Oct. 6, 1931. A. C. HAYDEN 1,825,663

FILM REEL AND SPINDLE

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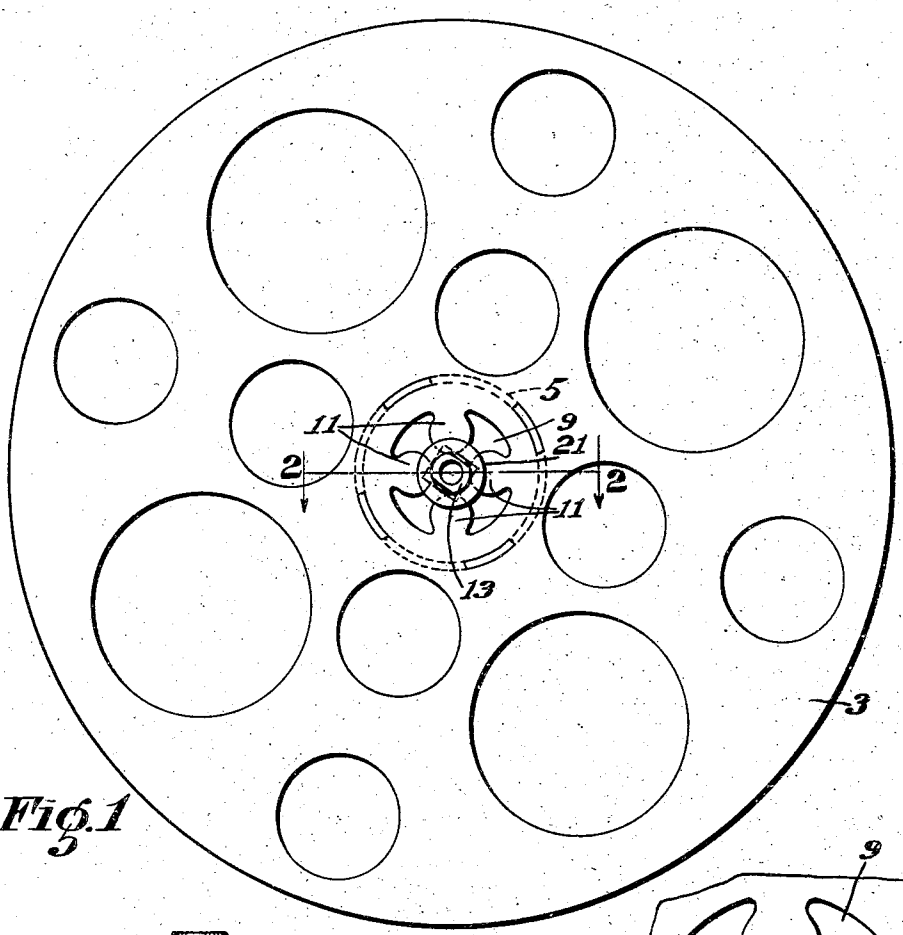



