J. L. BOYLE.

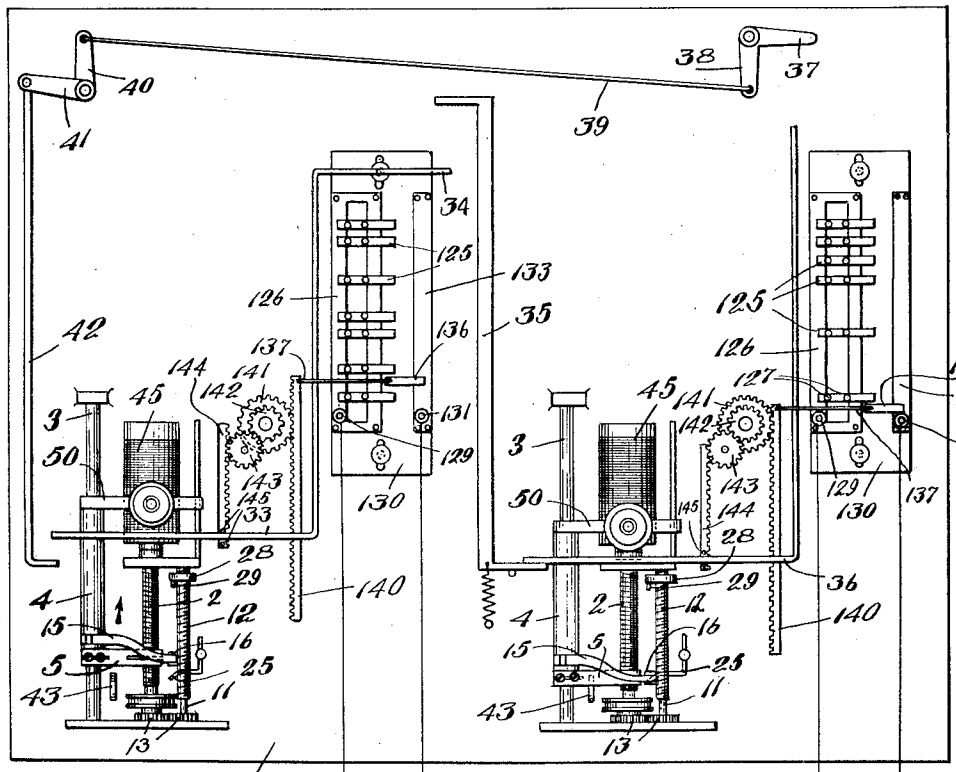
COMBINED TALKING MACHINE AND STEREOPTICON.

APPLICATION FILED MAY 16, 1919.

1,313,190.

Patented Aug. 12, 1919.

7 SHEETS—SHEET 1.



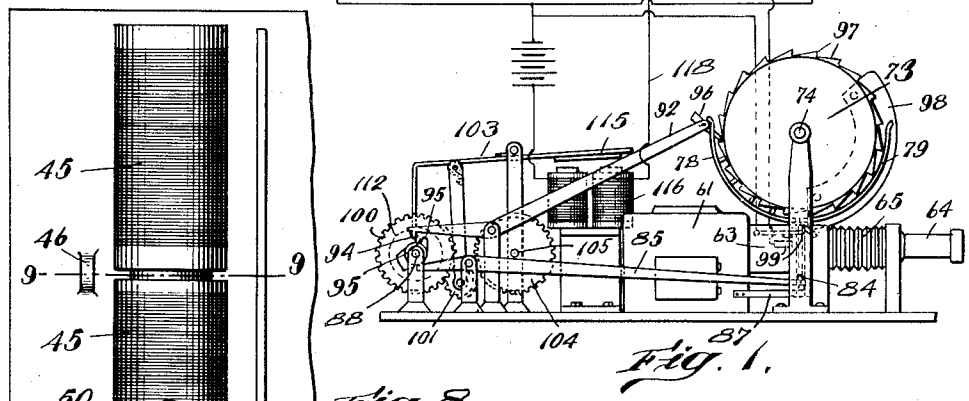


Fig. 1.

Fig. 8.

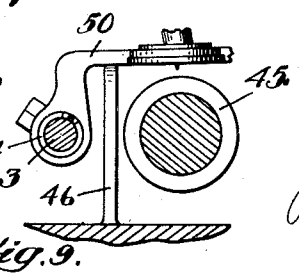


Fig. 9.

Witnesses:
H. B. Davis.
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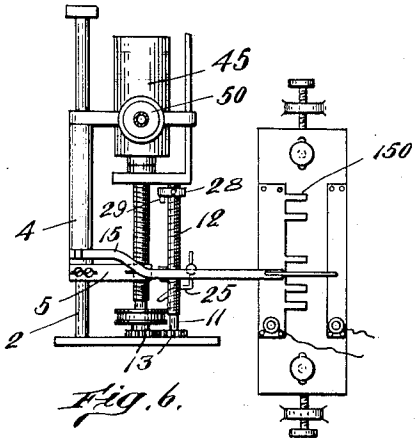


Fig. 6.

Fig. 2.

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7 SHEETS—SHEET 3.

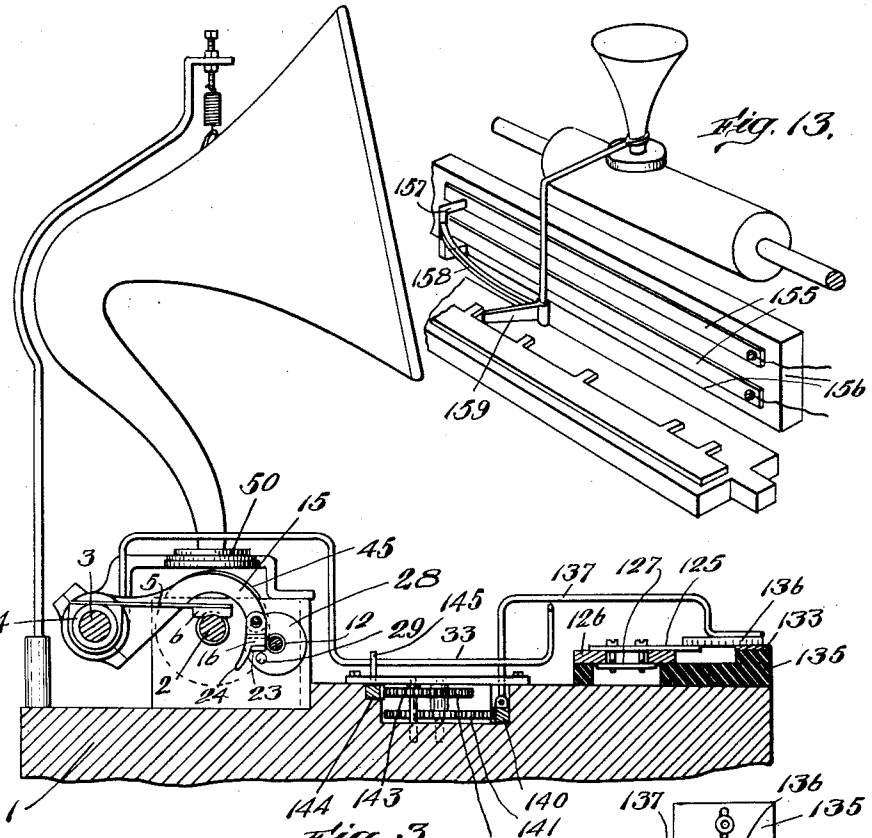


Fig. 13.

Fig. 3.

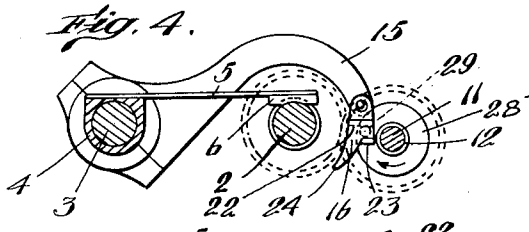


Fig. 4.

