March 8, 1960 G. A. DEL VALLE 2,927,972

REELING SYSTEMS

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Fig. 1.

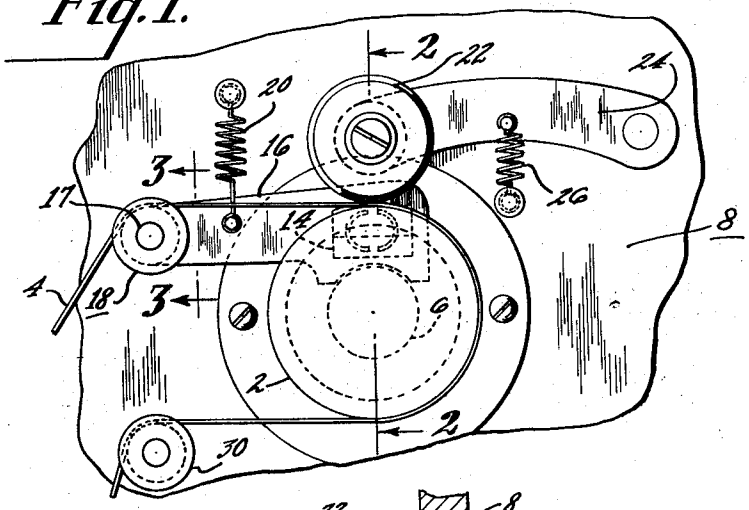


Fig. 2.

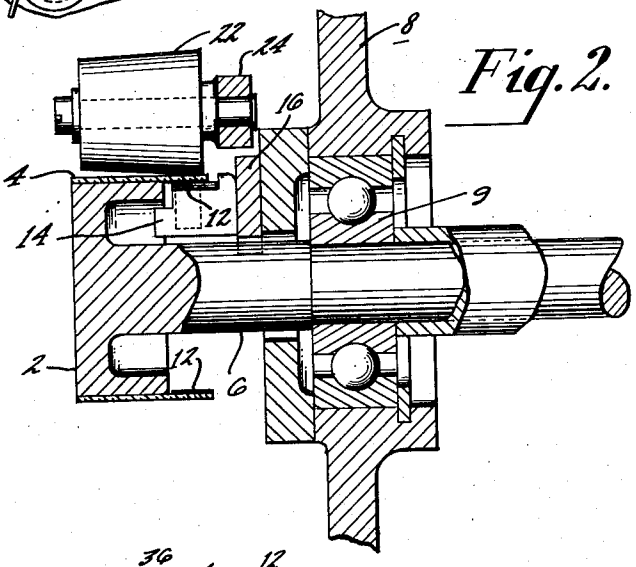
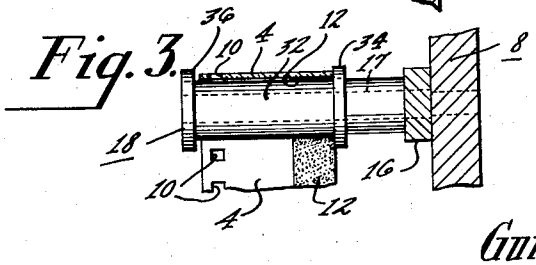


Fig. 3.



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REELING SYSTEMS

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7 Claims. (Cl. 179—100.2)

This invention relates to reeling systems, and more particularly to means for moving a flexible web member such as a motion picture film past a function station.

In the art relating to sound motion pictures there has been developed a technique for providing a sound track on the film wherein the sound record comprises a magnetic record. As is well known in the art relating to magnetic recording, a signal translating head should be in physical contact with the sound track to provide a maximum response.

In prior art devices, pressure means have been provided to press the film against the translating head. Those pressure means were arranged to exert a uniform pressure on the film with respect to the width thereof. Now, the film frequently picks up particles of foreign matter such as bits of dirt or bumps of film wax or coagulated grease. When this particle passes the uniform pressure means an irregularity of motion is produced which results in a distortion in the signal response of the apparatus.

Accordingly, it is an object of the present invention to provide an improved reeling means for such webs or films in which the distortion produced by such foreign particles is minimized.

It is another object of the present invention to provide an improved reeling means as set forth wherein any tendency to weave within associated guide members is minimized or eliminated.

A further object of the present invention is to provide an improved reeling means as set forth wherein the likelihood of the web or film being scratched or otherwise damaged by the pressure means in substantially eliminated.

Yet another object of this invention is to provide an improved signal translating system which includes the improved reeling means as set forth.

