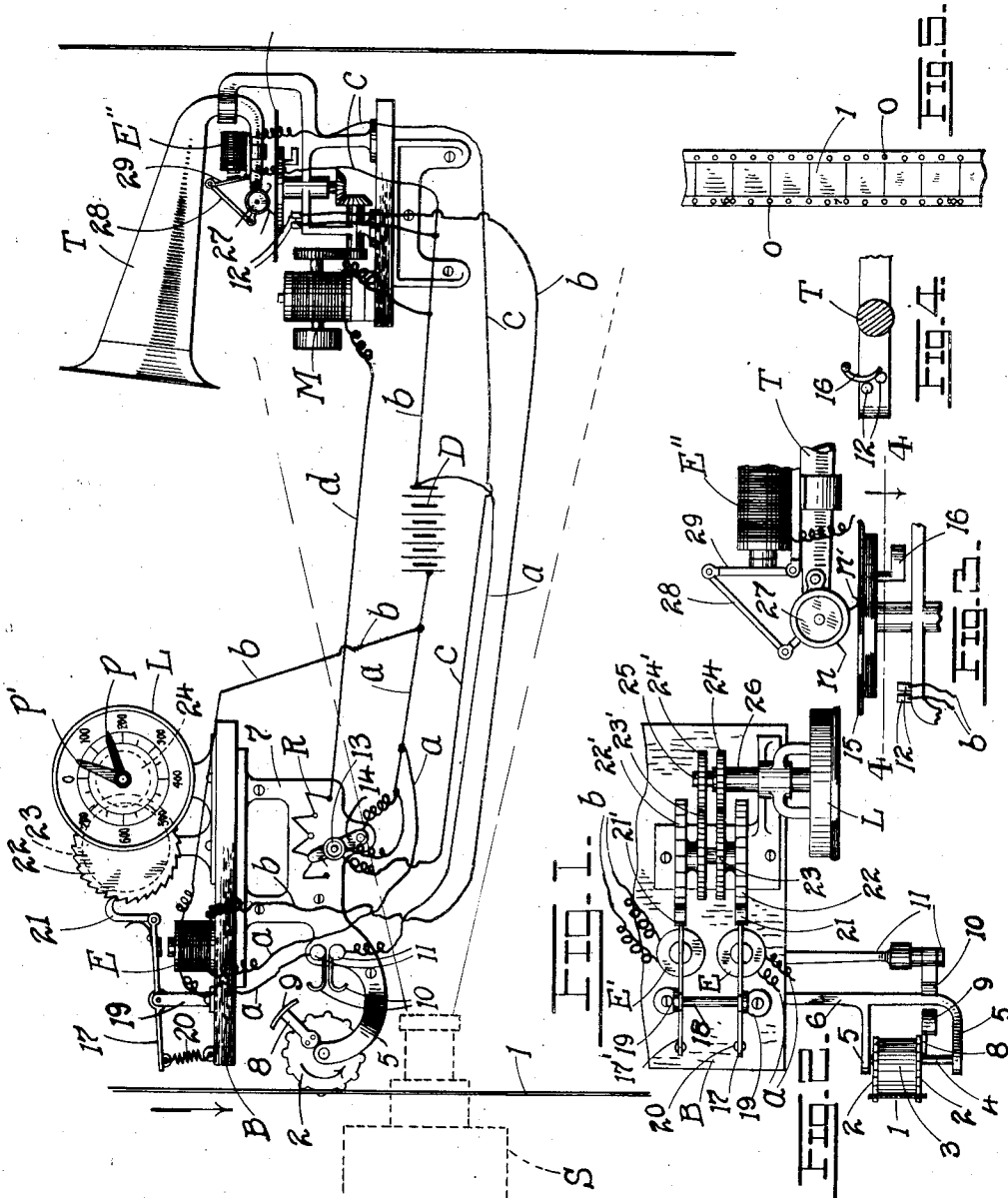


G. P. McDONNELL.
 SYNCHRONIZING APPARATUS.
 APPLICATION FILED JUNE 26, 1908.

945,976.

Patented Jan. 11, 1910.



WITNESSES:

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945,976.

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To all whom it may concern:

Be it known that I, GEORGE P. McDONNELL, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Synchronizing Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in synchronizing apparatus for combined talking and moving picture machines or stereopticon slides, and it consists in the novel construction and arrangement of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a general side elevation of the apparatus; Fig. 2 is a top plan of the registering mechanism; Fig. 3 is an elevation of the record disk and reproducer; Fig. 4 is a horizontal section on line 4-4 of Fig. 3; and Fig. 5 is a front view of the picture film.