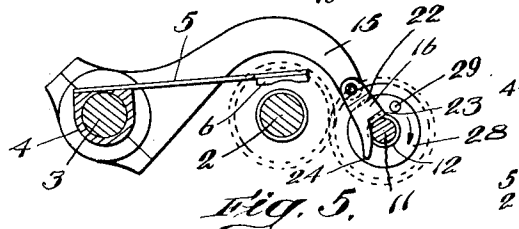


Fig. 5.

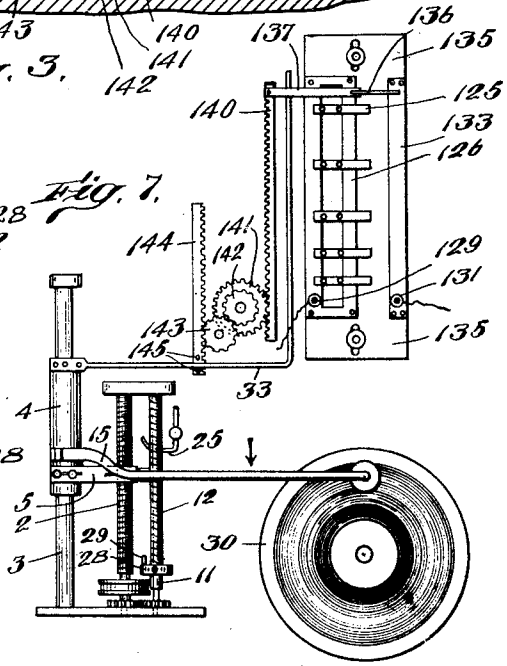


Fig. 7.

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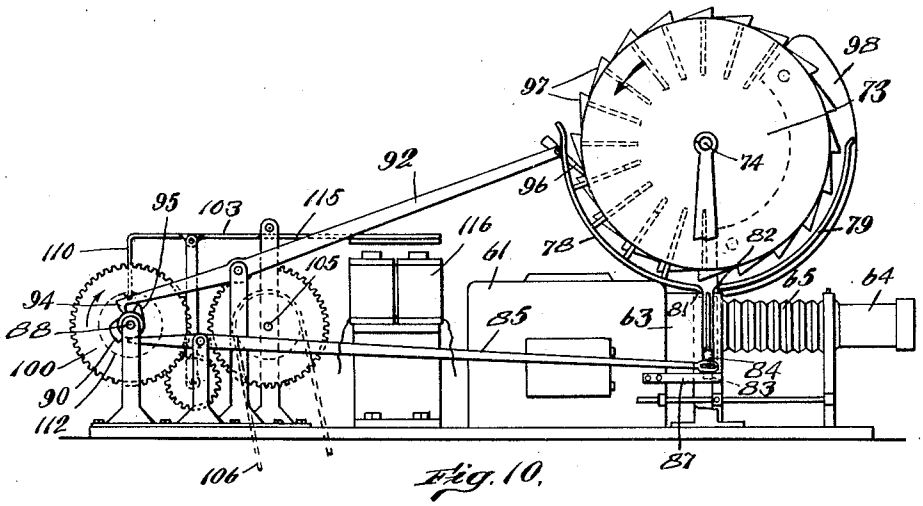


Fig. 10.

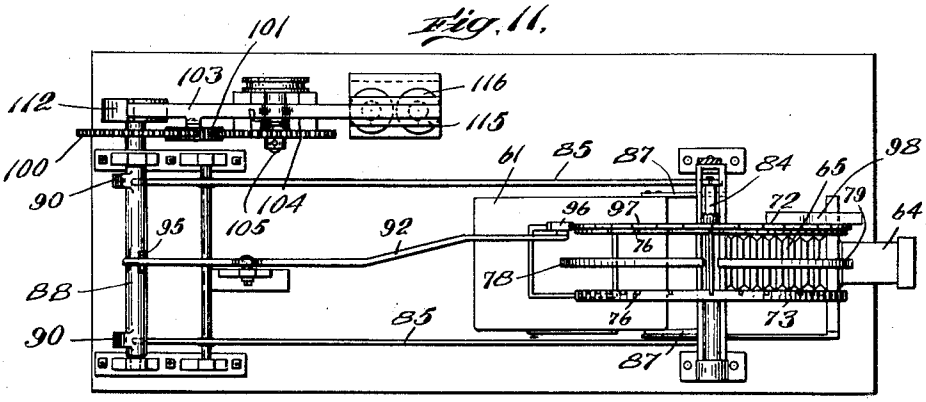


Fig. 11.

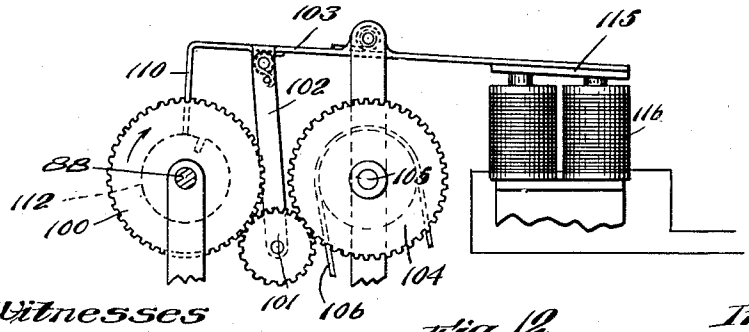


Fig. 12.

Witnesses

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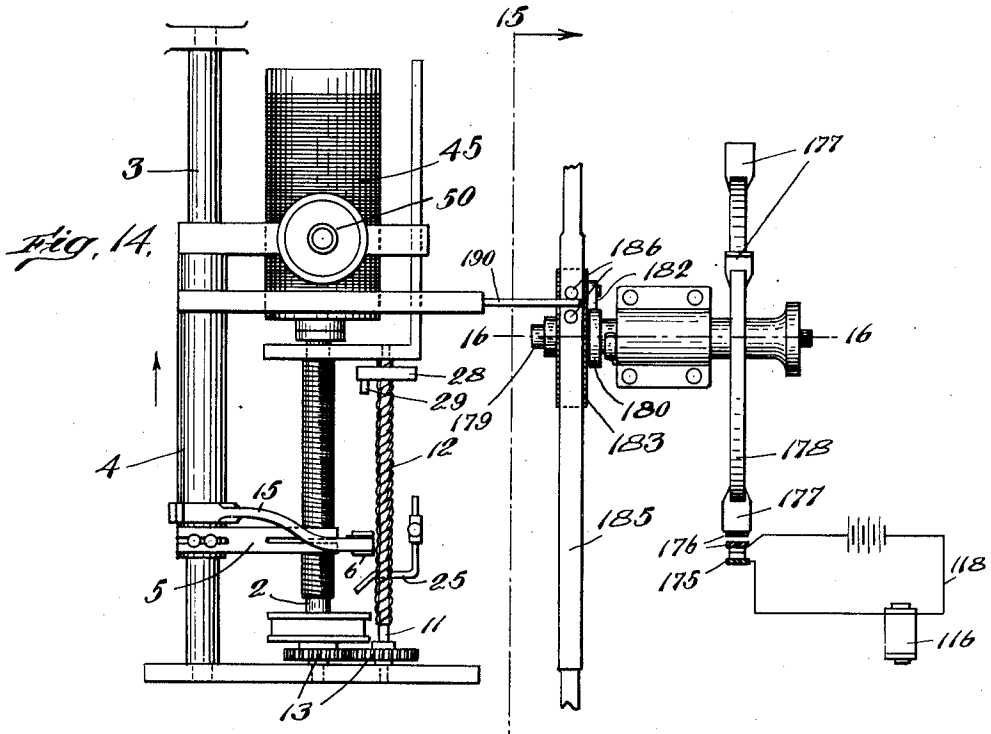


Fig. 14.