In accomplishing these and other objects, there has been provided, in accordance with the present invention, a stabilizing drum around which a web or film passes with a portion of the width of the film overhanging the drum. A signal translating head is mounted adjacent to the drum in a position to engage the overhanging portion of the film. A pivotally mounted pressure roller engages the film from the side opposite from the drum and the head, pressing the film toward the head. The pressure roller is slightly tapered with the larger diameter adjacent to the head.

A better understanding of this invention may be had from the following detailed description when read in connection with the accompanying drawings, in which:

Fig. 1 is a fragmentary elevational view of a portion of a reeling system embodying the present invention;

Fig. 2 is a cross-sectional view taken along the line 2—2 of Fig. 1 and viewed in the direction of the arrows; and

Fig. 3 is a view, partly in cross-section taken along the line 3—3 of Fig. 1 and viewed in the direction of the arrows.

Referring to the drawings in more detail, there is shown a stabilizing drum 2 around which a film 4 is pulled. The

drum 2 is secured to one end of a shaft 6 which passes through a mounting panel 8. The shaft 6 is supported in the mounting panel 8 by ball-bearing 9. The opposite end of the shaft carries a flywheel (not shown) which stabilizes the motion of the drum 2 and, hence, the film 4 is in contact therewith.

The film 4 is driven by a series of driving sprockets (not shown) which engage the sprocket holes 10 in the film. The film carries a strip of magnetizable material 12 which constitutes a signal or sound track. The film 4 is positioned on the stabilizing drum 2 in such a way that the signal track 12 on the film faces the axis of the drum. However, the drum 2 is not as wide as the film 4 and the portion of the film upon which signal track 12 is located overhangs the drum.

Positioned adjacent to the drum 2, and within the circle described by the periphery of the drum, there is a signal translating head 14. The head 14 is mounted on a bracket or arm 16 which is pivoted about the shaft 17 of a guide roller 18. The arm 16 is biased in a direction to engage the overhanging portion of the film by a suitable biasing means such as a spring 20.

A pressure roller 22 is mounted in a position to exert a pressure on the side of the film opposite from the drum 2 and the head 14, pressing the film into intimate contact with the drum and the head. The pressure roller 22 is carried on a pivotally mounted arm 24 which is biased, as by a spring 26, in a direction to press the roller 22 against the drum 2 and head 14. A pair of guide rollers 18 and 30 are provided to guide the film in its path toward and away from the stabilizing drum. The guide rollers 18 and 30 are substantially identical and are provided with a body portion 32 and two end flanges 34 and 36. The distance between the end flanges is substantially the same as the width of the film. However, as may be expected, there must be provisions made for tolerances in the production of such guide means. Consequently, the film 4, as shown in Fig. 3, does not occupy the full space between the flanges 34 and 36. Ordinarily, the film 4 would be allowed to weave back and forth within the limits defined by the guide means. Since such weaving can cause undesirable response effects, the weaving has been heretofore tolerated as a necessary evil. However, such weaving is eliminated in the system embodying the present invention.

As may be most clearly seen in Fig. 2 of the drawings, the pressure roller 22 is slightly tapered. Although, for purposes of clarity, the roller 22 is illustrated as having a substantial taper, in practice the taper is very slight. In one model which was made and successfully operated the roller 22 was nine-sixteenths of an inch long and the diameter of one end was five-thousandths of an inch less than the diameter of the other end, giving a taper of about 20 minutes. Although the material from which the roller is made is not critical, it is preferably made of a plastic material such as nylon. Further, if the material is light in color, such as white nylon, foreign particles which may adhere to the surface thereof may be readily detected and removed.

When a tapered pressure roller 22 is used, as herein provided, the force or pressure exerted on the film or web 4 is non-uniform with respect to the width of the film or web. As a result, the film or web will tend to shift, laterally in the direction of the side to which the greater pressure is applied. Thus, whereas if the pressure exerted on the web were uniform the film would tend to weave within the limits defined by the guide means; with the non-uniform pressure, the film will always be pressing against the one limit which corresponds to the side of the film to which the greater pressure is applied.

In the illustrative example, the taper of the roller 22 is so arranged that the larger diameter corresponds to that edge of the film which carries the magnetic signal track, that portion which overhangs the stabilizing drum 2 and which engages the signal translating head 14. When the film 4 is a motion picture film which has a picture record on that portion between the signal track and the sprocket holes 10 on the opposite edge, the use of a tapered roller, as herein set forth, includes a further advantage in that the least pressure is exerted on the picture bearing portion of the film, reducing the tendency of the film being scratched or otherwise damaged by contact with the roller 22.