Fig. 1

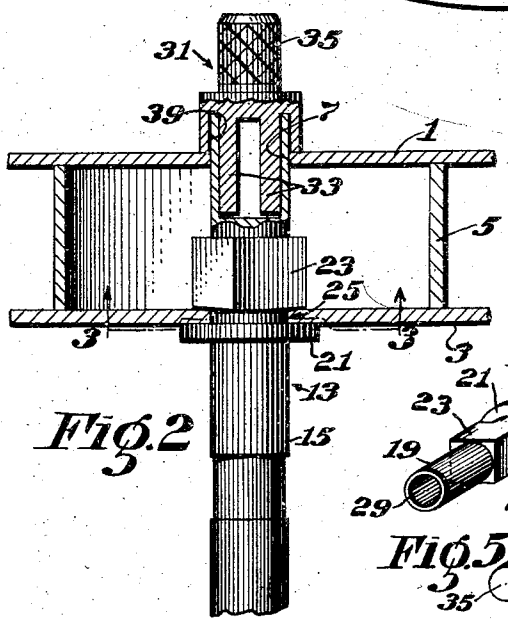



Fig. 2

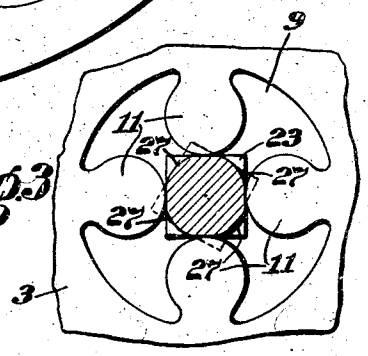



Fig. 3

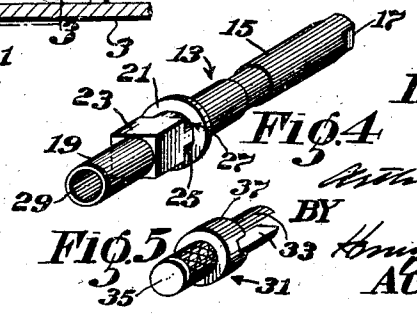



Fig. 4

Fig. 5

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# UNITED STATES PATENT OFFICE

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## FILM REEL AND SPINDLE

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The invention to be hereinafter described relates to a motion picture film reel and its spindle.

The ordinary film reel comprises a pair of circular plates having a hub between them adapted to have the film wound thereon. The plates have holes at the centers thereof in axial alinement adapted to receive the spindle of the motion picture camera or projector. Heretofore, it has been common practice to construct the spindle with a spring pressed key to cooperate with one of the plates of the reel to provide the driving connection and prevent the reel from escaping from the spindle.

A purpose of the present invention is to provide a spindle and reel which eliminate the necessity for such a key. The reel and spindle will interlock on slight relative rotative adjustment, thereby to give them a driving connection and prevent the reel from accidental escape from the spindle.

Another purpose of the invention is to provide the spindle with a cap which may be held onto the spindle with a friction fit and have engagement with one of the plates of the reel, thereby providing further means to prevent escape of the reel from the spindle.

The character of the invention may be best understood by reference to the following description of one good form thereof shown in the accompanying drawings, wherein:

Fig. 1 is a side view of the reel mounted on the spindle;

Fig. 2 on an enlarged scale is a section through the central portion of the reel taken on line 2—2 of Fig. 1;

Fig. 3 is a section taken on line 3—3 of Fig. 2;

Fig. 4 is a perspective view of the spindle; and

Fig. 5 is a perspective view of the cap.

Referring to the drawings, the reel shown therein as an embodiment of the invention, comprises a pair of circular plates 1 and 3 spaced and having a hub 5 between them and secured thereto, said hub being adapted to have the film wound thereon. The plate 1 has a circular hole 7 therein, and the plate 3 has an opening 9 therein, and projecting into this opening are four tongues 11 which extend toward but not to the center of the plate.

The spindle 13 has a portion 15 adapted to be mounted in the usual bearing. An end 17 has flattened sides for insertion in the hole of the usual spindle driving pulley. The spindle has a circular portion 19 for insertion in the circular hole of the plate 1 and a flange 21 for engagement with the outer face of the plate 3. Spaced somewhat from the flange is a block or square portion 23 having opposed sides a distance apart equal to the diameter of the circular portion 19, and corners project out beyond the circular portion. Between the flange and the block is a groove 25 having portions flush with the faces of the block and four rounded corners or cams 27 of longer radius than said flush portions. The spindle has a hollow end portion 29.

The spindle may be provided with a cap 31 having a fork 33 with tines adapted for insertion in the hollow end portion of the spindle with a tight friction fit. The cap may have a knurled handle 35 and between the handle and the fork is a collar 37 somewhat larger than the fork and providing a recess 39 for receiving the end of the spindle.