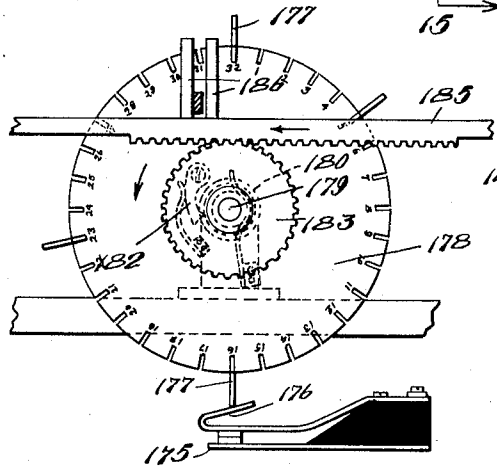


Fig. 15.

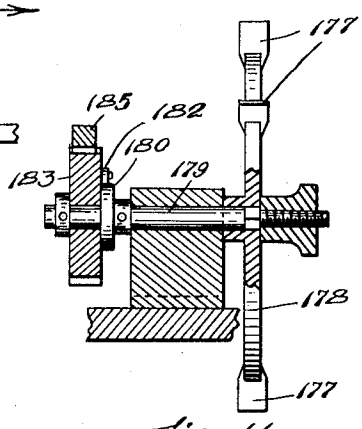


Fig. 16.

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APPLICATION FILED MAY 16, 1919.

1,313,190. Patented Aug. 12, 1919.

7 SHEETS—SHEET 6.

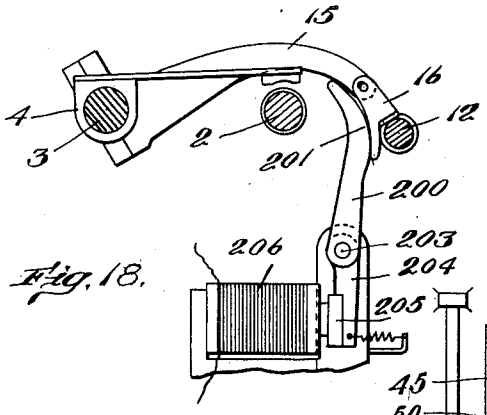


Fig. 18.

Fig. 17.

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7 SHEETS—SHEET 7.

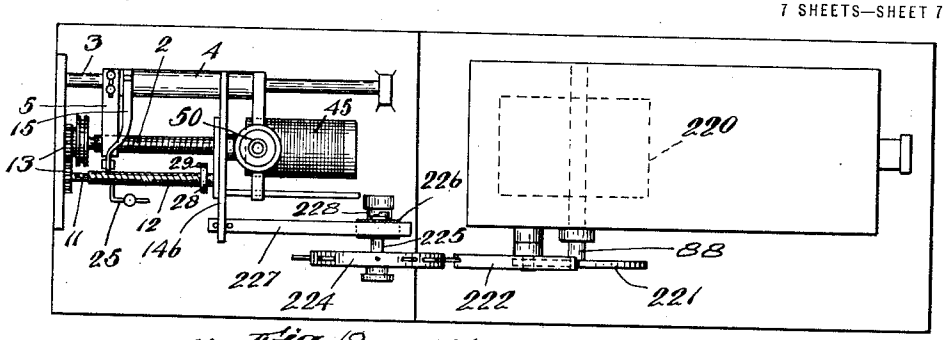


Fig. 19.

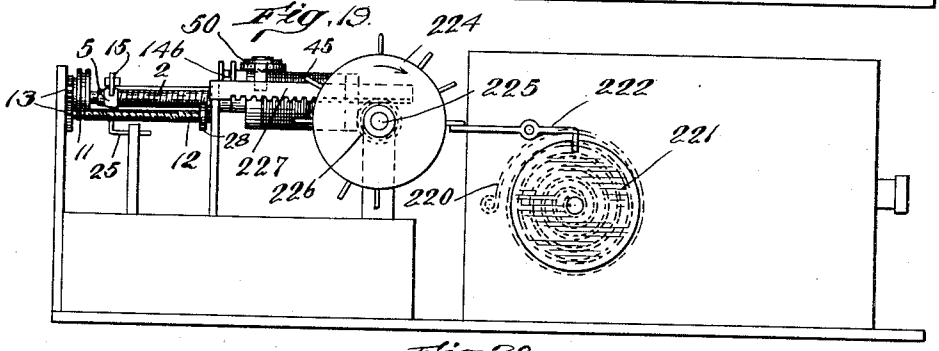


Fig. 20

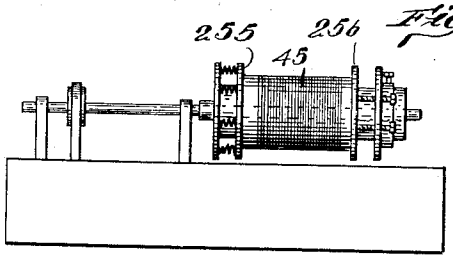


Fig. 23.

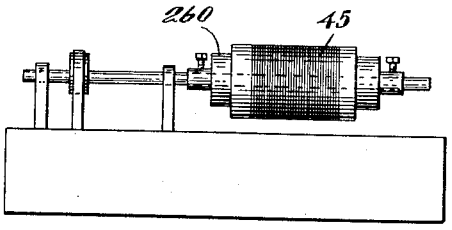


Fig. 24.

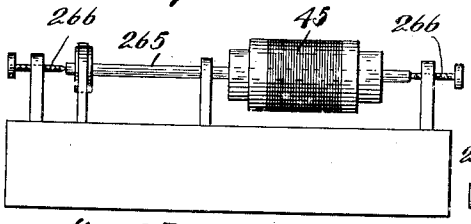


Fig. 25.

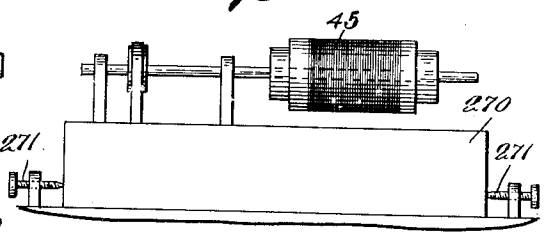


Fig. 26.

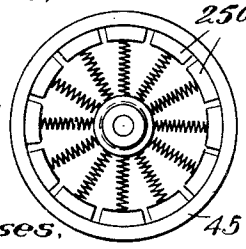


Fig. 22.

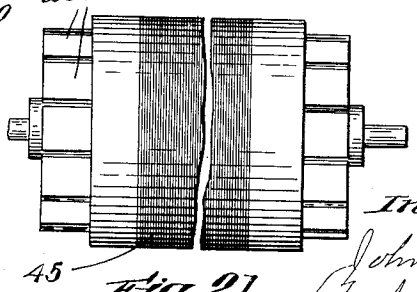


Fig. 21.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN L. BOYLE, OF BOSTON, MASSACHUSETTS.

COMBINED TALKING-MACHINE AND STEREOPTICON.

1,313,190. Specification of Letters Patent. Patented Aug. 12, 1919.

Substitute for application Serial No. 829,968, filed April 6, 1914. This application filed May 16, 1919. Serial No. 297,715.

To all whom it may concern:

Be it known that I, JOHN L. BOYLE, a citizen of the United States, and resident of Boston, in the county of Suffolk, in the State of Massachusetts, have invented an Improvement in Combined Talking-Machines and Stereopticons, of which the following is a specification.

This application is a substitute for application S. N. 829,968, filed April 6, 1914. A co-pending application, S. N. 879,280, filed Dec. 28, 1914, presents features set forth herein.

