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**2,089,787**

FILM REEL

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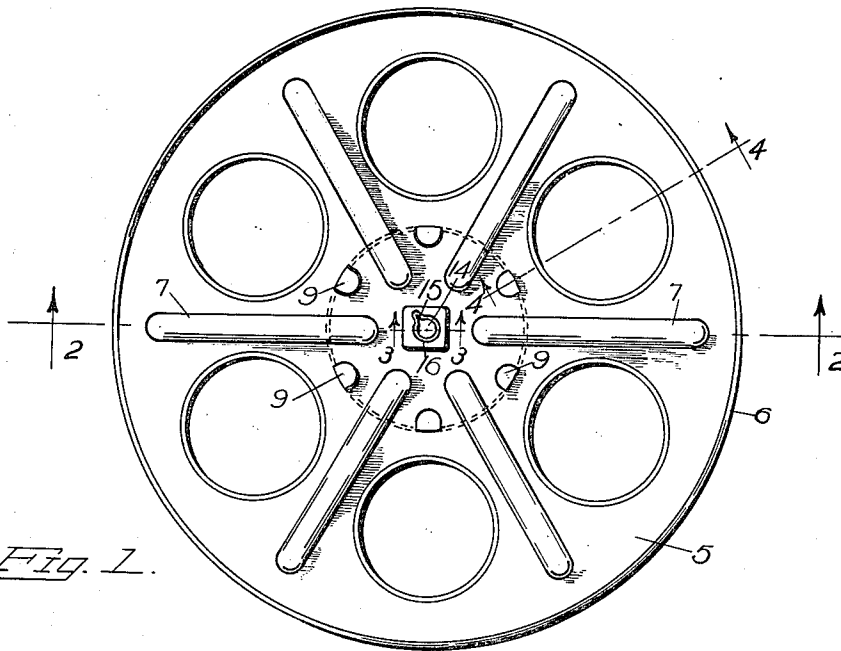


Fig. 1.

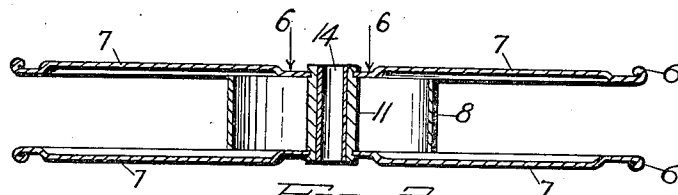


Fig. 2.

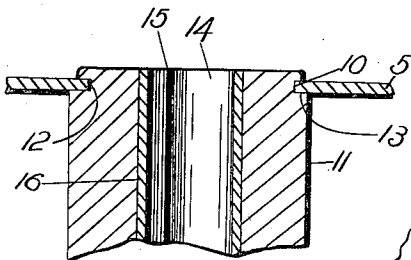


Fig. 3.

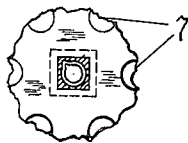


*Fig. 6.*

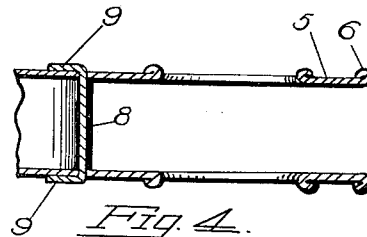


Fig. 4

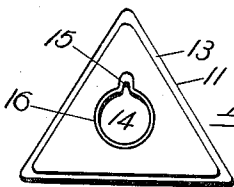


Fig. 5.

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## UNITED STATES PATENT OFFICE

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FILM REEL

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2 Claims. (Cl. 242—70)

This invention relates to improvements in reels for moving picture films.

In the manufacture, transportation and exhibition of moving pictures, reels are employed from which the films are unwound and on which they are rewound during exhibition. Such reels are so constructed that they can be quickly applied to a power driven shaft which rotates the reel during the rewind operation. The shafts are usually non-circular, and frequently square and the side plates of the reels are then provided with square openings. The shafts are sometimes circular and provided with one or more longitudinally extending splines, and when the reels are to cooperate with shafts of this shape, they have correspondingly shaped holes. Since the larger size reels of this type are frequently over fifteen inches in diameter, the driving force exerted by the shaft on the reel is often very great and the walls of the holes soon begin to wear away, and where the interconnection between the shaft and the reel is effected by means of a thin tube, the latter is frequently loosened and worn until it begins to rotate relative to the reel.

It is the object of this invention to produce a reel of such construction that torque exerted by the shaft will be positively transmitted to the reel by means that will not become loose and which can always be depended upon to function properly whereby practically all danger of a shutdown due to inoperativeness of the driving connection between the shaft and reel is eliminated.

Another object of this invention is to produce a reel in which the sides shall be strengthened by means of radial angularly spaced ribs.

Another object is to provide a reel having strengthening ribs that extend from a point near the center to a point near the peripheries of the sides and to provide a circular spacer between the sides at a point intermediate the ends of the ribs, which spacer serves as a fulcrum about which the sides tend to pivot when force is applied, tending to move them towards each other.

A further object of this invention is to produce a reel in which the centers of the side plates are rigidly spaced a predetermined distance from each other and which will therefore not change their shape when subjected to pressure at their centers.