When it is desired to mount the reel on the spindle, it is presented thereto with the plate 3 having the opening 9 nearer the spindle. Then the reel is slid onto the spindle, and in the course of this movement the tips of the tongues 11 will ride along the circular portion 19 and past the faces of the block 23 and thence to the groove 25 where further inward movement of the spindle will be limited by engagement of the reel plate 3 with the flange 21. Then on slight relative rotative adjustment of the reel and spindle, the corners of the block will move from their positions shown in full lines in Fig. 3 to their positions shown in dotted lines in said figure, and then the corners will be in engagement with the inner faces of the tongues. Thus the tongues will be confined between the flange and the block, and movement of the reel axially of the spindle will be prevented. On the relative rotative adjustment the cams 27 will

jam and wipe against the tips of the tongues and thereby provide the driving connection between the spindle and the reel. Also, these cams will prevent the spindle from turning relatively to the reel to the position for release shown in full lines in Fig. 3.

After the reel has been mounted on the spindle as described, the cap may be applied to the spindle by inserting its fork into the hollow end portion 29. The tines of the fork have sufficient resilience so that they may be pressed slightly toward each other on insertion into the spindle and have a tight friction fit. The cap is slid inward until its collar engages the outer face of the plate 1. Thus, the cap is a further means for preventing escape of the reel from the spindle, and adds to the finished appearance thereof, but it will be apparent that the cap is not indispensable.

The circular hole in the plate 1 is too small to ride over the block 23, and therefore, it will be clear that in mounting the reel on the spindle, it will be necessary first to present to the spindle the plate 3 having the tongues 11 in the aperture 9.

The reel and spindle set forth herein are simple and cheap in construction. The reel may be quickly and easily mounted on the spindle and removed therefrom. The construction is such that the reel and spindle may have relative rotative adjustment in either a clockwise or contra-clockwise direction to cause the cams 27 to jam against the tongues 11, and in either case the presence of the tongues between the flange and the block of the spindle will prevent accidental escape of the reel from the spindle.

It will be understood that the invention is not limited to the specific embodiment shown, and that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What is claimed is:—

1. The combination of a film reel comprising a pair of plates and a hub between said plates adapted to have a film wound thereon, one of said plates having a hole therein and the other of said plates having an opening with tongues therein projecting toward but not to the center of the plate; and a spindle in said hole and opening and having a groove for receiving said tongues to prevent movement of the reel axially of the spindle.

2. A film reel comprising a pair of plates and a hub between said plates adapted to have a film wound thereon, said plates having holes therein; and a spindle in said holes, said reel and spindle having means to interlock on relative rotative adjustment of the reel and spindle, thereby to prevent movement of the reel axially of the spindle.

3. The combination of a film reel comprising a pair of plates and a hub between said plates adapted to have a film wound thereon, one of said plates having a hole therein and the other of said plates having an opening with tongues therein projecting toward, but not to the center of the plate; and a spindle having means for engagement with said tongues to prevent movement of the reel axially of the spindle on relative rotative adjustment of the reel and spindle.

4. The combination of a film reel comprising a pair of plates and a hub between said plates adapted to have a film wound thereon, one of said plates having a hole therein and the other of said plates having an opening with tongues therein projecting toward, but not to the center of the plate; and a spindle having a portion for insertion into said hole, and a square portion for insertion through the plate between said tongues and adapted on relative rotative adjustment of the reel and spindle to interlock with said tongues and prevent the reel from moving axially of the spindle.

5. The combination of a film reel comprising a pair of plates and a hub between said plates adapted to have a film wound thereon, one of said plates having a hole therein and the other of said plates having an opening with tongues therein projecting toward, but not to the center of the plate; and a spindle having a portion for insertion in said hole, a flange, and a square portion spaced from the flange and adapted for insertion through the plate between the tongues until limited by engagement of the flange with faces of the tongues, said square portion being adapted to engage the opposite faces of said tongues on relative rotative adjustment of the reel and spindle.

6. In combination, a film reel comprising a pair of plates and a hub between said plates adapted to have a film wound thereon, said plates having holes therein, a spindle in said holes, the spindle being formed with a non-circular portion adapted in one rotative position to be inserted into one of said holes which is also non-circular, the said portion and the cooperating wall of the plate being formed to permit a limited relative rotation thereof but to jam and prevent further relative rotation at said limit, and means preventing relative axial movement of the reel and spindle when they are at said limit.

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