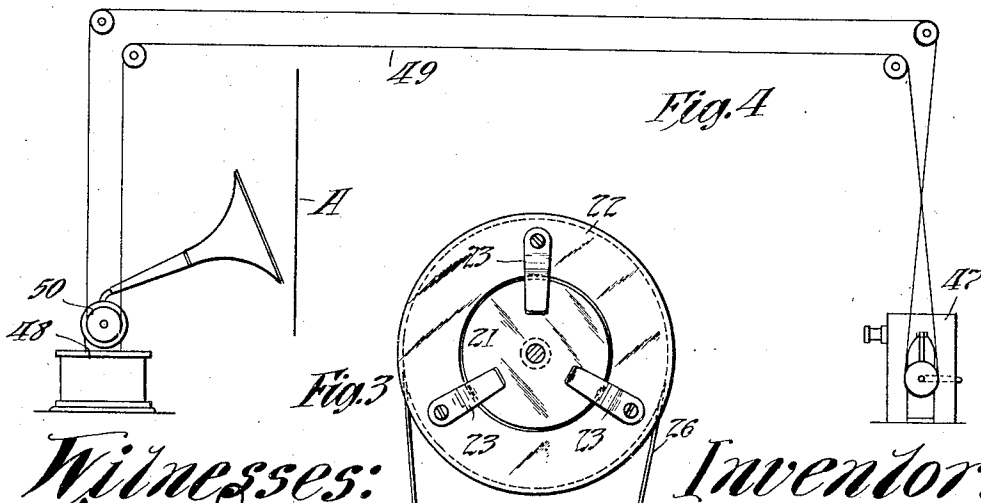
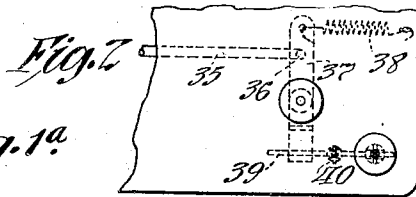
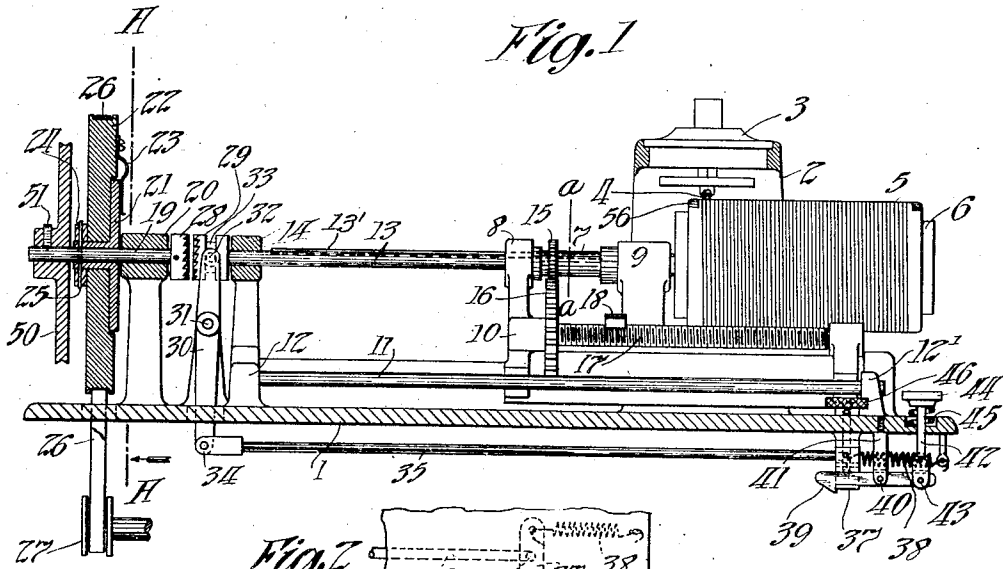


COMBINED PHONOGRAPH AND MOVING PICTURE APPARATUS.
APPLICATION FILED MAY-17, 1912.

Patented May 22, 1917.

Fig. 1



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 COMBINED PHONOGRAPH AND MOVING PICTURE APPARATUS.
 APPLICATION FILED MAY 17, 1912.

1,226,883.