This invention relates to a combined talking-machine and stereopticon, and has for its object to construct and arrange the combined apparatus whereby a lecture, speech or remarks of any kind or a song may be automatically repeated and repeatedly illustrated. Such an apparatus is of special value as an advertising or entertaining device, as it may be set in operation and caused to run for a long period of time, preferably an indeterminate period of time, and the advertisement or advertisements in the form of a speech, lecture or song may be repeated and also repeatedly illustrated.

The apparatus involves a talking-machine, such for instance as a phonograph, a stereopticon, and a controller for the stereopticon, which is operatively connected with the talking-machine. The talking-machine has a repeating attachment or device by which it is caused to repeatedly operate, and the stereopticon is of the type adapted for repeated operation, and the controller for the stereopticon is constructed and arranged to be repeatedly operated by the talking-machine, thereby to repeatedly control the operation of the stereopticon, whereby the combined apparatus is caused to repeatedly operate automatically, or run for an indeterminate period of time when set in operation.

Heretofore a talking-machine has been devised, having a repeating-attachment, as represented in Letters Patent No. 820,165; and a stereopticon has been devised adapted for repeated operation, as represented in Letters Patent No. 828,790; and a talking-machine has been combined with a stereopticon, a controller for the stereopticon being employed which is operatively connected with the talking-machine; but so far as I am aware a repeating talking-machine and a stereopticon adapted for repeated operation have never been associated together or combined with a controller for the stereopticon which is operatively connected with the talking-machine, and is adapted for repeated operation, whereby the apparatus may be started and caused to operate continuously for an indeterminate period of time without attention.

The novel element of my combination resides in the controller for the stereopticon, which is adapted for repeated operation, and which is constructed and arranged to be operated by the talking-machine to control the stereopticon. Various forms of controllers are here shown, of the electric and mechanical type, although the electric type admits of a remote control which is an advantage over the mechanical type. The electric type of controller involves a circuit-controller for controlling the circuit of an operating-magnet for the stereopticon, having a movable controlling-member which is operatively connected with the talking-machine, as for instance with the repeating-attachment thereof.

The electric controller may be of a reciprocating type or a rotary type, both forms being here shown for the sake of illustrating the broad character of the invention. The reciprocating controller involves a stationary contact-member and a movable contact-member, and said movable contact-member is operatively connected with the talking-machine and is adapted to be reciprocated by it, its movement in one direction being in engagement with the stationary contact-member and its return movement to normal being out of engagement with said stationary member.

The rotary controller involves a circuit-controller and the rotary operating-member therefor, and means operatively connected with the talking-machine for rotating said rotary member to cause it to rotate a complete cycle during each forward movement of the reproducer or other movable element of the talking-machine with which it is associated and to remain at rest during said

return movement of said reproducer or other movable element, whereupon it is caused to rotate another complete cycle upon the next forward movement of said reproducer, or other movable element, thus continuing to repeat such movements to correspond with the repeated operations of the talking-machine.

The mechanical controller involves the employment of a motor such as a spring-motor for operating the stereopticon, and means to repeatedly release said motor and permit it to operate for a predetermined period of time each time it is released, and a mechanical controlling-means for the releasing-means operatively connected with the talking-machine, whereby the operation of the releasing-means is controlled by the talking-machine.

Means are or may be provided adapted for operation by the stereopticon for controlling the operation of the talking-machine at predetermined moments, whereby both machines will be caused to begin their repeated operations at the same time, even if they should get out of synchronism during any of their operations.

Adjusting-means also may be provided for insuring synchronous operations of talking-machine and stereopticon during their repeated operations.

Figure 1 is a plan view of a combined talking-machine with repeating-attachment and stereopticon adapted for repeated operation, and a repeating-controller for the stereopticon, embodying this invention, a plurality of talking-machines being represented merely for the sake of illustration.

Fig. 2 is an enlarged plan view of the talking-machine with repeating-attachment, and a controller for the stereopticon adapted for repeated operation, which is operatively connected therewith.

Fig. 3 is a transverse vertical section of the apparatus shown in Fig. 2, taken on the dotted line 3—3.

Figs. 4 and 5 are detail views of the repeating-attachment for the talking-machine to be referred to.

Fig. 6 is a plan view of the talking-machine having a modified form of repeating-controller for a stereopticon.

Fig. 7 is a plan view of a modified form of talking-machine and a repeating-controller for a stereopticon associated therewith.

Fig. 8 is an enlarged plan view of a portion of a talking-machine of the type shown in Fig. 1, having two record cylinders arranged in alinement.

Fig. 9 is a transverse section of the modification shown in Fig. 8, taken on the dotted line 9—9, the reproducer being at the point of passing from one to the next record cylinder.

Fig. 10 is a side elevation of a stereopticon adapted for repeated operation.

Fig. 11 is a plan view of the same.

Fig. 12 is an enlarged side elevation of the operating-magnet and means for operating the slide-holder and the slides which are carried by it.

Fig. 13 is a view of another form of repeating-controller of the reciprocatory type.

Fig. 14 is a plan view of a rotary type of repeating-controller for a stereopticon.

Fig. 15 is a sectional view of the repeating-controller of Fig. 14, taken on the dotted line 15—15.

Fig. 16 is a longitudinal vertical section of the repeating-controller of Fig. 14, taken on the dotted line 16—16.

Fig. 17 is a plan view of the talking-machine and the controller and a side elevation of the stereopticon and means controlled by the stereopticon for controlling the operation of the repeating-attachment of the talking-machine.

Fig. 18 is a detail of the means shown in Fig. 17 for controlling the repeating-attachment of the talking-machine.

Figs. 19 and 20 respectively are plan and side views of a mechanical controller for the stereopticon which is operatively connected with the talking-machine, and,

Figs. 21 to 26 are modified means for adjusting longitudinally the record cylinder of the talking-machine.

The talking-machine here shown for the purpose of illustrating one embodiment of my invention is of the type ordinarily called a phonograph, and in Figs. 2, 3, 4 and 5 a phonograph is shown having a repeating-attachment substantially like that shown in Letters Patent #820,165, said repeating-attachment being of a reciprocating character and involving a return feed-screw. This phonograph has a bed-plate 1, on which is mounted in suitable bearings a main-shaft 2, which carries the usual mandrel, and which, for a part of its length, has a fine screw-thread to feed forward the reproducer 50, in a direction lengthwise of the record cylinder. The usual back-rod 3 has mounted upon it a sleeve 4, which is arranged to slide on the rod and also to rock thereon, and said sleeve carries the reproducer 50, and it, together with the parts attached to it, form a traveling carriage. A spring-arm 5 is secured to the sleeve which carries a feed-nut 6, for engaging the threaded-portion of the main-shaft 2, thereby to impart a progressive forward movement to the traveling carriage. On the base 1, bearings are provided for a return-shaft 11, having a coarse-pitch return-screw 12, and said shaft is driven from the main-shaft 2 by two gears 13, 13, mounted on the two shafts, respectively, and arranged in engagement with each other. Secured to the sleeve 4, is an arm 15, which

projects over in front of the spring-arm 5, and has pivotally connected to its extremity a dog 16, see Figs. 4 and 5, which is adapted to be engaged by a pin 29 or projection rotating with the return-shaft 11 and lifted and brought into engagement with the return-screw 12, and subsequently moved out of engagement with said screw. The pivot of said dog is loose in the pivot-hole permitting the dog to oscillate in two planes, one longitudinal and one transverse with respect to the axis of said return screw-shaft. The dog has a shoulder 22 extended entirely across one side of it and has a rib 23 at its end and also has a downwardly extended tail 24. The rib 23 is adapted to engage the thread of the return-screw 12, and effect the return of the traveling-carriage, and the tail 24 is so located as to engage an inclined rod 25, which is stationarily but adjustably supported on the base, to effect disengagement of the dog from the return-screw, and the lowering of the carriage from the position shown in Fig. 5 to the position shown in Fig. 4. The elevation of the carriage is effected by the rotary pin or projection 29, extended laterally from a disk 28, which is secured to the return-screw-shaft 11, at the inner end of said shaft, said pin 29 engaging the under side of the shoulder 22, and lifting the dog and arm 15 bearing it and then passing beneath said shoulder, causing the dog to move forward into engagement with the return-screw. When the arm 15 bearing the dog is lifted the sleeve 4 is rocked and the arm 5 bearing the feed-nut is correspondingly lifted, causing the feed-nut to disengage the feed-screw, and while the parts are thus held the traveling carriage is returned to normal position or starting point, by the return-screw. As soon as the traveling carriage arrives at its starting-position the tail 24 of the dog engages the inclined arm 25, and is moved by said arm to cause the dog to disengage the return-screw, whereupon said dog resumes the position shown in Fig. 4, and the feed-nut on the arm 5 again engages the feed-screw preparatory to again advancing the reproducer over the record cylinder. By this form of repeating-attachment the reproducer may be repeatedly advanced, and as here shown will be repeatedly advanced, for an indeterminate period of time.

