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F. H. OWENS

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DUAL SOUND RECORDING AND REPRODUCING APPARATUS

Filed June 10, 1929

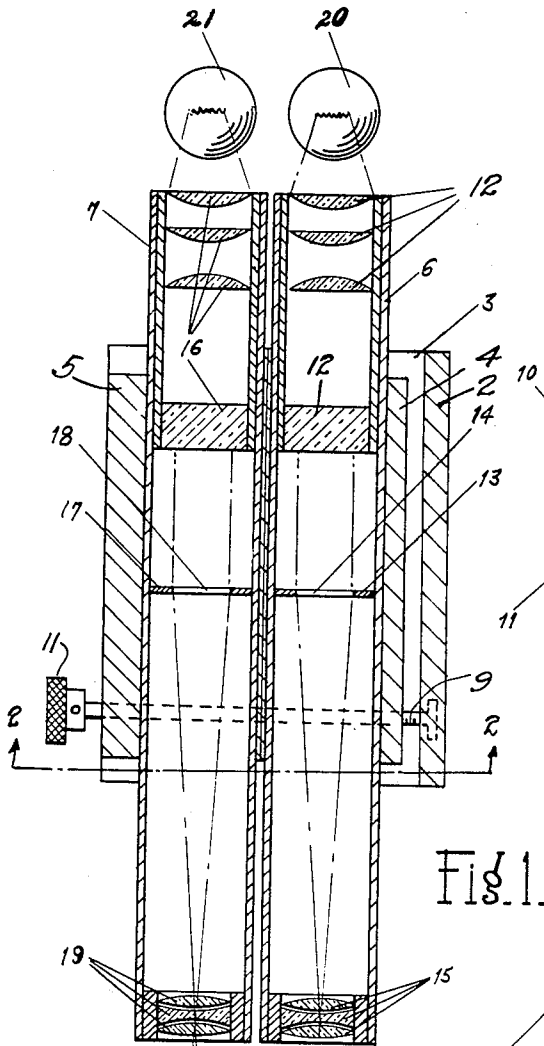


Fig. 1.

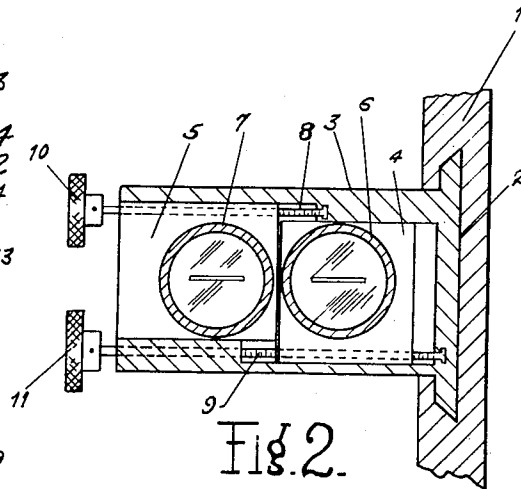


Fig. 2.

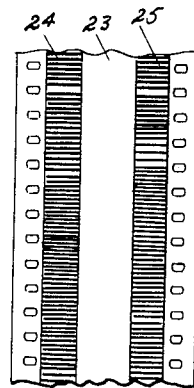
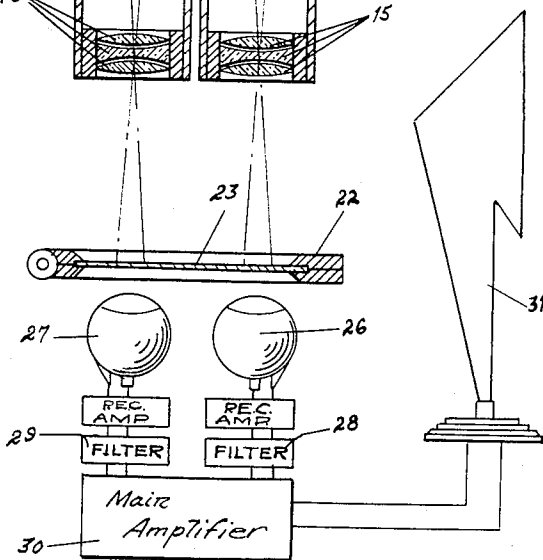


Fig. 3.



INVENTOR.
FREEMAN H. OWENS.
BY *Philip S. Hopkins*
ATTORNEY.

UNITED STATES PATENT OFFICE

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DUAL SOUND RECORDING AND REPRODUCING APPARATUS

Freeman H. Owens, New York, N. Y.

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1 Claim. (Cl. 179—100.3)

My invention relates to a means and method for recording and reproducing photographic sound records and has for its primary object the provision of a dual recording and reproducing system whereby a plurality of photographic sound records may be simultaneously recorded or reproduced upon a single film, such records being perhaps of different predetermined frequency ranges.

Another object of my invention, lies in the provision of an apparatus for accomplishing the above result and including means whereby the elements of the dual recording or reproducing device may be properly adjusted with respect to each other.

As is well known in the art of sound recording and reproducing, certain types of sound have frequency ranges different from other sounds—that is—a frequency range for ordinary voice sounds is considerably less or smaller than the frequency range for instance, of music or an orchestra.

Similarly, certain instruments such as bells, wind instruments, etc. have different frequency ranges. In recording these various sounds, particularly in connection with a motion picture, with which the sound records are to be reproduced synchronously, it often occurs that the recording and reproduction of these various sounds may occur at various intervals and at different times. It is advisable that in recording such sounds for reproduction, either with or without a motion picture, as many extraneous and disturbing sounds or noises as possible be eliminated from such recording. To accomplish this it may be entirely proper and advisable to introduce in the recording or reproducing circuits, filters adapted to pass only sound frequencies of a certain predetermined range depending upon the sounds to be recorded or reproduced.

