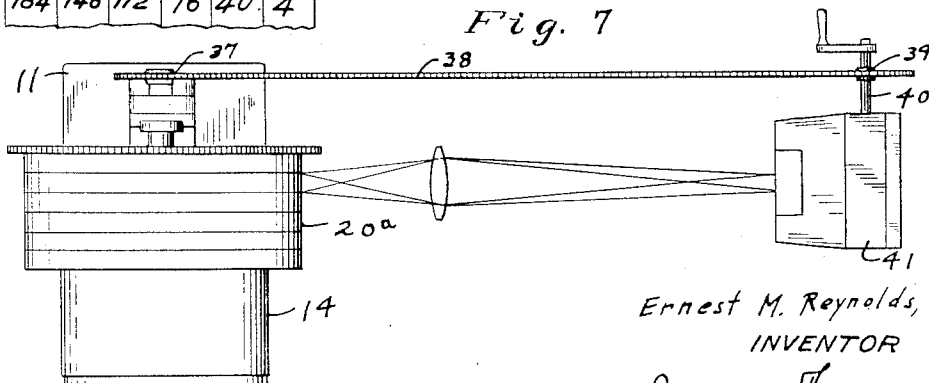


Fig. 9

204	170	136	102	68	34
203	169	135	101	67	33
202	168	134	100	66	32
201	167	133	99	65	31

175	141	107	73	39	5
174	140	106	72	38	4
173	139	105	71	37	3
172	138	104	70	36	2
171	137	103	69	35	1

Fig. 7



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Patented Oct. 20, 1925.

1,557,727

UNITED STATES PATENT OFFICE.

ERNEST M. REYNOLDS, OF CLEVELAND, OHIO.

MOTION-PICTURE MECHANISM.

Application filed May 2, 1923. Serial No. 636,084.

To all whom it may concern:

Be it known that I, ERNEST M. REYNOLDS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Motion-Picture Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to motion picture machines and has for its object the provision of a device of this character of a maximum simplicity of construction, a minimum of fire risk, and a minimum of compactness and cost; the provision of a new and less expensive type of picture strip; the provision of a new and improved mode of producing such strip; the provision of a new and improved mechanism whereby the film can be exhibited successively in an automatic manner; while further objects and advantages of the invention will become apparent as the description proceeds.

The features of cheapness, simplicity, and freedom from fire risk are peculiarly advantageous for small sized and temporary installations as for advertising use, in show windows and like places, and also for home use, children's toys, and small parties. The features of automatic operation are particularly advantageous in connection with advertising devices, but I do not limit myself to any type of use. In the drawings accompanying this specification and forming a part thereof I have shown, for purposes of illustration, one embodiment which my invention may assume and have chosen for this illustrative embodiment a machine particularly designed for use in window advertising. In these drawings:

Figure 1 is a general view illustrating one method of use of this particular machine,

Figure 2 is a plan view of the machine,

Figure 3 is a section on the line 3—3 of Figure 2,

Figure 4 is a developed view of the picture strip,

Figures 5 and 6 are details of the forward and lateral advancing mechanisms,

Figure 7 is a general view illustrating one method of forming the picture strip, while

Figure 8 is a general view illustrating a modified form of mechanism,

Figure 9 illustrates a modified arrangement of views on the strip.

The machine herein disclosed comprises a

base 11 provided with an upwardly extending arm 12 carrying by means of screws 13 a cam member 14 preferably formed from suitable wood and carrying at its center a plate 15 which supports a shaft 16 on which is rotatably and slidably mounted a sleeve 17 formed integral with a plate 18 which carries a drum 19 adapted to support a picture strip 20 which is in the form of a wide cylindrical band of comparatively small diameter and is positioned on the drum 19 by means of a pin 46 carried by the drum 19 and extending through an aperture 47 in the strip 20. The drum 19 and picture strip 20 are rotated by means of an elongated pinion 21 positioned to continuously engage the teeth 22 on the plate 18 in all lateral positions of the drum 19 and rotated by a star-wheel 23 operated by a pin 24 carried by a co-operating cam wheel 25 mounted upon a shaft 26 which is in turn rotated by a pulley 27 operated in any suitable manner as by means of a belt 28 driven by an electric motor 29. It will be obvious that the continuous rotation of the pulley 27, shaft 26, and cam wheel 25 will act through the pin 24 and star-wheel 23 to impart an intermittent movement to the pinion 21 and through it to the plate 18, drum 19, and picture strip 20, to thus advance the picture strip 20 to bring successive views into registering position.