The above and other objects that may become apparent as this description proceeds are attained by means of a construction and arrangement of parts that will now be described in detail, and for this purpose reference will be had

to the accompanying drawing in which the invention has been illustrated in its preferred form, and in which

Figure 1 is a side elevation of the improved reel that forms the subject of this invention;

Figure 2 is a section taken on line 2—2, Figure 1;

Figure 3 is a fragmentary section, through the center of the reel, taken on line 3—3, and shows the spacer to an enlarged scale;

Figure 4 is a fragmentary section, to an enlarged scale, taken on line 4—4, Figure 1;

Figure 5 is an end elevation showing a slightly modified form of spacer; and

Figure 6 is a section taken on line 6—6, Figure 2.

In the drawing, reference numeral 5 represents the side plates of the reel. The side plates are duplicates and are each provided with a reinforced rolled edge 6, and six outwardly pressed radial ribs 7. A circular hub or band 8 is positioned concentrically with respect to the side plates. The hub is formed from a strip of sheet metal bent into circular form and is provided on opposite edges with tongues 9 that project through holes in the side plates and are bent inwardly as shown most clearly in Figure 4.

The side plates 5 are provided at their center points with non-circular openings 10, which have been shown as square in Figure 1, but which may be a polygon of any number of sides or an ellipse or oval.

A spacer 11 is positioned between the plates and is of greater cross sectional area than the openings 10, and is provided at each end with a neck 12 of the proper size and shape to fit the openings. Since the areas of the necks are less than that of the body of the spacer, shoulders 13 are formed against which the inner surfaces of the plates 5 rest, in the manner shown in Figure 3. The necks are longer than the thickness of the plates and are swaged or riveted over the edges of the plates about each opening. The spacers are preferably quite large, and in the reel from which the drawing is made, the cross sectional area of the spacer is approximately one square inch, but may vary either way from this.

It is evident that the spacer serves as a means for rigidly and positively holding the plates a fixed distance apart. Since the holes 10 are quite large and non-circular, it is evident that the spacer cannot turn in the holes and will resist any normal force tending to rotate it in the openings.

The nearer the shape of the holes 10 approach a circle, the less force will be required to turn the

spacer in the openings, and for this reason, the holes are either square or triangular. It is obvious, however, that the invention cannot be limited to any size or shape of opening, as the spacer can be held from rotation by other means, such as spot welding, in which case the holes could be round.

The reel illustrated is designed to be used with a round drive shaft having a longitudinal spline or rib and the spacer is therefore provided with an opening 14 having a groove 15 along the side for the reception of the spline. If the shaft were square the opening would be square.

The spacer can be made of iron or soft steel and will then form a very reliable and positive means for interconnecting the reel and drive shaft. In order to reduce the weight of the reel, the spacer is preferably made from an aluminum die-casting. Although aluminum is soft, the manner in which connection is made between the spacer and the sides of the reel assures its successful operation. When the spacer is made of aluminum or other soft metal, the hole 14 is lined with steel, and the center of the spacer is preferably formed by a steel tube 16 of the desired cross sectional shape and the metal of the spacer is cast about the tube 16, which forms the core.

Attention is called to the bracing function of the spacer which gives great rigidity to the reel, especially when the side plates have radial strengthening ribs 7 that extend from a point near the center and to points adjacent the peripheries, thereby crossing the line of the hub 8, which therefore acts as a fulcrum for the sides.

The manner of securing the spacer in place so as to effectively resist forces tending to turn it in the side plates is also of great importance, as this results in a reel that is practically proof against failure at this point.

Having described the invention, what is claimed as new is:

1. A reel for moving picture films comprising, in combination, two circular side plates each of which has a polygonal opening at its center, a circular hub band concentrically positioned between the side plates, at some distance from the center, means for attaching the hub band to the side plates, a spacer of aluminum, having each

end provided with a neck of polygonal cross section, to fit the openings in the sides, the spacer having a shoulder at each end which extends beyond the sides of the neck and forms a stop for the inner surface of the corresponding side plate, the outer ends of the necks being swaged over the edges of the opening in the side plates, the spacer having a non-circular opening, concentric with the side plates, for the reception of a correspondingly shaped liner of iron, the liner having a non-circular opening shaped to receive a correspondingly shaped shaft, the wall thickness of the material of the central spacer being greater than the diameter of the shaft receiving opening and the dimensions of the necks being only slightly smaller than those of the spacer whereby the stresses between the sides of the necks and the sides of the openings will be substantially less than the corresponding torque strains between the shaft and the iron liner.

2. A reel for moving picture films comprising, in combination, two circular side plates, each of which has a polygonal opening at its center, a circular hub band concentrically positioned between the side plates, at some distance from the center, means for attaching the hub band to the side plates, a spacer of light metal, having each end provided with a neck of polygonal cross section, to fit the openings in the sides, the spacer having a shoulder at each end which extends beyond the sides of the neck and forms a stop for the inner surface of the corresponding side plate, the spacer having a non-circular opening, concentric with the side plates, for the reception of a correspondingly shaped liner of a heavy hard metal, the liner having a non-circular opening shaped to receive a correspondingly shaped shaft, the transverse dimensions of the central spacer being in every case greater than the corresponding dimensions of the polygonal openings in the side plates, the dimensions of the polygonal openings being greater than the shaft receiving opening whereby the stresses between the sides of the necks and the sides of the openings with which they engage will be substantially less than the corresponding torque strains between the shaft and the hard metal liner.

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