Patented May 22, 1917.
 2 SHEETS—SHEET 2.

Fig. 7

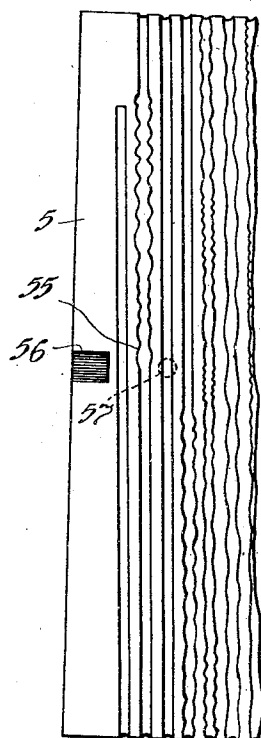


Fig. 5

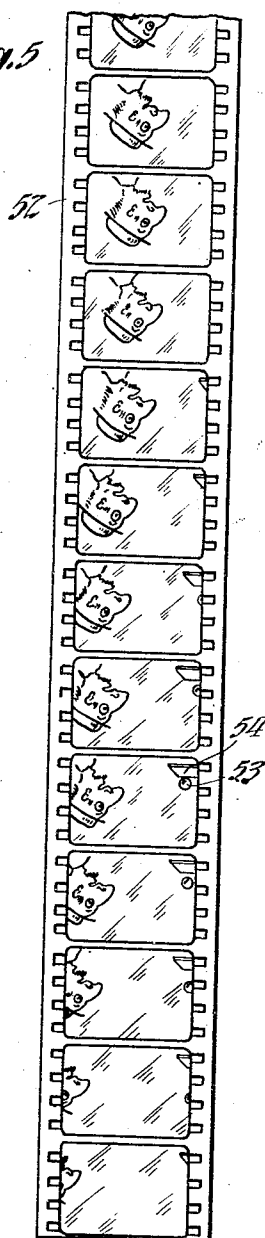
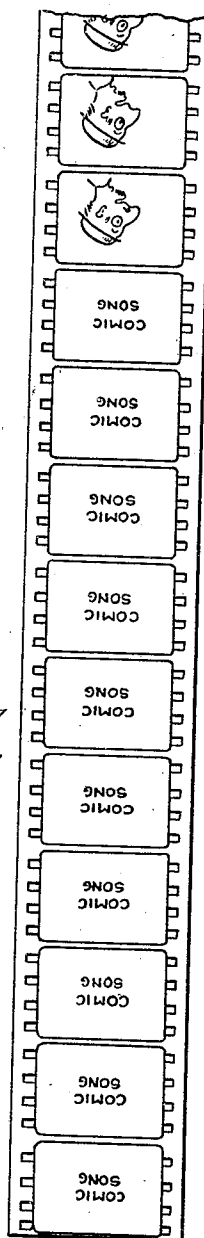


Fig. 6



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UNITED STATES PATENT OFFICE.

DANIEL HIGHAM, OF NEW YORK, N. Y.

COMBINED PHONOGRAPH AND MOVING-PICTURE APPARATUS.

1,226,883.

Specification of Letters Patent.

Patented May 22, 1917.

Application filed May 17, 1912. Serial No. 697,839.

To all whom it may concern:

Be it known that I, DANIEL HIGHAM, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have made a certain new and useful Invention in Combined Phonograph and Moving-Picture Apparatus, of which the following is a description.

10 This invention relates to apparatus by means of which a series of moving pictures are exhibited upon a screen or otherwise, this visual record being accompanied by the record of the sounds appropriate thereto, delivered in exact synchronism, each sound with the picture to which it belongs. The principal objects of the invention are to improve the construction of apparatus of the above named character and to provide an improved method of securing an alinement of the moving picture and sound records for synchronous operation, the improved apparatus being alone claimed in this application.

