

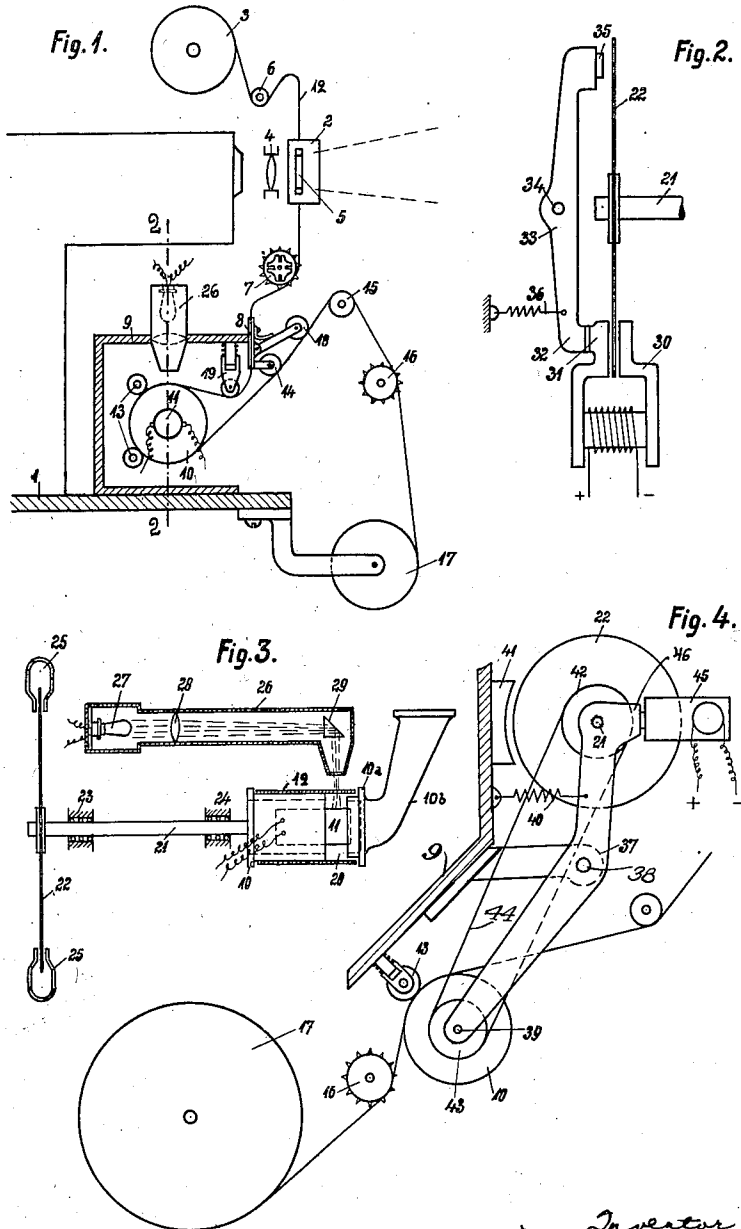
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DRIVING APPARATUS FOR SOUND FILMS

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UNITED STATES PATENT OFFICE

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DRIVING APPARATUS FOR SOUND FILMS

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6 Claims. (Cl. 179—100.3)

My invention relates to a driving apparatus for sound films. It is an object of my invention to provide an apparatus of the kind referred to which can be adapted to any existing picture-projecting camera.

To this end, I design the driving apparatus as an independent unit by mounting its parts, including means for scanning the sound record on the film, a guiding cylinder for the film which is preferably entrained frictionally by the film, and an eddy current brake for steadying the rotation of the guiding cylinder; on a casing which is adapted to be fitted to any existing picture-film projecting apparatus or camera.

It is another object of my invention to provide means for instantly arresting the moving element of the driving apparatus. To this end, I provide an electromagnet which is controlled by the energizing current of the driving apparatus, as a member of the eddy current brake, and a brake block associated with the disk of the brake, the disk being of light metal such as aluminium, and the brake block being adapted to be lifted off the disk by the excited electromagnet; in combination with means such as a spring for applying the brake block to the disk when the electromagnet is de-energized. By these means, the apparatus is arrested immediately the circuit of the current is interrupted.

In a preferred embodiment of my invention I so arrange and design the driving apparatus that a loop is formed in the film at the apparatus, and the film is steadied while moving in the loop. The apparatus is an independent unit which may be fitted to existing instruments. The moving element of the apparatus which will be referred to as the "guiding cylinder" is entrained by the film under friction only. The cylinder, or part of it, is operatively connected with an eddy-current brake which in order to eliminate separate starting means is made very light, and may be a disk of aluminium rotating in a magnetic field. Mechanical means are connected with the disk, and preferably combined with its magnets, for arresting the guiding cylinder immediately the apparatus is shut down. Where means such as friction rollers under spring pressure are provided for holding the film engaged with the cylinder, means may be provided for lifting the rollers immediately the apparatus is arrested so that the film is not stressed by the cylinder which obviously has a tendency to continue its rotation.