I do not desire to limit my invention to the employment of this or any other particular form of repeating-attachment for the talking-machine, as it is obvious that other forms of repeating-attachment may be employed and substantially the same results obtained which come within the spirit and scope of my invention; nor do I desire to limit my invention to the employment of the type of talking-machine shown in Fig. 2, as it is obvious that other well-known types of talking-machines may be employed; as for illustration a talking-machine of the type having a record-disk 30, such as represented in Fig. 7, may be employed, and provided with a repeating-attachment of substantially the same construction as above described, or some equivalent construction.

I may employ a single or several talking-machines, according to the needs, and in Fig. 1, two talking-machines are represented which are arranged for successive repeated operation, that is to say, first the reproducer 50 of one machine moves over its record cylinder and while returning the reproducer 50 of the other talking-machine moves over its record cylinder, and while said last named reproducer is returning the reproducer of the first talking-machine again moves over its record cylinder, and so on, the operation of the two machines thus being successive but continuous for an indeterminate period of time. In carrying out this feature of my invention a bent arm 33 is attached to the sleeve 4 of the first machine, one end-portion as 34 of which, is arranged for engagement with one end-portion of a sliding-bar 35, and the other end-portion of said bar 35 is arranged for engagement with a bent arm 36, attached to the sleeve 4 of the next machine, and the other end-portion of said arm 36 is arranged for engagement with one arm 37, of a bell-crank-lever, and the other arm 38 of said lever is connected by a link 39 with one arm 40 of a bell-crank lever, and the other arm 41 of said lever has connected with it a rod 42, having a bent end-portion arranged for engagement with the end-portion of the bent arm 33 of the first machine. Each machine is also provided with a rest or support 43, which is located to receive upon it the arm 5 bearing the feed-nut when said arm arrives at one end of the stroke of the sleeve 4, or it may receive upon it any other arm or projection on said sleeve, said rest being made high enough to hold said arm in elevated position with the feed-nut out of engagement with the feed-screw. In operation the sleeve 4 bearing the arm 33 of the first machine is moved axially in the direction of the arrow Fig. 1, until upon arriving at the end of its stroke inward the end-portion 34 of said arm engages the sliding-bar 35, and moves said bar longitudinally until it engages the end-portion of the arm 36 of the next machine and moves said arm and sleeve 4 to which it is attached a short distance, far enough to cause the arm 5 of said machine to disengage the rest 43, whereupon the feed-nut engages the feed-screw and the sleeve 4 is set in motion and is moved axially, carrying with it the arm 36, until upon arriving at the end of its stroke inward the end of said arm 36 engages and moves the bell-crank-lever 37, 38, and in turn the bell-crank-lever 40, 41 and also the rod 42, to

cause said rod to engage the end-portion of the arm 33 and move said arm and sleeve 4 to which it is attached far enough to cause the arm 5 of the first machine to disengage the rest 43. This operation may then be repeated for an indeterminate period of time.

While each machine is operating the repeating-attachment of the other machine returns the sleeve 4 and parts attached to it, and cause the arm 5 to engage the rest 43 preparatory to another operation being performed when said arm 5 is disengaged from the rest.

The structure here shown for holding each machine at rest while another operates and for causing each machine to start another machine, when combined with a plurality of talking-machines having repeating-attachments, is simple and easily operated, but my invention includes any equivalent structure whereby these results may be obtained.

I may employ on each talking-machine two or more record cylinders arranged in alinement as represented in Fig. 8, wherein it will be seen two record cylinders 45, are mounted on the same mandrel for coöperation with a single reproducer 50, and to enable the reproducer to pass from one to the next record cylinder a rest or support 46, is arranged in the path of movement of the arm of the reproducer, opposite the space between the cylinders, and just before the reproducer passes from one to the next cylinder it engages said rest 46 and rides thereon until it arrives in position for engagement with the next cylinder.

As the talking-machine is designed to be employed in combination with a stereopticon it is necessary that both the talking-machine and the stereopticon shall operate in synchronism and to this end the talking-machine may be made adjustable, so that its record cylinder may be slidably adjusted to bring it into synchronism with the stereopticon.

In Figs. 21 and 22 the mandrel 250 on which the record cylinder is placed is made collapsible in a radial direction and adapted to frictionally engage the record cylinder and thereby hold it, and the record may be adjusted longitudinally on said collapsible mandrel.

In Fig. 23 the mandrel has at one end a yieldingly supported plate 255 and at the other end an adjustable plate 256 and by said plates the record cylinder may be adjusted longitudinally.

In Fig. 24 the mandrel 260 is loosely mounted on its supporting shaft and is secured to said shaft by set screws which admit of its being moved longitudinally on the shaft and secured in different positions thereon.

In Fig. 25 the supporting shaft 265 has end bearings in adjusting screws 266 and is movable longitudinally a held in any position it may be set by s screws, thereby adjusting the record cylinder longitudinally.

In Fig. 26 the base 270 of the talking-machine is held by an adjusting screw 271 and by said screw is adjusted longitudinally thereby providing for longitudinal adjustment of the record cylinder.

In lieu of these various modifications I desire to include within the spirit and scope of my invention other means for adjusting and providing for adjustment of the record cylinder longitudinally to admit of its being caused to operate in synchronism with the stereopticon with which it is combined.

The stereopticon which is employed, is adapted for repeated operation, and, referring particularly to Figs. 10, 11 and 12, a stereopticon is shown, illustrating one embodiment of my invention, it having a rotary slide-holder with slides radially supported by it and capable of being withdrawn from it one at a time and moved into the path of the light, and then returned, and a step-by-step rotary movement is imparted to said holder. The slide-holder may carry one or more sets of slides to correspond with a record or any multiple or fraction thereof, and it is designed and intended that the holder shall make a complete cycle during the time the reproducer traverses the record cylinder or a multiple or fraction thereof, and that its operation, while intermittent, shall be continuously progressive for an indeterminate period of time, and that it shall be controlled by means operatively connected with the talking-machine. The stereopticon here shown is of the type represented in Letters Patent #828,790, aforesaid, and includes a light-box or lantern 61 mounted upon a base and having the usual condensing-lens tubular frame 63 and magnifying lens-tube 64 arranged in front of the bellows 65, with suitable adjusting-means. Associated with said lantern is a rotary slide-holder consisting of spaced heads 72, 73, carried by a shaft 74, which is suitably supported. The inner face of each head has a series of radial grooves or guideways 76, which are open at their outer ends, and are closed at their inner ends by suitable shoulders, and the grooves of the heads are in alinement in order that each pair of corresponding grooves may receive a slide which is supported upon the shoulders and is movable outwardly through the open outer ends of the grooves. Said holder is arranged above the lantern and in such position with respect thereto that when each pair of guideways is brought into a vertical position at the lower side of the holder said guideways will be alined with spaces between the condensing-lens and the magnifying-lens, in order that a slide contained in said grooves may be lowered into the path of the light

