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SYNCHRONIZING ARRANGEMENT FOR MOVING PICTURE PROJECTORS

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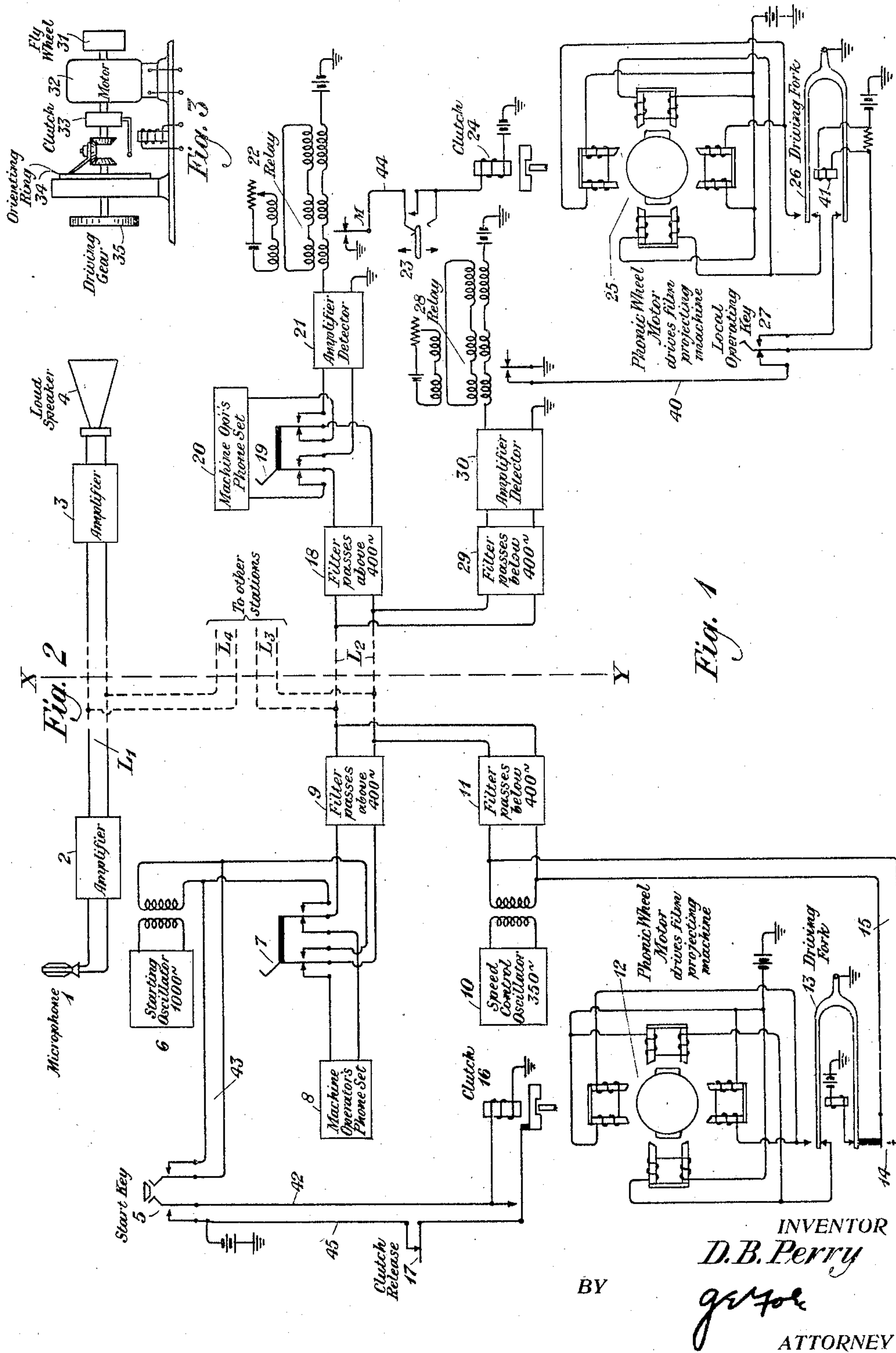


Fig. 1

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SYNCHRONIZING ARRANGEMENT FOR MOVING-PICTURE PROJECTORS

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The invention relates to control apparatus for moving picture machines and more specifically to arrangements for providing synchronous operation of a plurality of moving picture machines.

