United States Patent

[11] 3,585,446

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[21] Appl. No. **800,578**
[22] Filed **Feb. 19, 1969**
[45] Patented **June 15, 1971**
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[54] **MEANS FOR PREVENTION OF STATIC ELECTRIC DISCHARGE ON MOTION-PICTURE PROJECTOR REELS**
2 Claims, 1 Drawing Fig.

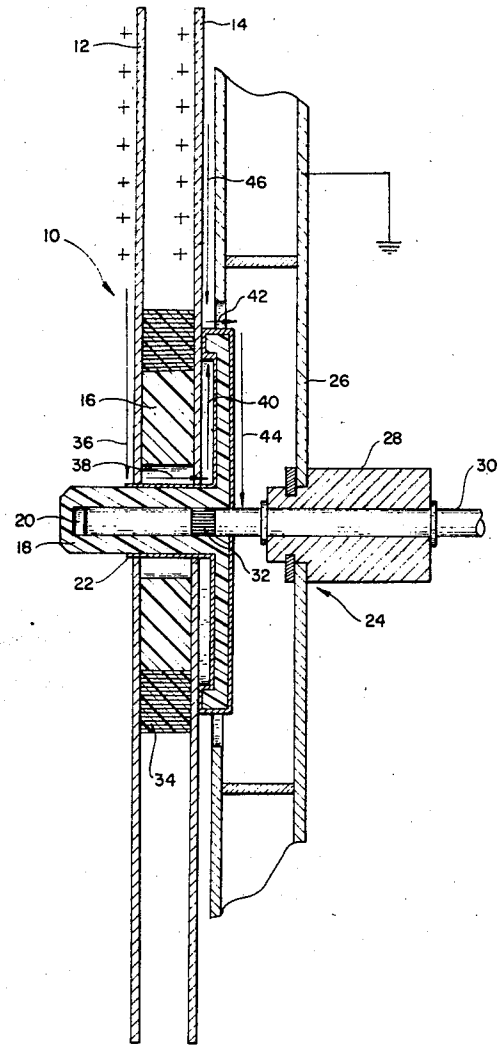
[52] **U.S. Cl.** **317/2,** 242/55.11
[51] **Int. Cl.** **H05f 3/00,** H05f 3/02
[50] **Field of Search** 242/71.8; 352/143; 317/2, 2.1

