May 5, 1931. F. H. OWENS 1,803,403

SOUND REPRODUCING OR RECORDING APPARATUS

Original Filed Sept. 25, 1926

Fig.1.

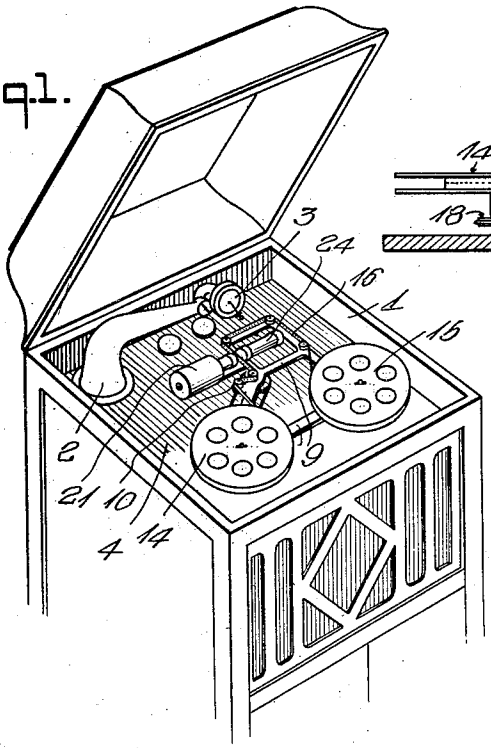


Fig.3.

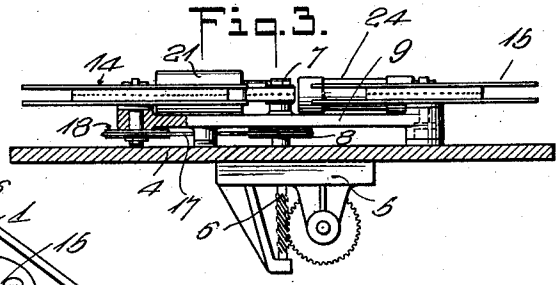


Fig.4.

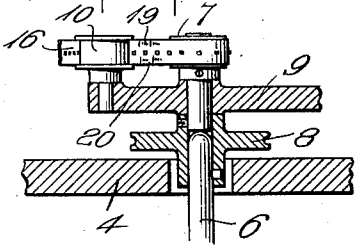
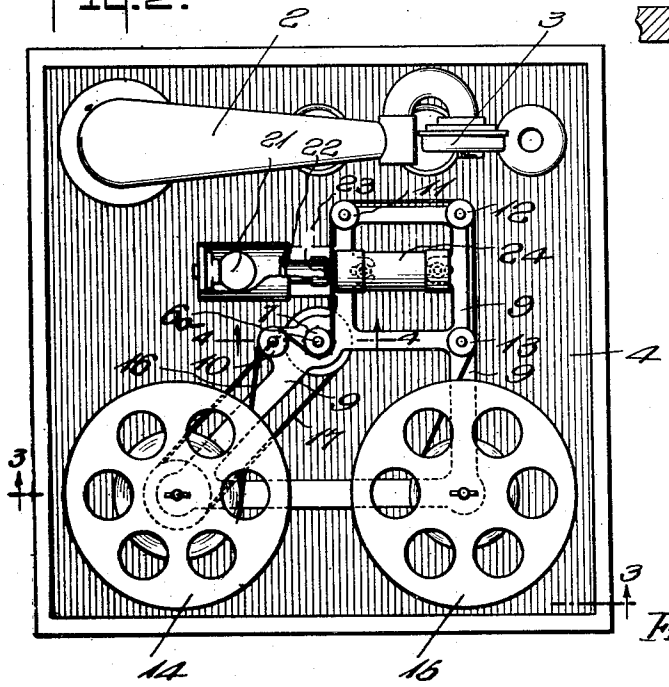


Fig.2.



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UNITED STATES PATENT OFFICE

FREEMAN H. OWENS, OF NEW YORK, N. Y.

SOUND REPRODUCING OR RECORDING APPARATUS

Application filed September 25, 1926, Serial No. 137,713. Renewed August 11, 1930.

My invention relates broadly to sound reproducing or recording apparatus and more particularly to a film apparatus for the reproduction of sound or the making of sound.

One of the objects of my invention is to provide a readily portable talking film apparatus which may be applied to a standard phonograph for operation thereby for the electrical reproduction of sound records prepared on a film.

Another object of my invention is to provide a readily portable construction of sound reproducing apparatus arranged to be driven by the usual phonograph by the attachment thereof in lieu of the usual record table of a phonograph.