In carrying out my invention, I make use of such filters and have provided a recording and reproducing apparatus including filters, whereby the recording or reproduction of certain types of sounds may be limited to the frequency range peculiar to the selected sound, and provide for such recording or reproduction on a single film, each of the sound records thereon limited to the frequency range of the desired sound. Of course, these sound records may be recorded or reproduced together or separately as desired.

Other objects and advantages in detail of construction and operation will be apparent as the description now proceeds, reference being had

to the figures of the accompanying drawing forming a part of this application and wherein like reference numerals indicate like parts.

In the drawing:—

Figure 1 is a sectional plan view, partially diagrammatic in character, illustrating my invention.

Figure 2 is a cross sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a detail view of a section of film bearing sound records such as is employed with my invention.

Reference character 1 may indicate a support and which may be the wall of a sound camera or reproducing apparatus. Slidably mounted within this support, as by dovetail connection 2, is a casing 3 carrying therein a pair of holders 4 and 5 slidably supported within which are tubes 6 and 7 respectively. These holders 4 and 5 are adjustable laterally toward and away from each other in the housing 3 as by means of the screw rods 8 and 9, the former being threaded through the holder 5 and having a rotatable engagement with the housing 3 and the latter being threaded through the holder 4 and likewise having rotatable engagement with the housing 3. As will be apparent from Figure 2, rotation of the screws 8 or 9 by means of the finger pieces 10 and 11 will result in moving the holders 4 or 5 with the tubes 6 and 7 toward or away from each other for proper adjustment.

The tubes 6 and 7 may be identical in construction and comprise optical systems or units for the recording or reproduction of sound photographically. The tube 6 is provided adjacent one end with a condenser lens system 12, a partition 13 having a narrow elongated slit 14 therein, and at the opposite end a focusing lens system 15. The tube 7 is provided with similar units, namely, the condensing lens system 16, partition 17 provided with slit 18, and the focusing lens 19. A light source such as lamps 20 and 21 are provided adjacent the ends of the tubes 6 and 7 respectively.

A film gate or guide 22 is provided for supporting and guiding a traveling film 23 past the ends of the tubes 6 and 7 opposite the lamps 20 and 21. The tubes of course, may be adjusted in any suitable manner longitudinally with respect to the film 23 so as to sharply focus the aerial images of the slits 14 and 18 upon the film 23 in spaced relation and in reduced length.

If the apparatus is used for recording sound the intensity of the lamps 20 and 21 will be modulated in a well known manner by translated

sound waves, and the modulated light will thus be photographed upon the film 23 to form the parallel spaced sound records 24 and 25. If it is desired that the translated sound waves used to modulate the intensity of the lamps 20 and 21 be limited to certain predetermined frequency ranges characteristic of or peculiar to the sounds being recorded, proper filters may be placed in the circuit to the lamps 20 and 21. Thus the sound records 24 and 25 will be limited to such frequencies as are passed by the filters.

If the device is to be used for reproducing sound records already made and appearing on the film 23, such sound records will be of course, illuminated by the light from the lamps 20 and 21, in this case of constant intensity of course, and the light passing through the sound records on the film will be modulated in accordance with said records.

A light sensitive device such as a photoelectric cell 26 is so positioned as to receive the modulated light passing through the sound record 25 and a similar light sensitive device 27 is positioned to receive the modulated light passing through the sound record 24. These photoelectric cells of course, act in the well known manner to translate the modulated light waves into corresponding electric impulses, which are then amplified by any of the known types of photoelectric cell amplifiers and which impulses may then be passed through filters 28 and 29 respectively to an amplifier 30, the output of which is connected to a loud speaker device 31 whereby the sound records are rendered audible.

By this means it will be understood that even though the sound records 24 and 25 on the film 23 were not recorded through filters as above described, but each contain in addition to particular sounds which it was desired to record, extraneous sounds or frequencies out of the range of the particular sound selected for recording, the filters 28 and 29 if properly constructed and

set for the desired frequency ranges, for instance, the filter 28 being set to pass ordinary voice frequencies only and the filter 29 being set to pass only certain frequencies characteristic to some musical instrument or instruments recorded in the record 24, the resultant reproduced sound through the loud speaker 31 will be a true rendition of the original sounds recorded minus such undesirable and extraneous sounds as may have been recorded originally in records 24 and 25.

It will thus be seen that I have provided a dual system of recording and reproducing sound records, utilizing a double unit having independent recording or reproducing devices whereby two sound records may be recorded or reproduced simultaneously or independently and wherein the frequency range of the various sounds to be recorded or reproduced is properly controlled and limited.

Of course changes may be made in details of construction and method of operation without departing from the spirit and scope of my invention. I do not limit myself therefore, to the exact form herein shown and described other than by the appended claim.

I claim:

A sound recording and reproducing apparatus comprising means for supporting a traveling film, a pair of optical units for recording and reproducing photographic sound records, in operative relation to said film, said units including tubular members having lenses and slits therein for passing light to spaced points on said film, and means for adjusting said units with respect to each other and said film, said adjusting means including a slidable common support and separate holders therein for said units, said holders being movable toward and away from each other, whereby to predetermine the spacing of said lights on the film.

FREEMAN H. OWENS.

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