25 In accordance with my invention, the sound reproducing means is arranged to be operated at will with or independently of the motion picture apparatus, suitable means being provided for connecting said sound reproducing means for synchronous operation with the moving picture apparatus at the proper moment for securing an alinement of the moving picture and sound records. The sound record is preferably provided with a mark or index which can be readily identified with a view on the moving picture record or film so that by this means, the sound record may be set into such a position on its support that by starting the rotation or movement of the latter, as by a clutch or other starting means, when the said view is exhibited, an alinement between the two records is obtained. In practice, I have found that if the motor or other operating means for the reproducing mechanism is positively or unyieldably connected with the said mechanism, the latter starts so suddenly upon the throwing in of the clutch or starting means as to frequently cause the reproducer to jump out of the record groove or from one groove to another; so that a proper alinement of the two records is not obtained. In order to obviate this objection, I place a yielding connection between the motive means and the record

support of the sound reproducing apparatus; whereby the sound record support is caused to start into rotation gradually at the operation of the clutch or other starting means. In order to always produce an exact alinement of the sound and picture records, the time taken to throw the sound reproducing means into operation upon the appearance of the proper view must be substantially constant. Because, however, of differences in "personal equation" involving different speeds of operation for different operators, the time taken by different operators to shift the ordinary manually movable clutch for starting the rotation of the sound record support varies considerably; and this form of clutch is, therefore, not sufficiently accurate in its operation for use with devices of the class in question. In order to overcome this last named objection, I provide for the automatic operation of the clutch by means, such as a spring, which is capable of always performing the desired operation in a fixed time. A manually releasable latch may be employed to resist operation of the clutch actuating mechanism.

According to the improved process forming a part of my invention, a combined aural and visual signal is produced, as by the striking of a bell, and recorded on the original sound record and moving picture negative. After this, without stopping the sound recording apparatus and the moving picture camera, which are connected for synchronous operation, the sounds and views which are to appear on the final records are recorded. The portion of the moving picture record or film containing the view or views showing the production of the alining signal is then removed, being preferably replaced by a section of film containing a title or other inscription, the sound record being provided with a mark or index to denote the point thereof corresponding with the first view following said new section of film. A positive having been made from the moving picture negative, the sound record is set with the point corresponding to the said view under the stylus of the sound reproducing apparatus; so that when in exhibiting said positive, the above named view is exhibited by the moving picture apparatus, the phonograph may be started in exact alinement with the moving

picture apparatus. Other features of my invention will appear more fully in the following specification and appended claims.

In order that my invention may be more clearly understood, attention is hereby directed to the accompanying drawings forming a part of this specification and in which—

Figure 1 is a view, partly in front elevation, and partly in section, of apparatus embodying my improvements;

Fig. 1^a is a cross section taken on line *a—**a* of Fig. 1.

Fig. 2 is a fragmentary plan view showing a detail of construction;

Fig. 3 is a view taken on line *A—A* of Fig. 1, and looking in the direction of the arrow;

Fig. 4 is a diagrammatic side view showing the moving picture and phonographic apparatus connected together for synchronous operation;

Fig. 5 is a face view of section of negative film containing views showing the striking of a bell to produce the signal through which the subsequent alinement of the moving picture and phonograph records is obtained;

Fig. 6 is a corresponding view of the positive made from the film shown in Fig. 5, and arranged for use in carrying on my improved process; and

Fig. 7 is a side elevation of a sound record designed for reproduction in accordance with my improved process.

In all of the views like parts are designated by the same reference numerals.

Referring to the drawings, the phonograph shown is of the type in which a cylindrical record carrying mandrel or support is fed axially past a stylus which is in contact with the record surface. The base plate 1 has secured to it or formed axially therewith the yoke or arch 2 by which the sound box 3 is carried. The sound box is provided with a stylus 4, which is shown in Fig. 1 as cooperating with a record 5 mounted upon the mandrel 6, the latter being secured to and carried by a sleeve 7, which is rotatably mounted in uprights 8 and 9 on the traveling carriage 10. The traveling carriage, carrying therewith mandrel 6 and sleeve 7, is adapted to travel along guide rods, one of which is shown at 11 in Fig. 1 and the other of which (not shown) is arranged in the rear of the rod 11 and parallel therewith. The rod 11 is mounted in brackets 12 and 12' rising from the base plate 1. The sleeve 7 is formed on its bore with a keyway 7' which is engaged by a key or spline 13' on the drive shaft 13 adjacent the right hand end thereof, the left hand end of the drive shaft being rotatably supported in an upright 14 on the base plate 1. In order to produce the proper feeding or movement of the carriage