In the accompanying drawing an apparatus to which my improved appliance has been adapt-

ed, and two types of combined eddy-current and mechanical brakes, are illustrated diagrammatically by way of example.

In the drawing

Fig. 1 is a partly sectional elevation of the complete apparatus,

Fig. 2 is a section on the line 2—2 in Fig. 1,

Fig. 3 is an elevation of a brake in which the aluminium disk is seated on the shaft of the cylinder, and

Fig. 4 is an elevation of a brake in which the cylinder is connected with the brake by a belt or the like.

Referring now to the drawing, and first to Figs. 1 and 2, 1 is a frame or table, 9 is the casing of the sound-rendering appliance, 2 is the end of the projecting lamp, with its picture frame 5 and its optical system 4, 3 is a supply, and 17 is a winding reel for the film 12; 6, 14, and 15 are fixed guiding rollers for the film, 7 and 16 are toothed feeding cylinders, the first cylinder having the Geneva cross; 8 are a pair of steadying rails at the top of the casing 9, 19 is a spring-pressed roller acting on the film, 10 is the guiding cylinder, with a photo-electric cell 11 therein, 13, 13, are friction rollers for holding the film engaged with the guiding cylinder 10, 18 is another spring-pressed roller intermediate the fixed rollers 14 and 15, and 26 is an illuminating appliance for the casing 9.

It will appear that the film is taken around the cylinder 10 in the shape of a loop. The spring-pressed rollers 19 and 18 serve for generating slack reaches in the film so that the step-by-step feeding motion of the cylinders 7 and 16 is not transmitted to the loop encircling the guiding cylinder 10. The cylinder, therefore, being entrained by friction only by the film 12, under the pressure of the rollers 13, 13, rotates at a uniform rate.

It will further appear that the casing 9 of the appliance is arranged intermediate the supply and winding reels 3 and 17 and therefore may be readily inserted and removed without interfering with other parts of the apparatus.

Referring now particularly to Fig. 2, the guiding cylinder 10 is combined with a stationary part 10a, on a bracket 10b, and the cell 11 projects into the gap 20 between the parts. Preferably the diameter of the stationary part is smaller than that of the cylinder 10 so that friction on the edge of the film is eliminated.

I may also provide an undivided guiding cylinder with a glass tube inserted at the gap 20.

Light is projected onto the cell 11 and through

the film 12 from a source of light 27 in the casing of the illuminating appliance 26, condensed by a lens 28, and deflected by a prism 29. The rays are projected onto the cell 11 through the tone records on the film 12.

Means for steadying the rotation of the cylinder 10 comprise a shaft 21, in ball bearings 23, 24, an aluminium plate 22 on the shaft, and permanent magnets 25. Brakes of this type are old and known as eddy current brakes. They effect a magnetic braking action the effect of which is in proportional to the number of revolutions per min. of the guiding cylinder 10.

Figs. 3 and 4 illustrate magneto-mechanical brakes combined with the steadying appliance.

Referring first to Fig. 3, instead of a permanent magnet, or magnets, an electromagnet 30 is provided in the circuit of the motor for driving the apparatus, not shown. The electromagnet is provided with a pole shoe 31 on the other side of the disk 22. 33 is double-armed lever which is fulcrumed at 34, 35 is a friction pad or block at one end of the lever, and 36 is a spring which tends to hold the pad 35 engaged with the disk 22. 32 is an armature at the opposite end of the lever which is attracted by the shoe 31 while the electromagnet 30 is excited, and holds the pad 35 away from the disk 22. When the motor of the apparatus is cut out, the electromagnet is de-energized and releases the lever 33 so that the spring 36 applies the pad 35 to the disk 22 and arrests the cylinder 10 immediately.

Referring now to Fig. 4, 37 is a rocking bracket which is fulcrumed at 38 and at one end supports the shaft 39 of the cylinder 10 while its other end supports the shaft 21 of the disk 22. The disk and the cylinder are operatively connected by pulleys or sprockets 42, 43 on their respective shafts, and a cable, belt, or chain 44. 45 is an electromagnet similar to the electromagnet 30, Fig. 3, 46 is an armature at the end of the bracket 37 which faces the electromagnet, and 41 is a fixed brake block adapted to be engaged by the disk 22 when a spring 40 is free to pull the bracket 37 to the left. The operation is similar to that described with reference to Fig. 3. When the electromagnet 45 is energized the bracket 37 is attracted by its armature 46 and the disk 22 is free to rotate with the cylinder 10. When the circuit of the motor is cut out the electromagnet 45 allows the spring 40 to move the disk 22 into engagement with the block 41, so that the disk 22 and the cylinder 10 are arrested.