In order to obtain a maximum fidelity in a magnetically recorded signal, the translating head 14 should be constantly in contact with the signal track. It is not unusual, in the course of using films, for the film to pick up particles of dirt or other foreign matter which would make small bumps on the film. When one of these particles passes between the stabilizing drum 2 and an untapered roller, the roller is momentarily lifted by the bump, causing a momentary difference in pressure between the signal track and the translating head. Magnetic signal translating heads are sensitive to such changes in pressure and, consequently, an audible change in signal response is produced by the passage of the particle. However, when a tapered roller 22 is used, the area of response to such particles is reduced to a narrow strip along the film which engages the inner edge of the stabilizing drum as compared to the full width of the drum when a non-tapered roller is used. Further, since the greatest pressure is exerted on the film along the portion which engages the head, the sensitivity to such particles is further reduced.

A still further advantage of using a tapered roller 22 as set forth herein, lies in that the production of a machine can be accomplished more economically than with a non-tapered roller. With a non-tapered roller, machine dimensions must be held to close tolerances to assure exact parallelism between the axis of the roller and the axis of the drum. With a tapered roller, the requirement of parallelism is not so critical and greater tolerances may be allowed.

Thus it may be seen that there has been provided, in accordance with the present invention, an improved reeling means for reeling a web-like member which is characterized by greater uniformity of motion of the web, greater safety to the web, and economy of construction.

What is claimed is:

1. In a signal translating system adapted for use with a web-like record member which carries a signal track in the form of a magnetizable strip along one edge of said web, in combination, a record member driven stabilizing drum for stabilizing the motion of the record member, guide means for guiding said web about said drum with said signal track overhanging said drum, a signal translating means mounted adjacent to said drum and positioned to engage said signal track as said record member passes over said drum, and pressure means having a record contacting surface inclined with respect to said drum for exerting a non-uniform pressure with respect to the width of the record member pressing said record member toward said drum and said signal translating means.

2. In a signal translating system adapted for use with a web-like record member which carries a signal track in the form of a magnetizable strip along one edge of said web, in combination, a stabilizing drum for stabilizing the motion of the record member, guide means for guiding said web about said drum with said signal track overhanging said drum, a signal translating means mounted adjacent to said drum and positioned to engage said signal track as said record member passes over said drum, and a tapered pressure roller positioned to press said record member toward said drum with a non-uniform pressure with respect to the width of said record member.

3. The invention as set forth in claim 2 wherein said roller is made of nylon.

4. In a signal translating system adapted for use with a web-like record member which carries a signal track in the form of a magnetizable strip along one edge thereof, in combination, a stabilizer drum for stabilizing the motion of said record member, guide means for guiding said record member around said drum with said signal track overhanging said drum, signal translating means mounted adjacent said drum and positioned to engage said signal track as said record member passes over said drum, a pressure roller having a tapered surface for pressing said record member toward said drum with a non-uniform pressure with respect to the width of said record member, and means for positioning said roller with the larger diameter thereof adjacent said signal translating means and the smaller diameter thereof adjacent said drum.

5. A reeling system for a flat web comprising a drum over which said web passes and pressure means for pressing said web toward said drum for causing said web to maintain intimate contact with said drum, the surfaces of said drum and said pressure means having a fixed inclined relationship at the point of opposition thereof whereby said pressure means exerts unequal pressure on said web with respect to the width thereof and continuously and unidirectionally urges said web laterally of its longitudinal direction of travel.

6. In a system for transporting an elongated flexible film having a magnetic recording medium along one edge thereof, a sound transducing stage comprising a drum and a guide roller arranged with their axes parallel to each other, said guide roller having a flange along one end thereof for guiding said one edge of said film, a pressure roller being tapered and having its larger diameter adjacent one end thereof, means for supporting said pressure roller and said sound drum for relative movement with respect to each other to maintain said film in intimate contact with said drum, said supporting means including means for maintaining said pressure roller with said larger diameter end thereof adjacent said one edge of said film, and means for maintaining said guide roller with said flanged end thereof adjacent said one edge of said film.

7. In a system for transporting an elongated flexible film, the combination comprising a stabilizing drum and a guide roller having their axes parallel to each other, said guide roller having a flange one one end thereof, said flange end of said guide roller being spaced along said axes in a direction away from one end of said drum, and a pressure roller being tapered with respect to said drum having a large diameter at one end thereof, said pressure roller being relatively movable with respect to said drum in directions toward and away from each other for applying pressure upon said film to hold said film in contact with said drum, and said large diameter end of said pressure roller being disposed closest said one end of said drum to urge said film for lateral movement in said direction away from said end of said drum until an edge of said film is in abutting relation with said flange of said guide roller.

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