10 and the record support upon the rotation of the shaft 13, the following means are provided. Sleeve 7 has secured thereto a gear 15 which operates a gear 16, the said gears being carried by the traveling carriage 10. The gear 16 is fast on the feed screw 17 which is carried by the traveling carriage 10. A nut 18 carried by the stationary frame of the phonograph engages with the feed screw 17. It will be evident that upon rotation of the shaft 13, the mandrel 6 will be rotated; and by means of the gear train including the gears 15 and 16, the feed screw 17 will be rotated and the traveling carriage with the mandrel and record thereon carried or fed past the stylus 4. So much of the construction of the phonograph as specifically described above is disclosed in my application, Serial No. 488,078 filed April 5, 1909, and does not form a part of the present invention.

My phonographic apparatus comprises the following improvements: A short shaft 19 is supported in a bearing 20 on the base plate of the phonograph and is arranged in alinement with the shaft 13. The shaft 19 carries a friction member 21 which is provided with a hub-like portion mounted on the said shaft and also with a flange extending outwardly of the latter. Upon the hub of the member 21 is rotatably mounted a drive pulley 22 which is held in frictional engagement with the flange of member 21, as by springs 23. A collar 24 is mounted on the end of the member 21 opposite that carrying the friction flange and serves to limit axial movement of the drive pulley 22, a pin or equivalent means 25 passing diametrically through the collar 24, the hub of the member 21 and the shaft 19, and thereby serving both to hold the said collar against movement on the member 21 and to secure both of these members to the shaft 19. Driving pulley 22 is driven, as by a belt 26, from a pulley 27 connected with a motor (not shown). The shaft 19 is provided at its end adjacent the shaft 13 with an enlarged toothed portion 28 so that it is adapted to be connected with or disconnected from the shaft 13 by a clutch 29 having a toothed face adapted for engagement with the toothed face of the enlargement 28. By the provision of the frictional connection between the pulley 22 and the member 21, the shaft 13, the mandrel, and the record thereon are permitted to start gradually into rotation upon the throwing in of the clutch 29 regardless of the comparatively high speed of the pulley 22, this gradual rotation being insured by the momentum of the record support and feeding mechanism as well as by the friction of the stylus 4 on the record 5. The clutch 19 may be moved into or out of clutching engagement with the enlargement 28 by means of an arm 30 pivoted at 31 and

carrying at its upper end a pin 32 which engages with the reduced portion 33 of the clutch member 29. Arm 30 has secured to the lower end thereof, as by the pivotal connection 34, a link 35 which is pivotally connected at its opposite end, as at 36, with a lever 37, the latter being pivotally supported from the base plate 1 for movement about a vertical axis. As stated above, I prefer to operate the clutch 29 automatically, as by a spring. I accordingly provide a tension spring 38 connected at its ends respectively to the base plate of the phonograph and to one end of the lever 37, as clearly shown in Fig. 2. In order to resist the operation of the clutch by the spring 38 and to cause the clutch to be held out of engagement with the member 28, I provide a latch lever 39 pivoted, as at 40 to a lug 41 projecting below the bed plate 1 and secured thereto. The lever 39, as shown in Fig. 1, is provided with a notch adapted to receive the forward end of the lever 37 and to prevent rotation of the latter by the spring 38. The latch 39 may be released from the lever 37 by depressing a member 42 projecting above the base plate 1 and pivoted, as at 43, to the end of the latch opposite that adapted for engagement with the lever 37. The numeral 44 designates a button or finger piece secured to the top of the member 42 to facilitate the manual operation thereof, and the numeral 45 designates a compression spring adapted to hold or return the member 42 to its raised position and to normally hold the latch in engagement with the lever 37. It will be seen that a very slight depression of the member 42 will cause the lever 37 to be released from the latch 39 and permit the spring 38 to cause the clutch to be thrown into engagement with the member 28. It will furthermore be seen that the time taken for throwing in the clutch is practically independent of the speed or "personal equation" of the operator. A member 46 provided with a knurled head and secured to the pivot of the member 37 permits the manual adjustment of the lever 37 into latching engagement with the member 39.