This picture strip 20, however, carries a plurality of rows of views arranged in series so that the first picture of each row follows the last picture of the preceding row and is connected thereto by a suitable number of views staggered between the two rows all as shown clearly in Figure 4 where the various squares represent views and the number in each square represents the point in the picture at which that view will be brought into registration. In order to utilize a plurality of rows of views, however, it is necessary to provide means for bringing the various rows selectively into alignment and this means is herein shown as a shoe 30 pivotedly carried by a cleat 31 mounted upon the inner surface of the drum 19 and riding within a cam groove 32 cut in the cam 14 and designed to act through the shoe 30 to cause the drum 19 and picture strip 20, during their rotation about the shaft 16, to continuously assume that position longitudinally of the shaft 16 which will bring the succeeding view on the strip 20 into proper registration until all of the

views have been brought successively into registration and the mechanism has reached the last view numbered 204 in Figure 4 whereupon the cam groove 32, by crossing its previous convolutions and returning to its point of beginning, will, during succeeding rotation of the drum 19, return the drum longitudinally of the shaft 16 to its initial position with the view 1 in registering position and the parts automatically set to re-display the picture as the rotation of the drum continues.

In utilizing this apparatus I prefer to form the picture strip as a paper strip carrying thereon the various views and to display the picture by reflection. To operate the mechanism in this manner I find it convenient to mount a lens tube 33 carrying lenses 34 in fixed position with relation to the machine and in such position that the operation of the machine will bring the various views successively into alignment therewith so that light thrown upon the picture strip 20 by a plurality of lamps 35 located concentrically with the axis of the lens tube 33 will be in part reflected by the particular view then in registration and pass through the lens tube 33 and lenses 34 onto the rear of a translucent screen 36 the front of which is exposed to view. In operating the mechanism in this manner a shutter may be interposed at any suitable point in the path of the light, for example intermediate of or in front of the lens tube 33, to intercept the light while the drum 19 is being operated to bring a succeeding view into position but by actual test I find that under usual conditions no time shutter is required and I therefore prefer to dispense with the time shutter in order to maintain the simplicity of the mechanism. In the arrangement above described the reflected light from the registering view will be inverted as it passes through the lenses 34 and accordingly the view should be carried by the picture strip 20 in inverted position.

In order to produce this picture strip 20 I find it convenient to employ the apparatus shown in Figure 7 wherein I have replaced the pulley 27 by a sprocket 37 adapted to be operated by a chain 38 which is in turn operated by a sprocket 39 mounted upon the shaft 40 of a moving picture camera 41. In using this mechanism I just photograph the action which is to be reproduced upon a moving picture film of the usual type and make a positive therefrom in the usual manner. Upon the drum 19 I place a sensitized film 20* and through the camera 41 I advance the film positive just described operating said camera and drum synchronously at such speed that a suitable light source behind the camera (not shown) shall afford the proper exposure to each view, the drum being meanwhile advanced

both circularly and axially as it will be moved while projecting. The reason for using a camera at 41 is that it is more accurately built and has a better lens than the usual projector but this is not imperative. It is only necessary that the views be inverted on the film 20* and appear in proper order. Preferably also the objective lens is located nearer the drum than the camera as I find it both economical and convenient to make the views of sub-standard size, at least for small machines as used in show-windows and homes. As many paper positives 20 as desired can be made from the film 20* and will register perfectly with the screen when used on a machine of the same construction with the projection lens in the same location as the objective lens shown in Figure 7. It makes no difference where on the strip the picture starts, provided only that it be taken and projected with the same setting; except that it is best to have the set-back occur at the end of the action as shown in Figure 4.