[56] **References Cited**
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1,848,871	3/1932	Corlette et al.	317/2
2,339,009	1/1944	Gordon	242/71.8
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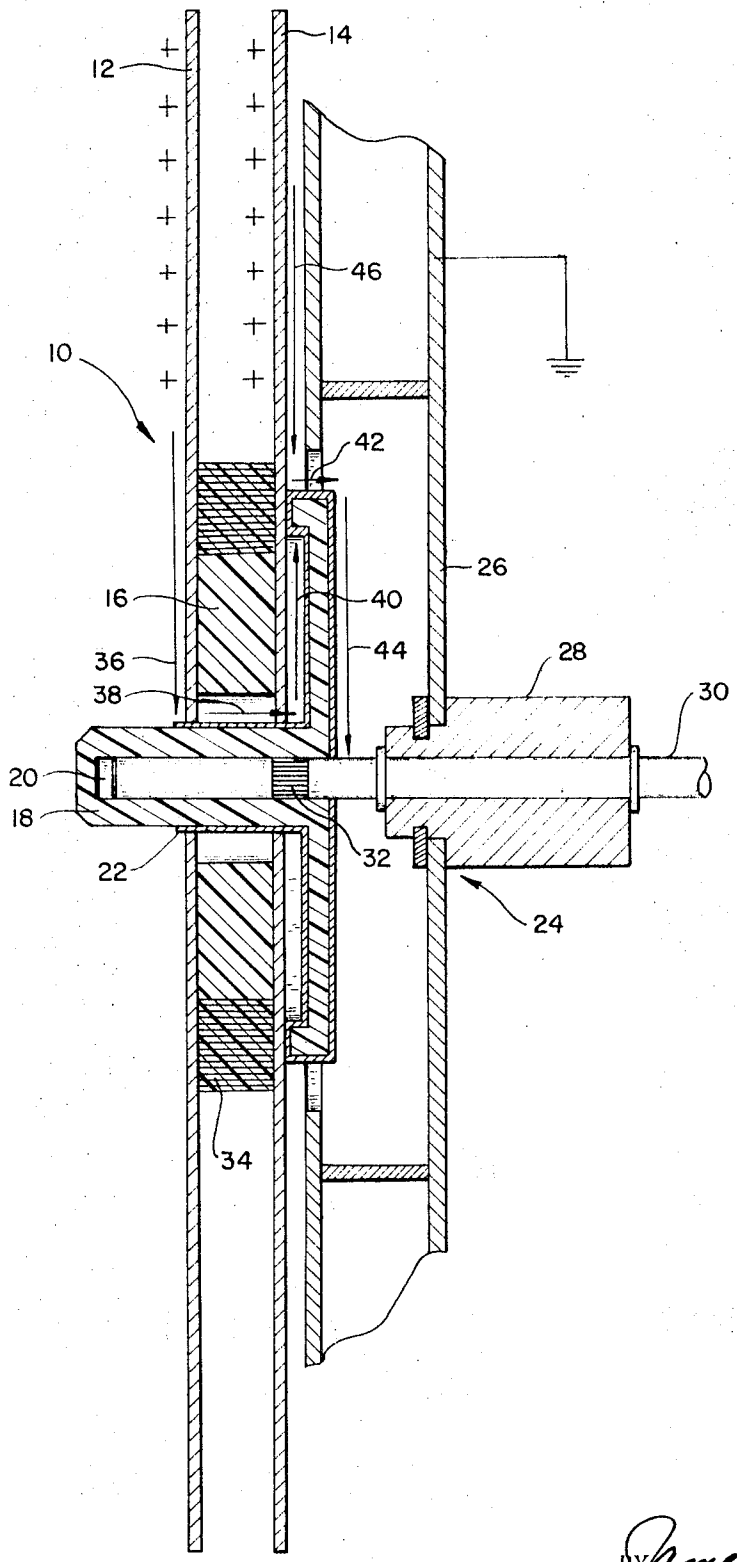
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ABSTRACT: This disclosure relates to a structure used to prevent the buildup of high voltage static electric charge on the flanges or support hub of motion picture reels. A conductive coating is placed around the nonconductive areas of the connection between the flanges and ground potential so that the accumulation of discharge potentials is prevented.



PATENTED JUN 15 1971

3,585,446



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MEANS FOR PREVENTION OF STATIC ELECTRIC DISCHARGE ON MOTION-PICTURE PROJECTOR REELS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to means for the prevention of static electric buildup on motion-picture projector reels.

2. Description of the Prior Art

The annoying and sometimes harmful effects produced by electrostatic discharges have been a problem in many industries.

The term static electricity or triboelectricity usually implies manifestations of electric charge accumulations resulting in interesting, useful, or undesirable phenomena.

The invention here, however, is concerned with those charge accumulations which often produce annoying and even dangerous effects. Those considerations are important particularly in the motion-picture projector field where static electric charge accumulations my produce electrostatic attractions of dust, lint, and light particles to surfaces such as phonographic records, photographic films, and high precision apparatus which may frequently impair performance. In particular in motion-picture practice, the large concentrations of charge can produce annoying and even dangerous effects to the operator, and in addition, even in those situations where the effects and simply annoying, nevertheless, the discharge produces electromagnetic radiation which propagates over considerable distances and may find its way into the audio amplifying equipment to produce deleterious results in the quality of reception by reason of the familiar noise disturbances.

Static electricity effects depend on the excess of charge of one sign existing on a macroscopic basis in one or more locations with respect to charge groups of opposite sign. Static electricity effects as generally understood frequently result from mechanical rubbing or impact processes. When two dissimilar substances are rubbed together they become electrified with opposite polarities. The frictional action probably serves to accentuate the contact potential differences normally existing between different substances. Many modern plastics, such as polystyrene, while excellent insulators nevertheless, are easily electrified by frictional effects produced even by ordinary handling.

The prior art has struggled to eliminate or at least alleviate these problems. For example, U.S. Pat. No. 1,206,357 to Nusbaum teaches the prevention of the generation of static electricity in motion-picture apparatus by insuring that, a predetermined portion of the material of the apparatus, the parts of which are in moving contact with the film, is of the same electrostatic characteristics as the film itself in order to prevent the buildup of charge. Nusbaum is primarily interested in preventing electrostatic discharge because the resulting sparks could ruin the film.