Referring to Fig. 4, the numeral 47 represents a moving picture apparatus as a whole and the numeral 48 a phonographic apparatus, the latter being arranged behind a screen A upon which the pictures from the apparatus 47 are adapted to be projected, the apparatus 47 and 48 being connected for synchronous operation. Various kinds of synchronizing apparatus such as that disclosed and claimed in my application, Serial No. 461,869, filed November 10, 1908, may be employed, the apparatus shown comprising a flexible member 49 passing over a pulley 50 secured to the shaft 19 (see Fig. 1) of the phonographic apparatus, as by a screw 51 (see Fig. 1), this member 49 being connect-

ed with the moving picture apparatus 47 to cause the operation of the latter in synchronism with the phonograph.

In accordance with my invention, a starting point for alining the picture and sound records for future use is made in the following way. After a moving picture camera and a recording phonograph have been arranged for simultaneously and synchronously taking a suitable record, such as that produced by a person singing and dancing, the apparatus is started into operation, a person comes on the stage and strikes a bell or equivalent means with a hammer or in any other suitable way makes a distinctive sound which can readily be identified with a picture or view of momentary duration, the sound and view being simultaneously recorded by the phonograph and the camera respectively. After this, without stopping the recording apparatus, the song and dance or other matter to be recorded are produced and the combined phonographic and moving picture records made. A developed moving picture film or negative made in this way is shown in Fig. 5, the fifth picture from the bottom showing a hammer 53 or other suitable striker in engagement with a bell 54. After development of the original film, the pictures showing the striking of the bell are preferably removed, being foreign to the subject matter of the remainder of the record. Preferably a new section of film containing a title or other suitable inscription is cemented or otherwise secured to the film 52 in place of the removed portion. In practice I remove about the first ten pictures on the original film, but it is obvious that the number of pictures removed depends upon the nature of the signal and the visual record made thereof. It is also obvious that the strip of film replacing the removed section need not be of exactly the same length as the latter; and in practice, the portion of the film containing the title is commonly made from fifteen to twenty feet long for ordinary moving picture film. Positives are now made from the negative by any suitable process, one of these positives being shown in Fig. 6. The title having been secured to the negative, these positives may obviously be made in one continuous strip free from joints.

The phonograph record made as described above will have a series of undulations 55 (see Fig. 7) formed by the sound emitted when the bell represented at 54 is struck by the hammer. As the length of the portion of film from the view showing the striking of the bell to the first of the original views retained in the positive is known, the length of the sound record impression from the undulations 55 to the point corresponding with the first picture following the title in the positive picture film can readily be deter-

mined. This having been determined, a mark or index 56 is placed at the periphery of the sound record to indicate the proper angular position of the sound record with respect to the reproducer stylus when the sound reproducing mechanism is arranged for reproducing the sound or sounds corresponding to the last named view. This mark is preferably arranged to be placed in alignment with the reproducer stylus in placing the reproducing mechanism in starting position. As shown in Fig. 7, the mark 56 is placed in alinement with the end of the series of undulations 55, the correct position of the reproducing stylus in this instance, for the beginning of the sound reproduction being shown in dotted lines at 57 one revolution in advance of the said undulations.

In reproducing the combined record with my improved apparatus, the clutch 29 is set to disengage the shaft 13 from the driving pulley 22. The phonograph record 5, or a duplicate made thereof by any well known process is placed upon the mandrel 6 with the reproducing stylus engaging the beginning of the record groove; and the record is then manually rotated until the sound or sounds corresponding to the original alining signal are heard. After this, the record is rotated the necessary amount for bringing the reproducer stylus to starting position, this position being accurately obtained by bringing the mark 56 into alinement with the reproducing stylus. The positive film is then exhibited, beginning with the title, by means of the moving picture projecting or exhibiting apparatus 47; and when the first picture following the title or inscription is exhibited, the operator presses the finger piece 44 to release the catch 39 and permit the spring 38 to cause the clutch 29 to be thrown in engagement with the member 28. In this way, an exact alinement of the moving picture and sound records is obtained; and by means of the synchronizing connection between the phonographic and moving picture apparatus the two records may be reproduced in synchronism.

It is obvious that various changes may be made in the details of construction of the apparatus shown, and in the exact particulars of the method described without departing from the spirit of my invention.