and then returned into the same pair of grooves from whence it came when the desired exposure has been made. For supporting the slides during the lower half of the path of rotary movement of the holder there is provided a pair of stationary elements 78, 79, in the nature of arcuate strips or plates embracing the lower peripheral portions of the holder between the heads 72, 73. The inner end-portions of the member 78, 79, are suitably supported independently of any part of the lantern, and have downturned lips 81, 82, which are spaced apart to provide for the passage of the slide and to guide the slide downwardly from the holder into the space between the lens. With the slide-holder rotating in the direction of the arrow Fig. 10, the strip 78 supports those slides which are approaching the vertical position, and when the slides successively come into alinement with the space between the two strips they fall by gravity into position between the lenses and are subsequently lifted and returned to the holder, and after they have been returned to the holder they are supported on the strip 79, until they pass into the upper half of their rotary path. For the purpose of supporting each slide in the path of light and also for returning the slide to the holder a cross-head 83 is mounted to slide vertically in front of the condensing-lens, and is provided at each end with a projection 84, working in a longitudinal slot in the front free end of vertically swinging levers 85, fulcrumed adjacent their rear ends upon a suitable bracket rising from the base. The levers 85 lie at opposite sides of the lantern and are simultaneously operated to raise and lower the cross-head, the downward movement of the latter being limited by means of bars 87, applied to opposite sides of the lantern, and extended between the latter and the fixed frame. The means for operating the levers 85 consists of a shaft 88, which is suitably supported for rotation and provided with a pair of tappers 90, disposed for simultaneous engagement with the rear extremities of the levers. This shaft is adapted to be driven by means of an electric-motor or other motive power which is controlled by the controller which is operatively connected with the talking-machine. Said shaft is also employed to operate means to impart a step-by-step rotary movement to the slide-holder, and, as here shown, a lever 92, is fulcrumed intermediate of its ends, and its rear free end has a downwardly extended heel 94, for engagement by a tappet 95 carried by the shaft 88, and its front end has a pivotal dog 96 for engagement with any one of a series of ratchet-teeth 97, arranged on the head of the slide-holder.

The rotary slide-holder is made to provide for a large number of slides which are ample under all conditions to provide for illustration of the records of the talking-machine, but frequently a less number of slides are employed and in such case the remaining spaces are left unfilled, and an arcuate contact-strip 98 is secured to one of the side-pieces, as 72, of the slide-holder, for engagement with a pair of contact-pins 99, to close a circuit including the electro-magnet 116 for the stereopticon, and as soon as the slide-holder has been turned and the last slide of the set or sets has been displayed, then said contact strip 98 is brought into engagement with the contact-pins 99 and the circuit of the magnet 116 is closed, whereupon the armature 115 of said magnet is attracted and the train released and permitted to operate, and such operation is caused to continue uninterruptedly until the slide-holder has completed its cycle of operation at which moment the contact-pins 99 disengage the contact-strip 98. It will be understood that for different numbers of slides contact strips of greater or less length will be employed, which are coextensive with the unfilled portion of the slide-holder. In lieu of this particular construction of means to control the operation of the stereopticon other means may be employed which are arranged to cause it to operate continuously while the unfilled portion of the slide-holder passes the displaying position for the slides.

The operation of the repeating stereopticon is as follows:—

The slide-holder is supplied with slides and one of the slides is supported upon the cross-head 83 in the path of light and then the shaft 88 is rotated until the tappets 90 engage the levers 35 and thereby lift the cross-head 83 and also the slide until the latter has been moved back into the holder. Before the tappets 90 disengage the levers 85 the tappet 95 engages the heel 94 of the lever 92 and thereby imparts a rotary movement to the holder, sufficient to move the slide from the cross-head to the strip 79, so as to be supported by said strip when the cross-head descends. The several parts of the device are so proportioned that when the tappet 95, disengages the lever 92, and the rotary movement of the carrier is thus stopped, the tappets 90 will then disengage the levers 85 and thus permit the cross-head to descend with the next in rear slide supported thereon. The length of time of any exposure will be controlled by the movement of the shaft 88, and the slides will be brought into the path of light and then returned into the holder. As a means for rotating the shaft 88 at intermittent intervals it is here shown as having secured to it a spur-gear 100, adapted to be engaged and disengaged by a pinion 101, borne by an arm 102, pivotally connected with and depending from a lever 103, and said pinion is also

movable into and out of engagement with a spur-gear 104, secured to a shaft 105 which is adapted to be rotated by a belt 106, which is driven by an electric-motor or other source of power. The spur-gear 104, is rotated continuously by the motor and when it is desired or required to rotate the spur-gear 100, to in turn rotate the shaft 88, the pinion 101 is moved into engagement with both spur-gears 100 and 104, and as soon as said pinion is moved out of engagement with said spur-gears rotary movement of the shaft 88 ceases. Thus the shaft 88 is moved progressively step by step. To control the movement of the shaft 88 as well as the length of time the shaft shall rotate, the lever 103 bearing the pinion 101 has an extension or finger 110, at one end which coöperates with a disk 112, when in one position entering a notch in said disk to check rotation of the shaft and when in another position bearing upon the periphery of the disk to permit rotation of the shaft, and when in the notch the pinion is disengaged from the spur-gear 104, and when engaging the periphery of the disk the pinion is in engagement with both spur-gears, and said lever 103 bears the armature 115, of an electro-magnet 116, which is arranged in an electric-circuit controlled by the circuit-controller which in turn is controlled by the talking-machine. Thus it will be observed that the operation of the slide-holder is controlled by the electro-magnet 116, and is caused to operate whenever said magnet is energized and to cease operation whenever said magnet is deënergized and the finger on the lever 103 has resumed its position in the notch of the disk.

This form of stereopticon is adapted for repeated operation for whenever the slide-holder has made a complete cycle it will have returned to its starting position, and is in position to repeat its operation, and its operation is controlled by the controller which is operatively connected with the talking-machine, but so far as my invention is concerned I do not desire to limit it to the form of repeating stereopticon here shown, or to the means here shown for operating the slide-holder, or to slides carried by a movable slide-holder, as it will be understood that my invention includes other forms of stereopticons adapted for repeated operation, and having the general characteristics of the form here shown.

One form of electric repeating controller for the stereopticon will now be described, reference being had first to Figs. 1, 2 and 3, wherein a controller of the reciprocating type is shown comprising a stationary contact-member and a movable contact-member arranged to make and break the circuit 118 of the electro-magnet 116. The stationary contact-member consists of a plurality of metallic fingers 125, arranged transversely with respect to and supported upon a metallic plate 126, and adapted to project therefrom, said fingers being held in adjusted position by clamps 127, the screws of which extend through a slot in said plate, which slot admits of the clamps being moved along for the purpose of varying the position of the fingers with respect to each other. The slotted finger-supporting plate is secured to a block 130 of insulating material, which block is adjustably and detachably secured to the base-plate of the apparatus to admit of its being removed for the substitution of another block. One of the circuit-wires of the circuit 118 is connected to a binding-post 129, on the plate 126. Another metallic plate 135 is secured to said block 130, which is arranged in parallel with the row or set of fingers, and the other circuit-wire, of the circuit 118 is connected to binding-post 131 on said plate. Said fingers 125 and plate 135 are arranged in the same plane, so that the movable contact-member may move over them and successively engage the fingers. Said movable contact-member consists of a brush 136, attached to an arm 137, and is arranged transversely with respect to the finger-supporting plate and the contact-plate 135, hence is in parallel relation with the fingers, and said brush is made long enough to extend over the fingers or at least the projecting end-portions thereof and also over the contact-plate 136, which is common to all the fingers. Said brush continually engages said conducting-plate 135 as it is moved along in one direction and successively engages the fingers to make and break the circuit. The brush-carrying arm or movable contact-member is connected with means operated by the talking-machine, and, as here shown, said arm is pivotally connected to a rack-bar 140, arranged to slide in a guideway provided for it on the base of the apparatus, and said rack-bar engages a spur-gear 141, secured to a short-shaft bearing a pinion 142, which engages a pinion 143, and said pinion engages the rack-bar 144, which is slidably supported and bears two upright-pins 145, arranged to receive between them an arm 146, which is attached at one end to the sleeve 4 of the traveling-carriage of the talking machine, its other end being bent at right angles or thereabout, and extended beneath the brush-carrying arm 137. As the sleeve 4 is moved longitudinally and the reproducer advances over the record cylinder the rack-bar 144, is moved to rotate the gearing above described, to in turn move the rack-bar 140, in the same direction and thereby move the brush-carrying arm to move the brush along over the contact-members and make and break the circuit, and according as the fingers are located the circuit will be closed and the electro-magnet 116 energized to operate the slide-holder and