U.S. Pat. No. 1,848,871 to E. H. Corlett et al. eliminates static electricity in a film camera by placing conductive material, such as tinfoil, on the back of the entire area of film, rolling metallic sheet and the film on a spool so that they will being alternate convolutions, and grounding the metallic sheet to the metallic body of the camera.

U.S. Pat. No. 1,530,704 to Thomson teaches the prevention of electrostatic charge buildup by the use of a flat graphite conducting member, such as a cloth membrane or plate which is covered with graphite, and which is in close contact with the unexposed side of the film, so that the film in its travel between guide rollers successively discharges the buildup of static electricity.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an electrically conductive path between the metallic flanges of a film reel and a point of ground potential on apparatus for receiving such reels when the flanges are supported by a member having electrical insulator properties.

In accordance with the above object, the illustrated embodiment of the present invention includes a motion picture projector adapted to receive a takeup or supply film reel comprising two metal flanges and a plastic core. The projector is provided with a plastic spindle which is attached to a metal spindle shaft. The shaft is electrically grounded and a conductive coating on the plastic spindle provides a conductive path between the reel flanges and the shaft.

The novel features of the invention are set forth with particularity in the appended claims, the invention itself however, both as to its organization and method of operation together with further objects and advantages thereof may best be understood by reference to the description to follow considered in connection with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a sectional view of a motion-picture reel means utilizing means for the prevention of high voltage static electric buildup on motion-picture reels in accordance with the invention.

Referring now to FIG. 1 the motion-picture projector reel in accordance with one embodiment is indicated generally at **10**. The reel comprises metallic flanges **12** and **14** positioned in spaced relationship by means of a plastic ring core **16**.

The reel **10** in the illustrated embodiment is adopted for mounting on a projector indicated generally in part sectional view at **24**. The projector **24** comprises a frame **26**, supporting a metallic bearing **28**, which in turn supports a metallic spindle shaft **30**. The shaft **30** includes a splined portion, indicated at **32**, over which a plastic spindle **18** is nonrotatably forced in order to secure the spindle on shaft **30**. Photographic film is indicated at **34**. A conductive coating **22** is deposited around the outer geometrical outline of spindle **18** to provide a conductive path between flanges **12** and **14** of reel **10** and shaft **30**.

In the practice of the invention the motion-picture projector reel builds up a charge of static electricity on metallic flanges **12** and **14** both from the handling of the reel itself by the operator and by the motion of the photographic film. The macroscopic charges built up are considerable, and may reach several thousand volts. It is not at all unusual to observe a spark jump through a distance of one-eighth inch or so. Knowing the dielectric strength of air it can readily be calculated that this discharge potential is in the order of several thousand volts. Additionally, the trapped charge buildup depends in great measure upon atmospheric conditions. For example a high atmospheric humidity, helps to increase the circuit linkage conductivity, so that not as great a charge will buildup. The converse is true when atmospheric humidity is low. With the provision of the conductive coating **22** on the spindle, the accumulated charges are bled off. As indicated by the arrow **36** the trapped charge on the flange **12** migrates toward the conductive coating **22** where it is conveyed as indicated by the successive arrows: **38, 40, 42, 44** to the metallic shaft **30**. The frame of the device may be preferably grounded as indicated, but even if ungrounded, the electrical sink presented by the large metallic area of the frame will assist in the dissipation of the charge. Similarly the charge on flange **14** is leaked off in a path as indicated by the arrows identified successively at: **46, 42, 44** to the same metallic shaft **30**.

The invention has been described in detail with particular reference to a preferred embodiment thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

I claim:

1. Apparatus for preventing the buildup of static charges on film reels of the type having metal flanges, said apparatus comprising:

a source of ground potential;

a rotatable shaft;

electrical insulator support means for mounting the reels on said shaft; and

an electrically conductive coating on said support means, said conductive coating being positioned to make good electrical contact with the flanges of a mounted reel and with said source of ground potential to provide a low resistance path between the reel flanges and ground.

2. Apparatus as defined in claim 1 wherein:

said shaft is electrically conductive and is connected to ground;

said support means comprises a plastic spindle fixed to said shaft for rotation therewith; and

said conductive coating is positioned to provide a low resistance path between the flanges of a received reel and said shaft.