Having now described my invention, what I claim and desire to protect by Letters Patent of the United States is as follows:—

1. In a device of the class described, the combination of a rotatable support, driving means, power transmitting means connected with said driving means and comprising a plurality of yieldably connected members, and means for operatively connecting said power transmitting means to or for disconnecting the same from said support, substantially as described.

2. In a device of the class described, the combination of a rotatable record support, a shaft connected therewith for rotating the same, driving means, power transmitting means connected with said driving means and comprising a plurality of yieldably connected members, and means for operatively connecting said power transmitting means to or for disconnecting the same from said shaft, substantially as described.

3. In a device of the class described, the combination of a rotatable record support, a shaft connected therewith for rotating the same driving means including a pivoted member, power transmitting means connected with said driving means and comprising a plurality of yieldingly and frictionally connected members, and means for operatively connecting said power transmitting means to or for disconnecting the same from said shaft, substantially as described.

4. In a device of the class described, the combination of a rotatable record support, a shaft connected therewith for rotating the same, driving means, power transmitting means connected with said driving means and comprising a plurality of yieldably connected members, and a clutch for operatively connecting said power transmitting means to or for disconnecting the same from said shaft, substantially as described.

5. In a device of the class described, the combination of a rotatable record support, a shaft connected therewith for rotating the same, driving means, power transmitting means connected with said driving means and comprising a plurality of yieldably and frictionally connected members, and a clutch for operatively connecting said power transmitting means to or for disconnecting the same from said shaft, substantially as described.

6. In a device of the class described, the combination of a rotatable record support, a shaft connected therewith for rotating the same, driving means, power transmitting means comprising a plurality of yieldably connected members, one of which is connected with said shaft, and the other with said driving means, and a driving member connected for synchronous rotation with said shaft, substantially as described.

7. In a device of the class described, the combination of a rotatable record support, a shaft connected therewith for rotating the same, driving means, power transmitting means comprising a plurality of yieldably connected members, one of which is connected with said driving means, means for operatively connecting the other of said yieldably connected members to or for disconnecting the same from said shaft, and driving means connected for synchronous rotation with said last named member, substantially as described.

8. In a device of the class described, the combination of a rotatable record support, a shaft connected therewith for rotating the same, driving means, power transmitting means comprising a plurality of frictionally connected members, one of which is connected with said driving means, means for operatively connecting the other of said frictionally connected members to or for disconnecting the same from said shaft, and driving means connected for synchronous rotation with said last named member, substantially as described.

9. In a device of the class described, the combination with a driving member, a driven member, and means adapted to operatively connect said members, of automatic means for moving said connecting means into operative position, spring operated means for holding said moving means inoperative, means for releasing said holding means, and means for moving said automatic means into operative relation to said holding means, substantially as described.

10. In a device of the class described, the combination of a driving member, a driven member, and means adapted to operatively connect said members, of automatic means for operating said connecting means, said automatic means comprising a plurality of levers, a link connecting said levers, and a spring for moving said link and levers, means for holding said automatic means inoperative, and means for releasing said holding means, substantially as described.

11. In a device of the class described, the combination with a driving member, a driven member, and means adapted to operatively connect said members, of automatic means for moving said connecting means into operative position, means for holding said moving means inoperative, means for releasing said holding means, and

pivoted means for moving said automatic means into operative relation to said holding means, substantially as described.

12. In a device of the class described, the combination with a driving member, a driven member, and means adapted to operatively connect said members, of automatic means for moving said connecting means into operative position, spring operated means for holding said moving means inoperative, means for releasing said holding means, and pivoted means for moving said automatic means into operative relation to said holding means, substantially as described.

13. In a device of the class described, the combination with a driving member, a driven member, and means adapted to operatively connect said members, of automatic means comprising a spring pressed lever for operating said connecting means, a latch for holding said automatic means inoperative, and means for shifting said lever to move said automatic means into operative relation to said holding means, substantially as described.

14. In a device of the class described, the combination of a rotatable support, driving means, power transmitting means comprising a plurality of yieldably connected members, one of which is connected with said driving means, means for operatively connecting the other of said yieldably connected members to or for disconnecting the same from said support, and driving means connected for synchronous rotation with said last named member, substantially as described.

This specification signed and witnessed this 15th day of May 1912.

DANIEL HIGHAM.

Witnesses:

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ANNA R. KLEHM.