slide-moving mechanism of the stereopticon. When the sleeve 4 arrives at the end of its stroke it is rocked by the repeating-attachment, as heretofore described, and when thus rocked the bent arm 146 is moved by it to raise its end-portion which extends beneath the brush-carrying arm, thereby raising said brush-carrying arm and lifting the brush free from engagement with the contact-members and holding it in elevated position during its return movement, thus admitting of its being returned to normal position without engaging the contact-members.

By making the supporting-plate 130 for the controller adjustable, it may be moved longitudinally thereby to vary its position, so that it may operate in synchronism with the talking-machine; and by making the fingers 125 adjustable they may be set to occupy different relative positions according to the requirements of the record on the talking-machine. The plate 126 may be graduated if desired as represented in Fig. 2 and printed cards may accompany the record, thereby to indicate where to set the fingers to correctly correspond with the records which they accompany.

The stationary contact-member instead of having adjustable fingers 125, may have fixed fingers, as represented at 150, Fig. 6, formed on a conducting-plate which is secured to an insulated base-plate, and to which one of the circuit-wires of the circuit 118 is connected, although said conducting-plate bearing the fingers is removable from the base-plate, so that conducting-plates having fingers differently disposed relative to each other may be employed.

In Fig. 13 another form of electric repeating controller of the reciprocating type is shown wherein the two circuit-wires are connected respectively to flat contact-strips 155, 155, secured to a plate 156, of insulating material, and the brush 157, is adapted to engage both strips 155, and is attached to an arm 158, pivotally connected to an arm carried by the talking machine, said arm 158 having a short arm 159, extended from it which engages the fingers of a stationary engaging-member. In this form of controller the current passes from one to the other conducting-strip through the brush, and the fingers act as cams to move the short arm 159, thereby to move the brush into and out of engagement with the conducting-strips at intervals of time according to the arrangement of the fingers on the plate.

Referring to Figs. 14, 15 and 16, another form of electric repeating-controller for the stereopticon is shown, which is of a rotary type.

In this form of controller the circuit 118 of the electro-magnet 116 is controlled by a circuit-controller comprising a stationary member 175 and a resilient member 176, said resilient member being movable into engagement with the stationary member 175, by the engagement therewith of projections 177 on a wheel 178, which is detachably secured to a suitably supported rotatable shaft 179. A disk 180 is secured to said shaft having on its periphery a single notch for engagement therewith of a pawl 182, which is pivotally supported on the side of a pinion 183, said pinion being loosely mounted on the shaft or otherwise supported. A reciprocating rack-bar 185, engages said pinion 183, and has a pair of pins 186, projecting upwardly from it which receive between them an arm 190, atached to the sleeve 4 of the talking-machine. In operation, as the sleeve 4 of the traveling-carriage is moved longitudinally in conjunction with the reproducer said rack-bar 185, is correspondingly moved and the pinion rotated in the direction of the arrow Fig. 15, and the disk 180 is likewise rotated, thereby rotating the shaft 179, bearing the wheel 178, having the projections 177, and thus repeatedly operating the circuit-controller 175, 176, and closing the circuit 118 to energize the electro-magnet 116. As the sleeve 4 is rocked by the repeating-attachment of the talking-machine the arm 190 is raised a short distance, but not above the tops of the pins 186, and then as said sleeve is returned to normal position the arm 190 is moved with it and the rack-bar 185 is correspondingly returned to normal position and the pinion is rotated reversely while the pawl 182 passes over the edge of the disk. This return movement of the parts continues until the pinion has been revolved a complete cycle at which time the parts will have been returned to their normal position and the pawl has again entered the notch in the disk preparatory to repeating the operation above described. In this form of controller the actuator for the circuit-controller is intermittently but progressively moved.

The projections 177 may be detachably placed in notches in the edge of the disk 178 and said disk may have a great many notches which may be regularly spaced apart and the projections inserted in any of the notches, as desired, or as will be indicated on printed cards accompanying the records.

Referring to Figs. 19 and 20 another form of repeating-controller which is of mechanical type is represented, wherein a motor, 220 such for instance as a spring-motor, is connected with the shaft 88 of the operating means of the stereopticon and a notched disk 221 is also secured to said shaft, which is normally engaged by a pivot detent-lever 222, and when said detent-lever is moved on its pivot to disengage said disk the shaft 88 will be turned by the motor one complete revolution, whereupon it will be again engaged by the detent-lever. The detent-lever

is controlled by an actuating-wheel 224, secured to a shaft 225, said wheel having on its periphery a plurality of projections arranged to engage the end of the detent-lever, thereby to repeatedly lift said lever as the actuating-wheel revolves. The projections on the actuating-wheel will be irregularly spaced apart in accordance with the requirements of the record of the talking-machine. Said actuating-wheel is detachably secured to the shaft, being held in position thereon by a finger nut. The toothed wheel 226 is mounted on the shaft 225 which is engaged by a rack-bar 227 which is operatively connected with the arm 146 which is connected with the repeating-attachment of the talking-machine, so as to be operated thereby. During each stroke of said arm 146, the toothed wheel is rotated in one direction, and said toothed wheel bears a pawl which engages a ratchet-toothed wheel 228 secured to the shaft 225, so that as the toothed wheel is rotated said shaft is correspondingly rotated in one direction and is then caused to rest. As the arm 146 is moved back and forth in the manner heretofore described said rack-bar 227 will be correspondingly moved and the toothed actuating-wheel rotated and the spring-motor repeatedly released and permitted to operate the stereopticon.

From the foregoing it will be understood that I do not desire to limit my invention to the particular construction of controller, so long as it has the necessary characteristics adapting it for repeated operation, whereby the stereopticon may be repeatedly operated in accordance with the repeated operations of the talking-machine.

In case it should be necessary or desirable to provide for resetting the talking-machine and stereopticon, one with respect to the other, in order that synchronous operation may be maintained, automatic means are here shown which may be employed, by which they are caused to begin each successive operation simultaneously.

In carrying out this feature of my invention the repeating-attachment for the talking-machine is automatically controlled by means operated by the stereopticon and upon referring to Figs. 17 and 18, one simple form is shown for purposes of illustration, it being understood that other similar structures may be devised for accomplishing this result, which come within the spirit and scope of the invention. In said figure the repeating attachment shown is substantially that shown in Fig. 1, with the exception that the disk 28 and pin 29 for raising the arm 15 and dog 16, and for moving said dog into engagement with the return-screw 12 are omitted and a cam-lever 200 is arranged adjacent the arm 15 and dog 16, so that its end-portion engages said arm to lift it, together with the dog borne by it, high enough for the dog to be moved forward into engagement with the return-screw 12, and said cam-lever also has formed thereon a projection 201 arranged to engage said dog and move it forward into engagement with the return-screw, thereby insuring starting the return movement of the reproducer at a predetermined moment. Said cam-lever 200 is pivoted at 203 and has connected with it a short arm 204 bearing an armature 205 of an electro-magnet 206 which is included in a circuit 207, with a pair of contacts 208, and the rotary slide-holder of the stereopticon or some other moving part thereof has a projection 210 arranged upon it which at a predetermined moment engages the circuit-contacts 208 and closes the circuit 207 to energize the electro-magnet 206, and upon attraction of its armature to move the cam-lever 200 and lift the arm 15 and move forward the dog 16 into engagement with the return-screw. The projection 210 on the rotary slide-holder is here shown as arranged at the end of a cycle of its operation and consequently at the end of a series of slides which may be held by it, so that the repeating attachment of the talking-machine is caused to operate at such moment. Therefore, if for any reason the the two machines should get out of synchronism during the operation they may be simultaneously started at the beginning of the next succeeding operation.