Another object of my invention is to provide a compact assembly of film apparatus, projector and photo-electric system which may be driven by motive power derived from the usual phonograph for the convenient reproduction of film records in the home.

Still another object of my invention is to provide a sound recording apparatus by which sound records may be conveniently made with the usual phonograph as the driving equipment.

Other and further objects of my invention will be understood from the specification hereinafter following by reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a phonograph equipped with the film moving apparatus of my invention; Fig. 2 is a plan view showing the arrangement of the film moving apparatus of my invention; Fig. 3 is a side elevation of the film moving apparatus with parts partially in cross section on line 3—3 of Fig. 2; and Fig. 4 is a cross-sectional view of a part of the film moving apparatus on line 4—4 of Fig. 2.

Heretofore in the art the reproduction of sound from film records has been impracticable in the home by reason of the lack of suitable apparatus. I have devised the apparatus of the present invention to provide a convenient means for the reproduction of sound records, which have been recorded on film, in the home.

The apparatus comprises a frame structure carrying a reel mechanism, an optical system and a photo-electric cell which cell is influenced by variation in light received from the optical system by the passage of the film record between the optical system and the photo-electric cell, the motive power for actuating the reel mechanism being obtained from the usual phonograph in the home. The separate sound record is so arranged on the film that rewinding of the reel mechanism is unnecessary, in that the optical system may be arranged to cooperate with the sound record on one portion of the film while the film is being driven in one direction while cooperating with the other sound record when the film is being driven in the reverse direction. The arrangement of parts of the apparatus by which the convenience in operation of the sound reproducing apparatus is obtained will be more clearly understood by reference to the accompanying drawings in detail.

In the drawings reference character 1 designates a phonograph having the usual tone arm 2 and sound reproducer 3. The top of the phonograph is designated at 4, with record table removed and the tone arm shifted out of actuating position to permit the attachment of the apparatus of my invention to the phonograph. Reference character 5 designates generally the driving motor beneath the top 4 of the phonograph for imparting rotary motion to a shaft 6 which projects above the top 4 as shown more clearly in Fig. 4.

A combined coupling member and drive pulley wheel 8 is detachably secured to the extremity of shaft 6 and to the shaft 6*a* of the sprocket wheel 7 journaled in a frame 9. The frame 9 consists of open skeleton side members defining a polygonal shaped outline. Journaled adjacent the sides of the frame structure 9 I provide idler pulley members 10, 11, 12 and 13 over which the film 16 passes in the course of its travel between reels 14 and 15. The reel 14 is positively driven by a belt connection 17 from the drive pulley 8 to the driven pulley 18 keyed to the shaft of reel 14. The film 16 is apertured along its central line to enable the sprocket

wheel 7 having a centrally arranged row of teeth to mesh with corresponding apertures in the film for advancing the film at uniform speed. On opposite sides of the centrally arranged line of apertures or perforations the sound records 19 and 20 are recorded, as indicated in Fig. 4. The direction of the sound records is opposite each other so that rewinding of the film is not necessary and it is only required that the position of reels 14 and 15 be reversed and the film operated in the opposite direction from that of the initial run for reproducing both of the sound records independently.

Supported on the frame structure 9 I provide an optical system comprising a lamp housing 21, lens 22 and the optical slit 23 focused to direct light rays upon a light sensitive element disposed in cartridge 24. The light sensitive element or photo-electric cell is thus subjected to varying light rays in accordance with the sound records 19 and 20 on film 16. Conductors leading from opposite terminals of the photo-electric cell connect through a suitable amplifying system with a loud speaker for the reproduction of sound in accordance with the record recorded on the film. The amplification equipment and loud speaker may be conveniently housed in the cabinet of the phonograph and connections established from the photo-electric cell system to the input circuit of the amplifier.

In order to control the speed of the driving apparatus 5 I provide the usual type of governor whereby the film 16 may be uniformly advanced with respect to the optical system and light sensitive element. The compact arrangement of the apparatus permits convenient installation of the equipment in the home. The interchange of film records is extremely simple, by merely placing the film reels upon the frame structure and threading up the film with respect to the sprocket wheel 7 and idler rollers 10, 11, 12 and 13.

To convert the apparatus into a recorder instead of a reproducer a recording lamp may be positioned in the lamp housing 21 and acted upon by sound vibrations for the preparation of the film record.

While I have described my invention in one of its preferred embodiments, I desire that it be understood that modifications may be made and that no limitations upon the invention are intended other than are imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. A sound reproducing apparatus for attachment to the driving shaft of a phonograph comprising a frame structure arranged to be mounted upon the top of a phonograph to form a unitary structure therewith, a sprocket journaled in said frame structure and arranged to establish driving connection with the shaft of said photograph, a pair of film carrying reels rotatably carried by said frame structure, a plurality of idler rollers for guiding said film in a path of travel over said sprocket, a light projecting system carried by said frame structure on one side of said film, a light sensitive element carried by said frame structure on the opposite side of said film whereby the effect of light rays upon said light sensitive element may be controlled by a sound record on said film, and means on said frame structure for engaging the top of the phonograph.