As compared with revolving weights for steadying the rotation of the cylinder in the manner of a fly wheel, my steadying means comprising the disk 22 and its magnet, or magnets, has the advantage that means for speeding up the guiding cylinder when starting are not required. By combining the steadying means with an eddy current brake, as described, the guiding cylinder 10 is immediately arrested.

I claim:

1. In a driving apparatus for sound films adapted to smoothly drive a sound film at its point of reproduction, a guiding cylinder frictionally engaging said film, frictional rollers pressing said film upon said cylinder, an eddy current brake associated with said cylinder comprising a pivoted lever supporting at one end thereof said cylinder, a light metallic disk rotatably mounted at the other end thereof, driving connections between said cylinder and

said disk, an electro-magnet controlled by the energizing current of the driving apparatus associated with said disk and adapted to attract said pivoted lever, fixed braking means, and resilient means connected to said lever adapted to force said disk into engagement with said braking means and to separate said cylinder from said frictional rollers when said energizing current is disconnected from the apparatus.

2. In a driving apparatus for sound films, a casing adapted to be fitted to a picture-film projecting apparatus, a pivoted lever mounted on said casing, means for scanning the sound record on the film, also mounted on said casing and including a guiding cylinder for said film which is supported at one end of said lever, a light metallic disk rotatably mounted at the other end thereof, driving connections between said cylinder and said disk, an eddy current brake associated with said disk, an electromagnet controlled by the energizing current of the driving apparatus forming part of said eddy current brake and adapted to attract said pivoted lever, fixed braking means, and resilient means connected to said lever adapted to force said disk into engagement with said braking means and to separate said cylinder from said film when said energizing current is disconnected from the apparatus.

3. In a driving apparatus for sound films adapted to smoothly drive a sound film at its point of reproduction, a guide cylinder frictionally engaging said film, a pivoted lever supporting at one end thereof said cylinder, a light metallic disk rotatably mounted at the other end thereof, driving connections between said cylinder and said disk, an eddy current brake associated with said disk, an electromagnet controlled by the energizing current of the driving apparatus associated with said disk and adapted to attract said pivoted lever, fixed braking means, and resilient means connected to said lever adapted to force said disk into engagement with said braking means and to separate said cylinder from said film when said energizing current is disconnected from the apparatus.

4. In a driving apparatus for sound films, a casing adapted to be supplementarily fitted to a picture-film projecting apparatus of any suitable commercial type, means mounted on said casing for scanning the sound record on the film comprising a guiding cylinder for said film and a photo-electric cell within said guiding cylinder, an eddy current brake for steadying the rotation of said cylinder, an electromagnet controlled by the energizing current of the driving apparatus and forming part of said eddy current brake, and a mechanical brake for arresting said cylinder upon the de-energization of said electromagnet.

5. In a driving apparatus for sound films, a casing adapted to be supplementarily fitted to a picture-film projecting apparatus of any suitable commercial type, means mounted on said casing for scanning the sound record on the film comprising a guiding cylinder for said film and a photo-electric cell within said guiding cylinder, an eddy current brake comprising a rotating disc and an electromagnet for steadying the rotation of said guiding cylinder, said electromagnet being controlled by the energizing current of the driving motor of said driving apparatus, mechanical braking means associated with said rotating disc comprising means for exerting a mechanical force of lesser degree and

in opposition to the magnetic force exerted by said electromagnet whereby said disc is arrested by said braking means upon the de-energization of said electromagnet, and said braking means is rendered inoperative upon the energization of said electromagnet.

6. In a driving apparatus for sound films, a casing adapted to be supplementarily fitted to a picture-film projecting apparatus of any suitable commercial type, means mounted on said casing for scanning the sound record on the film comprising a guiding cylinder for said film, a rotatable shaft for carrying said guiding cylinder at one end thereof, and a photo-electric cell

within said guiding cylinder, an eddy current brake for steadying the rotation of said cylinder comprising a disc mounted on said shaft, and bearings for said shaft between said disc and said cylinder, an electromagnet controlled by the energizing current of the driving apparatus and forming part of said eddy current brake, a mechanical brake for arresting said cylinder upon the de-energization of said electromagnet, and means for rendering inoperative said brake upon the energization of said electromagnet.

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20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150