While the controlling-means here shown is adapted for operation at the beginning of the return movement of the reproducer, yet it will be understood that this moment is merely one selected for simplicity of construction, the gist of the invention including a control for the successive operations of the talking-machine by means of the stereopticon at any predetermined moment, the contacts 210 and 208, being correspondingly arranged on or in coöperative relation with the stereopticon.

Means are preferably provided to insure the placing or adjusting of new records and new controllers, so that they will correctly coincide, and referring to Fig. 2, a very convenient means is shown for accomplishing this result. In this figure, a new cylinder or record is pushed onto the mandrel or holder against a stop 280, which is adjustably mounted on the holder, and held secure by a set-screw or other means, and said stop has an annular flange 281, which in any position thereof will serve as a pointer, and arranged adjacent to said flange and supported in fixed position with respect thereto, is a graduate scale 282 having any desired numerals or indicators thereon, whereby the position of the stop may be correctly indicated. The controller 130 of the stereopticon has arranged upon it a pointer 285, and arranged adjacent said

pointer and supported in fixed position with respect thereto is a graduated scale 286, having any desired numerals or indicators thereon which correspond with the numerals or other indicators on the graduated scale 282. When the stop for the record is arranged with its pointer at the middle or other predetermined point on the scale 282, and the controller is arranged with its pointer at the middle or other predetermined point on the scale 285, both will coincide, and if by error, they do not correctly coincide, one or the other may be adjusted. If the end of a record is broken a mark on the cylinder record may be made to coincide with a suitably arranged pointer secured to a stationary part of the talking-machine.

When changeable controllers are employed having numerous small adjustable members, the small members may be adjusted to conform with an instruction sheet sent with the record, and when the new record and controller have been set at 0 or other predetermined position on their respective supports, they will be correctly adjusted to coincide, and the apparatus is ready for operation. When disk records are employed the controller, if correct when set on 0 or other predetermined position, will coincide, and if by error in construction, it does not coincide, the controller can be adjusted as a unit.

I claim:—

1. The combination with a talking machine and a stereopticon, of a controller for the stereopticon and interposed multiplying means operatively connecting the talking machine with the controller to amplify the movement of the talking machine in the controller, whereby the combined apparatus may operate automatically when set in operation, substantially as described.

2. The combination with a talking machine arranged for repeated operation and a stereopticon arranged for repeated operation, and a controller for the stereopticon operatively connected with the talking machine and arranged for repeated operation, of means controlled by the stereopticon for causing the repeated operation of the talking machine and controller substantially as described.

3. The combination with a talking machine arranged for repeated operation and a stereopticon arranged for repeated operation, and a controller for the stereopticon operatively connected with the talking machine and arranged for repeated operation, of means controlled by the stereopticon at a predetermined moment in its cycle of motion for controlling the repeated operations of the talking machine at such moments and also of the controller, substantially as described.

4. The combination with a talking machine having a repeating attachment and a stereopticon arranged for repeated operation and a controller for the stereopticon operatively connected with the talking machine and arranged for repeated operation, of movable means to operate said repeating-attachment, a controller for said movable means adapted for repeated operation by the stereopticon at a predetermined moment during its cycle of operation, substantially as described.

5. The combination with a talking machine having a repeating attachment and a stereopticon arranged for repeated operation and a controller for the stereopticon operatively connected with the talking machine and arranged for repeated operation, of movable means to operate the repeating attachment, an electro-magnet controlling its operation, and a controller for the circuit of said magnet operatively connected with the stereopticon, and adapted for operation at the end of a cycle of operation of the stereopticon, substantially as described.

6. The combination with a talking machine having a repeating attachment and a stereopticon arranged for repeated operation and a controller for the stereopticon operatively connected with the talking machine and arranged for repeated operation, of movable means to operate said repeating attachment, and a controller for said movable means operatively connected with the movable slide holder of a stereopticon and arranged for operation at the end of each cycle of operation of the slide holder, substantially as described.

7. The combination with a talking machine arranged for repeated operation, and a stereopticon having a slide holder carrying a plurality of slides and arranged for repeated operation, of a controller for said stereopticon operatively connected with the talking machine and arranged for repeated operation, and means associated with the stereopticon and coextensive with an unfilled portion of its slide holder for operating the stereopticon independently of the talking machine, substantially as described.

8. The combination with a talking machine arranged for repeated operation, and a stereopticon having a slide holder carrying a plurality of slides and arranged for repeated operation, of a controller for said stereopticon operatively connected with the talking machine and arranged for repeated operation, an electric-controller for the stereopticon including an electro-magnet and a circuit controller for the circuit of said magnet, the movable member of which is operatively connected with the talking machine, and another circuit controller for said circuit, the movable member of which is op-

eratively connected with the stereopticon, whereby the stereopticon may be operated independently of the talking machine, substantially as described.

9. The combination with a talking machine and a stereopticon having a slide holder carrying a plurality of slides, of a controller for said stereopticon operatively connected with the talking machine, an electric controller for the stereopticon including an electro-magnet and a circuit-controller for the circuit of said magnet, the movable member of which is operatively connected with the talking machine, and another circuit-controller for said circuit, the movable member of which is arranged on the slide holder of the stereopticon and is coextensive with an unfilled portion thereof, substantially as described.

10. The combination with a talking machine arranged for repeated operation, and a stereopticon having a slide holder carrying a plurality of slides and arranged for repeated operation, of a controller for said stereopticon operatively connected with the talking machine and arranged for repeated operation, means associated with the stereopticon for automatically permitting the stereopticon to operate independently of the talking machine, and means controlled by the stereopticon for controlling the repeated operation of the talking machine, substantially as described.

11. The combination with a talking machine arranged for repeated operation, and a stereopticon having a slide-holder carrying a plurality of slides and arranged for repeated operation, of a controller for said stereopticon operatively connected with the talking machine and arranged for repeated operation, and means associated with and operated by the stereopticon for automatically permitting the operation of the stereopticon independently of the talking machine, and means controlled by the stereopticon for controlling the repeated operation of the talking machine, substantially as described.

12. The combination with a talking machine arranged for repeated operation, and a stereopticon having a slide-holder carrying a plurality of slides and arranged for repeated operation, of a controller for said stereopticon operatively connected with the talking machine and arranged for repeated operation, and means associated with the stereopticon and coextensive with an unfilled portion of its slide-holder for operating the stereopticon independently of the talking machine, and means controlled by the stereopticon for controlling the operation of the talking machine, substantially as described.

13. The combination with a talking machine arranged for repeated operation, and a stereopticon having a slide-holder carrying a plurality of slides and arranged for repeated operation, of a controller for said stereopticon operatively connected with the talking machine and arranged for repeated operation, an electric-controller for the stereopticon including an electro-magnet and a circuit-controller for the circuit of said magnet, the movable member of which is operatively connected with the talking machine, and another circuit-controller for said circuit, the movable member of which is operatively connected with the stereopticon, whereby the stereopticon may be operated independently of the talking machine, and means controlled by the stereopticon for controlling the operation of the talking machine, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN L. BOYLE.

Witnesses:
H. B. DAVIS,
T. T. GREENWOOD.