The object of my invention is to construct an apparatus which will maintain a traveling moving-picture film in synchronous relation with a talking machine the expressions of which relate to the subject-matter of the film as projected on a suitable screen. The apparatus of course may with equal propriety be used in connection with stereopticon slides projected on a suitable screen.

A further object is to provide a suitable register for the film, and an indicator which will at a glance show when the talking machine and picture machine are out of harmony with each other.

The advantages of the invention may be better understood from a detailed description thereof which is as follows:

Referring to the drawings, 1 represents a moving-picture film or band provided at its opposite edges with perforations *o, o*, and marked by suitable division lines, the film being provided with numbers indicating one foot lengths (Fig. 5). The film is passed in front of a lantern *S* as usual, being advanced by means of a pair of pinions 2, 2, forming the ends of a drum 3, the teeth of the pinions engaging the holes or openings *o, o*, of the film. The shaft 4 of the drum is mounted in the fork 5 of an arm 6 forming a part of the casting 7 depending from the base *B* of the recording mechanism. To one of the terminal pinions 2 of the drum

3 (which in practice is rotated usually by hand) is secured an arm 8 provided with a terminal wiper or contact plate 9, said wiper with each revolution of the film-advancing drum or gear 3 engaging the contacts 10, 10, at the ends of the conducting arms 11. These conducting arms are in circuit with the battery *D* through the conducting wires *a, a*, the wires leading from the poles of the battery to and from the conducting arms 11, 11, through the energizing coil *E*. A second energizing coil *E'* has one of its wires *b, b* leading to one of the wires *a* which in turn runs to one pole of the battery, the second wire *b* running from the coil *E'* to a contact post or pin 12, a second contact post 12 being in circuit with a wire section *b* which in turn leads to the opposite pole of the battery *D*. A third series of conducting wires *c, c* lead from a push-button 13 on the switch arm 14 of the resistance coil *R*, the latter being in circuit at one end with a wire *d* leading to a motor *M*, the opposite end of the motor-winding leading to the battery through wire *b*. The opposite end of the resistance *R* connects to the switch arm 14 whence the circuit leads back to the battery *D* through wire *a*, the battery supplying the necessary energy to the motor *M*, which energy may be varied at pleasure by the arm 14 being passed over the resistance coil. The third circuit *c, c*, above referred to, after leaving the contacts controlled by the push-button 13, couples on to section *a* and runs back to the battery, the section *b* from the opposite pole of the battery connecting with a section *c* from the energizing coil *E''*, the opposite end of the coil coupling up to section *c* which runs back to the push-button 13.

The motor *M* through suitable gears and bevel pinions as shown (Fig. 1) imparts rotation to the horizontal record-disk 15, the latter being provided with a depending contact-arm or wiper 16 which closes the gap between the contact posts 12, 12, with each revolution of the disk, thereby energizing the coil *E'* with each contact. With each closing of the circuit by the contact of the wiper 9 with the contacts 10, 10, the coil *E* becomes energized; and with each contact of the wiper 16 with the contact posts 12, 12, the coil *E'* becomes energized. The coil *E* when energized actuates an armature 17 pivoted at an intermediate point to a shaft 18

between the posts 19, one end of the armature being coupled to a contracting spring 20 as shown (Fig. 1), the opposite end of the armature carrying a spring-controlled pawl 21 which engages a ratchet disk 22 the hub of which has formed integrally therewith a gear wheel 23. The shaft 18 carries a similar armature 17' having a similar pawl 21' engaging a similar ratchet 22' which is in turn provided with a gear wheel 23', the latter meshing with a pinion 24' at the adjacent end of a spindle 25, the opposite end of the spindle carrying a pointer p' on the face of a register L. The gear 23 on the other hand engages a pinion 24 on a sleeve 26 loosely surrounding the spindle 25, the outer end of the sleeve carrying a pointer p . Thus with each turn of the drum 3 which advances the film 1, the coil E becomes energized, thereby depressing the armature 17 and advancing the ratchet 22 which in turn advances the pointer p a sufficient number of marks on the dial L, thus indicating the number of units of length (feet) through which the film has passed. With each revolution of the record disk 15, the coil E' is energized and its armature 17' correspondingly advances the pointer p' . If the speeds of rotation of the disk 15 and that of the drum 3 correspond, the pointers p , p' will travel together at the same speed, indicating that the record of the talking machine and the travel of the film carrying the pictures are in synchronous relation, so that the pictures are not getting ahead of the talking machine.

