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DRIVING MECHANISMS MORE PARTICULARLY FOR THE MOVEMENT OF PICTURE FILMS

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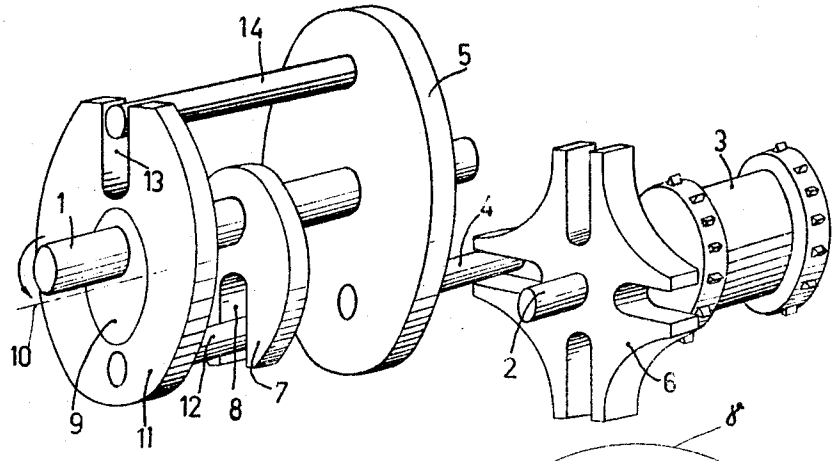

FIG.1

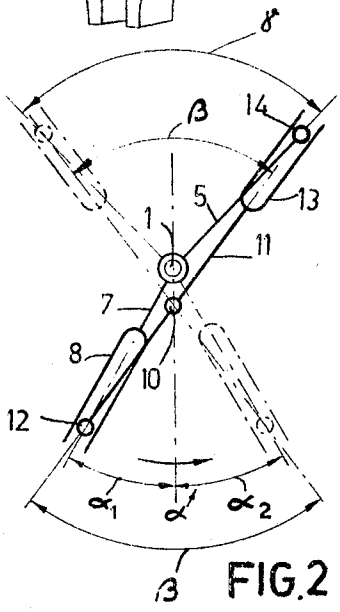

FIG.2

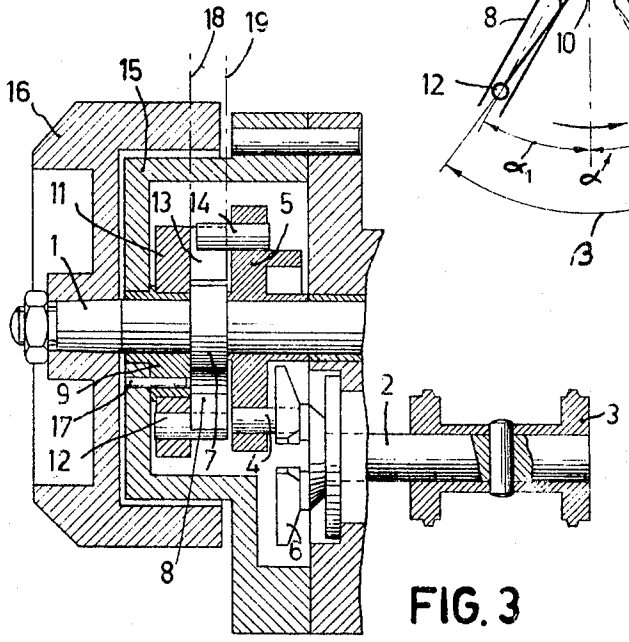

FIG. 3

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DRIVING MECHANISMS MORE PARTICULARLY FOR THE MOVEMENT OF PICTURE FILMS

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This invention relates to driving mechanisms, more particularly for the movement of picture films, in which a uniformly-rotating driving shaft intermittently drives through a Maltese cross or a Geneva movement a second shaft through a first component, rigidly connected to the driving shaft, and a second component which is rotatable about a shaft positioned eccentrically relative to the driving shaft, which two components are in driving connection with each other by means of a slotted-link mechanism.