2. An apparatus for the reproduction of sound comprising an attachment for the drive shaft of phonographs, said attachment including a frame structure arranged to be mounted upon the top of a phonograph to form a unitary structure therewith, a sprocket wheel journaled in said frame structure and arranged to be rotatably driven from the drive shaft of said phonograph, a film carrying mechanism, means for guiding said film in a path of travel around said frame structure and over said sprocket wheel, a light projecting system carried by said frame structure on one side of said film, a light sensitive element supported from said frame structure on the opposite side of said film and surrounded by said film in the course of the travel thereof through said film carrying mechanism, said film carrying a sound record thereon for varying the effect of said light projecting system upon said light sensitive element in accordance with said sound record, and means on said frame structure for supporting said frame structure above the top of the phonograph.

3. In a sound reproducing apparatus for attachment to the drive shaft of a phonograph, a polygonal shaped frame structure arranged to be mounted upon the top of a phonograph, a sprocket wheel journaled centrally in said frame structure and arranged to be driven from the drive shaft of said phonograph, a film having a sound record thereon, a film carrying reel mechanism rotatably carried by said frame structure and arranged to be driven from the drive shaft of said phonograph, idler pulleys carried by said frame structure for directing said film over said sprocket wheel, a light projecting system, a light sensitive element carried by said frame structure and disposed between parallel extending portions of said film, in the course of its travel through said reel mechanism, the sound record on said film operating to vary the effect of said light projecting system upon said light sensitive element in accordance with the sound record on said film, and means on said frame structure for supporting said frame structure over the top of the phonograph.

4. An apparatus for the reproduction of

sound for attachment to the drive shaft of a phonograph comprising a frame structure arranged to be mounted on the top of a phonograph, a sprocket wheel journaled centrally in said frame structure, supply and take-up reels carrying film having a sound record thereon, said reels being rotatably mounted on said frame structure, means for driving one of said reels from the drive shaft of said phonograph, a plurality of idler rollers carried by said frame structure for guiding said film over said sprocket wheel, a light directing system, a light sensitive element carried by said frame structure and disposed between parallel extending portions of said film during the course of travel of said film over said sprocket wheels whereby the sound record on said film controls the effect of the light rays from said light directing system upon said light sensitive element, and means on said frame structure for engaging the top of the phonograph.

5. An apparatus for the reproduction of sound for attachment to the drive shaft of a phonograph comprising a polygonally shaped frame structure arranged to be mounted on the top of a phonograph, a sprocket wheel journaled centrally in said frame structure, a film carrying mechanism supported by said frame structure, a plurality of idler rollers positioned around the peripheral edges of said frame structure for guiding said film over said sprocket wheel, a light sensitive element carried by said frame structure in a position between two sides of said frame structure, and a light projecting system carried by one side of said frame structure, said film passing between said light projecting system and said light sensitive element, a sound record disposed on said film whereby the effect of the light rays from said light projecting system upon said light sensitive element may be controlled in accordance with said sound record in the course of the travel of said film.

6. In combination, a phonograph having a substantially horizontal support, a drive shaft passing through an aperture in said support, a frame structure arranged to be mounted on top of said support and carrying a film moving mechanism, a source of light and a light sensitive element, said light source and said element being so disposed on said frame structure relative to the film that light from said source may pass through the film to said element; and coupling means between said drive shaft and said film moving mechanism.

7. In combination, a phonograph having a substantially horizontal member, a drive shaft passing through an aperture in said member, a frame structure removably secured to the top of said member, said frame structure having rotatably mounted therein a sprocket, a pair of film carrying reels and a plurality of guide rollers for guiding the film in a path of travel over said sprocket, a source of light and a light sensitive device carried by said frame structure and disposed on opposite sides of the film, and coupling means between said drive shaft and said sprocket.

8. A sound reproducing apparatus for attachment to a phonograph, said phonograph having a substantially horizontal support and a drive shaft passing through an aperture in said support, comprising a frame structure arranged to be mounted on top of said support and carrying a film moving mechanism, a source of light and a light sensitive element, said light source and said element being so disposed on said frame structure relative to the film that light from said source may pass through the film to said element; and coupling means, carried by said film moving mechanism, adapted to be connected to said drive shaft.

In testimony whereof I affix my signature.

FREEMAN H. OWENS.