The arrangements of the invention would be particularly useful under conditions when it would be desirable to give similar exhibitions of a visual and audible type simultaneously at a plurality of places. For example, with the arrangements of the invention it would be possible to have the same orchestra furnish music at several moving picture houses at once. Furthermore, a lecturer might be accompanied by a moving picture film and with the arrangements of this invention present his exhibition to several audiences at once. Other features and objects of the invention will appear more fully from the detailed description thereof hereinafter given.

The invention may be more fully understood from the following description together with the accompanying drawing in the Figures 1, 2 and 3 of which the invention is illustrated. Fig. 2 is a talking circuit interconnecting two places. Fig. 1 is a circuit diagram of the moving picture synchronizing and control arrangements of the invention, while Fig. 3 is a side view of the motor mechanism for driving the projecting machines.

In Figs. 1 and 2, the arrangements at the left of the dotted line XY represent the controlling station where the speaker is located. The arrangements at the right of line XY represent one of any desired number of distant connected stations. The two stations illustrated, are interconnected by two telephone circuits, such as line L_1 for the voice or music, and by the line L_2 for synchronizing, automatic starting and operators' communication. These two telephone circuits L_1 and L_2 are shown as of the metallic type but it is understood that they may consist of line, radio or carrier channels, or any desired combination of these. The circuits L_3 and L_4 shown in dotted lines would be provided, as well as other similar circuits, should it be desired to connect with other stations.

The motion picture projecting machines at the various stations are driven by apparatus shown in Fig. 3 consisting of a motor 32 and fly wheel 31. To the left of the motor and controlled by a magnet is a clutch 33. Connected to the clutch is an idler gear and the mechanism 34 which makes it possible to orient the driving gear in respect to the motor. The driving gear mechanism is illustrated as 35.

The motor used is the well known phonic wheel motor. The circuit details of the motor may be seen by reference to the diagram of motor 12 of Fig. 2. The motor 12 is operated in the usual manner by the driving tuning fork 13. This fork is operated at its own natural frequency, the speed of vibration depending upon the fork weights hung on the tines. As the fork 13 vibrates, an auxiliary contact 14 on the fork will periodically close a shunt circuit 15 across the output of the speed control oscillator 10. This oscillator generates a train of oscillations of a desirable frequency, such for example, as 350 cycles per second. If we assume for purposes of illustration that the period of vibration of the fork 13 is approximately 50 cycles per second, this will result in spurts of 350 cycles per second alternations being sent out from the oscillator 10 at the rate of 50 spurts per second. The low pass filter 11 will pass these spurts of 350 cycle current and they will be transmitted over line L_2 , through the low pass filter 29, to the amplifier detector 30, and thence to the operating windings of relay 28. This relay will accordingly open and close its contacts with each spurt of current, or at the same rate as the period of vibration of fork 13, namely, 50 times a second. This will open and close the circuit 40 at the rate of 50 times per second and operate the fork magnet 41 at this frequency. Accordingly, the driving fork 26 will operate at a frequency which will be the same as the master fork 13. As the fork 26 drives the motor 25 and since both the forks 26 and 13 operate at exactly the same frequency, the motors 12 and 25 will operate in synchronism at the same speed.

At all times, except when the various mov-

ing picture projecting machines are being started, the operators of the machines may communicate with each other over a telephone circuit. This telephone circuit comprises the operators' set 8, the switching device 7, the filter 9 which passes frequencies above 400 cycles, line L_2 , the filter 18, switch 19, and the telephone set 20. This circuit will pass frequencies above 400 cycles which will allow understandable speech to be transmitted.

The operation of starting the machines is as follows: The fork 13 and motor 12 at the controlling station will first be started with the clutch mechanism 16 released to prevent feeding of the film. The films at all of the stations having been threaded to the starting point and each operator having informed over the heretofore mentioned telephone circuit the operator at the controlling station that he is ready, the starting key 7 will be thrown to the right. This will connect the starting oscillator 6, which generates oscillations of a frequency of 1,000 cycles, to the line L_2 . This puts a 1,000 cycle tone on the circuit. All of the other operators upon hearing this note, will throw their starting keys, such as the key 19. This will connect the line L_2 to the amplifier detector 21. The rectified 1,000 cycle current will then operate the relay 22 and cause it to hold its armature on the right-hand or marking contact, thus holding open circuit 44. The key 23 will also be restored at this time from the upward position to the middle position to prepare completion of the circuit 44 to the clutch mechanism 24.