Under certain circumstances, however, it may be more convenient to operate the picture mechanism under other conditions of projection such as on a larger scale or upon the front of an opaque screen or both and under such circumstances I may desire a stronger light. Under these conditions I may still utilize the mechanisms of Figure 7 but substitute for the sensitized paper carried by the drum 19 a sensitized transparent film, form the picture upon this film, and develop the film in the same manner to form a film picture strip 42 which may be utilized in a modified apparatus wherein the drum 19 has been replaced by a translucent drum 43 and the light passes from a source 44 within the drum 43 through suitable lenses 45 onto any desired screen, the entire arrangement, including the production of the picture upon the film 42, being of course so arranged that the picture when projected will be neither inverted nor reversed.

The views instead of being arranged mostly in circumferential rows with only a few spiral or staggered views, connecting them, can, as shown in Figure 9, be arranged in a uniform spiral, in which case the drum is moved axially at a uniform rate instead of intermittently. It makes no difference how this movement occurs in case the pictures on the strip are arranged to conform thereto. The uniform spiral movement may be found better with the projection arrangement of Figure 8 or in case a screw instead of a cam be arranged to effect the longitudinal movement, all of which is within my inventive idea.

It is not necessary to use either a motor drive or an automatic set-back mechanism, especially in case the device is made for juvenile use, for which this simplified form

is peculiarly adapted by reason of its cheapness, its freedom from fire danger, and the cheapness of the picture strips.

It will be obvious to those skilled in the art, however, that various modifications may be made without sacrificing the advantages or departing from the spirit of my invention and it will therefore be remembered that the disclosure herein is illustrative only and that my invention is not limited thereto.

I claim:

1. In a motion picture machine, a picture strip having thereon a plurality of rows of views arranged spirally and forming a single sequence, a drum adapted to support said strip, means for rotating said drum to advance said strip, a stationary drum cam provided with a spiral groove corresponding to the spiral of said views and with a steep pitch connecting groove connecting the ends of said spiral groove, and a follower on said drum arranged to ride in said cam grooves and to shift said drum laterally to thus bring successive views successively into registration with a projection mechanism and then return quickly said drum to initial lateral position.

2. A cylindrical picture strip having a plurality of rows of views wherein the last view in each row is connected to the first view in the succeeding row by at least one intermediate laterally staggered picture.

3. In a motion picture machine, a guide for a picture strip carrier comprising a spiral cam track having its ends connected by a return track running in the same general direction around the cam and intersecting the successive convolutions of the spiral track.

4. A picture strip for a motion picture machine having thereon a plurality of rows of views arranged side by side, the views of one row being arranged sequentially behind those of the preceding row and connected therewith by one or more views located in a staggered position relatively to both rows.

5. In a motion picture machine, in combination, a picture strip bearing thereon a

plurality of rows of views arranged side by side, the views of one row being arranged sequentially behind those of the preceding row and connected therewith by one or more views located in a staggered position relatively to both rows, and a cylindrical drum about which said strip is wrapped.

6. In a motion picture machine, a rotary cylindrical drum, means for advancing the same in an intermittent angular manner, means operative at a given point in each revolution to shift the same axially a predetermined distance, and a picture strip wrapped about said drum and having a plurality of rows of views thereon corresponding to the axial and angular positions of said drum.

7. In a motion picture machine, a rotary cylindrical drum, means for advancing the same in an intermittent angular manner, means operative at a given point in each revolution to shift the same axially a predetermined distance, means operative after a given number of revolutions to return said drum axially to its starting point, and a picture strip wrapped about said drum and having a plurality of rows of views thereon corresponding to the axial and angular positions of said drum.

8. In a motion picture machine, a rotary cylindrical drum in combination with a cam-member bearing a plurality of parallel grooves and an inclined portion connecting together the ends of adjacent grooves, each groove terminating at a point ahead of the succeeding groove whereby said inclined portions are advanced gradually about the drum, and the end of the last groove being connected with the first groove by an inclined channel which intersects the first inclined portions in a reverse direction, and a follower member co-operating with said grooves and drum whereby the latter is moved axially as it is rotated.

In testimony whereof, I hereunto affix my signature.

ERNEST M. REYNOLDS.