The talking machine T, is of a kind well known and requires no detailed description, suffice it to say however that the rotatable reproducer disk or diaphragm 27 is coupled by links 28 to an armature 29 hinged in front of the energizing coil E'', the disk carrying a reproducer needle n and a dead needle n' . Of course the dead needle being disconnected from the diaphragm does not transmit any sound from the record. Now, should the film advancing drum 3 and record disk 15 be out of synchronism, a fact at once apparent by the divergence or separation of the pointers p , p' , the operator simply pushes the button 13, closing the circuit c , c of the coil E''. The coil E'' being energized attracts the armature 29 which through the link connections 28 rotates the reproducer disk 27 about its axis, disengaging the live needle n from the record disk 15 (which keeps on revolving) and bringing the dead needle n' against the record disk 15. Since the needle n' can convey no sound to the talking machine T, the machine for the time being, that is while the circuit c , c is kept closed, will cease to talk so there is no possibility of the talking machine getting ahead of the film, or out of harmony with the subject-matter thereon and about which

the talking machine is discoursing. Thus the subject-matter on the film and the discourse thereon delivered by the talking machine may be kept in perfect synchronous relation. The speed of the motor may be regulated by the resistance R coöperating with the controller-arm or switch-handle 14, as well understood in the art. The dial L of course subserves the purpose of registering the number of units of length of film operated on.

Having described my invention what I claim is:—

1. The combination with a talking machine and a moving picture machine comprising film feeding mechanism, of a register for indicating the relation of the discourse produced by the machine to the subject-matter of the film, and devices under the control of the operator for electrically terminating the operation of the discourse producing means of the talking machine, during any period of discrepancy between the subject-matter exposed by the film and the discourse of the machine, substantially as set forth.

2. The combination with a talking machine and a moving picture machine comprising film feeding mechanism, of means for advancing the film, and devices under the control of the operator for cutting off the discourse of the machine for any period of discrepancy between the subject matter exposed by the film and the discourse of the machine, substantially as set forth.

3. The combination with an electrically operated talking machine and a moving picture machine comprising film feeding mechanism, of means for electrically registering the units of the length of the film advanced by said mechanism and indicating either the synchronism or lack of synchronism between the film and mechanism of the talking machine, and electrically operated devices under the control of the operator for silencing the talking machine for any period of discrepancy between the subject matter of the film, and discourse of the machine, substantially as set forth.

4. In combination with an electrically operated talking machine, and a moving picture machine having film-feeding mechanism, of means for electrically registering the units of its length thus advanced, including an indicator for indicating either the synchronism or lack of synchronism between the film and mechanism of the talking machine, and means for silencing the talking machine for any period of discrepancy between the subject matter of the film, and discourse of the machine, substantially as set forth.

5. In combination with an electrically operated record-disk of a talking machine and a moving picture machine having film-feeding mechanism, of a reproducer, an ener-

gizing coil having an armature in coupled relation with said reproducer, a register, an energizing coil, an armature therefor, actuating mechanism for the register interposed
5 between said armature and dial, means on the record-disk for conducting the electric energy to said coil with each rotation of said disk and thereby actuating the registering mechanism, a second energizing coil, an
10 armature therefor, intermediate mechanism between said last named armature and recording dial, means on the picture machine for establishing a circuit whereby the last mentioned coil is energized and actuates the
15 registering mechanism with each rotation of said machine, and means for energizing the first mentioned coil and whereby the reproducer is disconnected from the record disk for any period desired, substantially
20 as set forth.

6. In combination with an electrically op-

erated record-disk of a talking machine, and a moving picture machine having mechanism for advancing a film carrying subject
25 matter related to the discourse of the talking machine, of means for indicating the relations and discrepancies of speed between the record-disk and film, and means under the control of the operator for electrically effecting a conformation between the subject
30 matter of the record as expressed by the talking machine and the subject-matter displayed by the film, according to the discrepancies shown by the indicating means, substantially as set forth. 35

In testimony whereof I affix my signature, in presence of two witnesses.

GEORGE P. McDONNELL.

Witnesses:

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FANNIE E. WEBER.