The operator at the control station now presses the start key 5 to operate all of the clutches and thus start all of the film projecting machines operating in the following manner. The left-hand contact of key 5 closes a circuit from battery over circuit 42 to operate the clutch mechanism 16. This mechanism may be held operated by a locking circuit 45, which may be opened later by the release key 17. The right-hand contact of key 5 closes a short circuit 43 across the output of the starting oscillator 6 and thus cuts off the 1,000 cycle tone on line L_2 . This will cause all of the relays similar to relay 22, to release. The release of relay 22 will cause its contact to close to its left-hand contact. This will close circuit 44 and operate the clutch mechanism 24. The operators at all of the distant stations may restore their keys, such as key 19, to the normal position as soon as film is started, and also operate their keys, such as key 23 to the lower position. The controlling operator will also restore his key 7 to normal. This again makes telephone communication possible between the projecting machine operators. Key 23 in the lower position keeps the clutch operated.

It is pointed out that the films at all of

the stations should be identical and that any patching or splicing made in one should be duplicated in the others. The loud speaker circuit is shown in schematic form in Fig. 1. A microphone 1 and an amplifier 2 are located at the controlling station and an amplifier 3 and loud speaker 4 at each distant station.

While the invention has been disclosed in certain specific forms which are deemed desirable, it is understood that it is capable of embodiment in many other widely varied forms without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. Synchronizing and control arrangements for a plurality of visual and audible exhibitions comprising a line circuit, a master station connected to said circuit, said master station comprising a motor driving mechanism for a motion picture machine, a vibrating driving fork for operating said motor, a circuit controlled by the frequency of vibration of said driving fork for applying to said line circuit a series of pulses of the same periodicity as the frequency of said fork vibrations, a second station connected to said line circuit comprising a motor driving mechanism for a motion picture machine, a vibrating driving fork for operating said motor, an operating circuit for said fork controlled by said incoming pulses whereby said fork will vibrate with the same periodicity as the frequency of said driving fork at said master station, starting mechanism for each of said motor driving mechanisms, and means associated with said line circuit at one of said stations for simultaneously operating said starting mechanisms.

2. A control circuit interconnecting two stations, motor driving mechanism for a motion picture machine at each station, vibrating driving forks for each of said motors, means associated with said control circuit at each of said stations and controlled by the frequency of vibration of the fork at one station for controlling the frequency of vibration of the fork at the other station, starting mechanism for each of said motor driving mechanisms, and means associated with said control circuit at one of said stations for simultaneously operating said starting mechanisms.

3. A control circuit interconnecting two stations, motor driving mechanism for a motion picture machine at each station, vibrating driving forks for each of said motors, means associated with said control circuit at each of said stations and controlled by the frequency of vibration of the fork at one station for controlling the frequency of vibration of the fork at the other station, clutch mechanisms for each of said motor driving mechanisms, relay means associated with said

control circuit at one of said stations tuned to respond to oscillations of a desired frequency, an operating circuit for the clutch mechanism at said station controlled by said relay means, and means at the other of said stations for applying to said control circuit oscillations of a desired frequency to operate said relay means and for operating the clutch mechanism at said last mentioned station.

10 In testimony whereof, I have signed my name to this specification this 19th day of November 1925.

DONALD B. PERRY.

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DISCLAIMER

1,733,165.—*Donald B. Perry*, Yonkers, N. Y. SYNCHRONIZING ARRANGEMENT FOR MOVING-PICTURE PROJECTORS. Patent dated October 29, 1929. Disclaimer filed March 28, 1930, by the assignee, *American Telephone and Telegraph Company*.

Hereby enters this disclaimer to the said claims of said Letters Patent which are in the following words—to wit:

"2. A control circuit interconnecting two stations, motor driving mechanism for a motion picture machine at each station, vibrating driving forks for each of said motors, means associated with said control circuit at each of said stations and controlled by the frequency of vibration of the fork at one station for controlling the frequency of vibration of the fork at the other station, starting mechanism for each of said motor driving mechanisms, and means associated with said control circuit at one of said stations for simultaneously operating said starting mechanisms.

"3. A control circuit interconnecting two stations, motor driving mechanism for a motion picture machine at each station, vibrating driving forks for each of said motors, means associated with said control circuit at each of said stations and controlled by the frequency of vibration of the fork at one station for controlling the frequency of vibration of the fork at the other station, clutch mechanisms for each of said motor driving mechanisms, relay means associated with said control circuit at one of said stations tuned to respond to oscillations of a desired frequency, an operating circuit for the clutch mechanism at said station controlled by said relay means, and means at the other of said stations for applying to said control circuit oscillations of a desired frequency to operate said relay means and for operating the clutch mechanism at said last mentioned station."

[*Official Gazette April 15, 1930.*]

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