The term "slotted-link mechanism" is to be understood herein to mean a mechanism comprising two parallel shafts one of which carries a crank whose pin coacts with a slot of a component seated on the other shaft in such manner that the shafts can drive each other.

Driving mechanisms of the kind referred to are used in those cases where the aim is to shorten as much as possible the period which is required to rotate the shaft to be driven intermittently through a certain angle and to lengthen the period in which said shaft is stationary, the so-called accelerated Maltese cross drive. They are used, for example, in picture film projectors in which it is important to reduce as far as possible the dark period of the film in order to minimize the light loss through the darkening of the projection screen required during this period.

Driving mechanisms of this kind are already known, but for obtaining the desired effect these require the use of a very large disc on the driving shaft which is difficult to incorporate in a construction, while the great dimensions of the slotted-link mechanism cause very high inertial forces which give rise to considerable wear. Furthermore, in this mechanism there is no freedom in the positioning of the shafts.

The object of the invention is to overcome these disadvantages. This is achieved by providing the mechanism with a second slotted-link mechanism by which the second component is in driving connection with a crank which co-acts with the Maltese cross.

One advantageous embodiment is characterized in that the crank coacting with the Maltese cross is seated on a shaft located in line with the driving shaft or on the driving shaft itself. This is possible due to the freedom in the choice of the positions of the shafts and affords the advantage that the structure can be incorporated in a mechanism provided with a nonaccelerated Maltese cross drive, without the positioning of the shafts having to be modified.

A very compact structure which envisages the same advantage is obtained by another advantageous embodiment which is characterized in that the second slotted-link mechanism is substantially situated, as viewed in the axial direction, between the two boundary surfaces of the first component.

A very compact structure is also obtained by journalling the second component on an eccentric which cannot rotate relative to a frame and which has a bore for journalling the driving shaft.

In order that the invention may be readily carried into effect, it will now be described in detail, by way of example, with reference to the accompanying diagrammatic drawing, in which:

FIGURE 1 shows a schematic diagram of the driving mechanism according to the invention;

FIGURE 2 shows a diagram thereof and

FIGURE 3 is a sectional view of one advantageous embodiment of the driving mechanism according to the invention.

FIGURE 1 shows a uniformly-rotating driving shaft **1** and an intermittently driven rotary shaft **2** on which, by way of example, a sprocket **3** for a picture film is shown. The shaft **2** is driven by a pin **4** on a disc **5**, which pin operates a Maltese cross or Geneva member **6**, rigidly seated on shaft **2**, once during each revolution of the shaft **1**, whereby the shaft **2** is rotated through a certain constant angle.

A disc **7** having a slot **8** is immovably fitted on the shaft **1**.

A disc **9** is positioned eccentrically relative to the shaft **1** and so connected to a fixed point of the construction that it cannot rotate. The disc **9** having a center **10** can also serve as a bearing for the shaft **1**. Rotatable about the disc **9** is another disc **11** having a pin **12** and a slot **13**. The pin **12** coacts with the slot **8** and constitutes therewith a first slotted-link mechanism. The slot **13** coacts with a pin **14** on disc **5** and constitutes therewith a second slotted-link mechanism.

It will be evident that there is complete freedom in the positioning of the pin **4** on the disc **5** so that the position of the shaft relative to the shaft **1** can also be chosen wholly arbitrarily.

The operation of the mechanism will now be described in detail with reference to the diagram of FIGURE 2. In this figure the full lines indicate a determined relative position of the components at which the rotation of the Maltese cross begins and the dotted lines indicate a second position, after rotation of the shaft **1** through an angle α, at which the rotation of the Maltese cross has ended. When the shaft **1**, together with the disc **7**, has rotated through said angle the disc **11**, together with the pin **12** and the slot **13**, has rotated about the γ center **10** of the eccentric through an angle β which is greater than α. The pin **14** and hence the disc **5** then rotates about the center line of the shaft **1** through an angle γ which is again greater than the angle β. Thus a rotation of the pin **14** on the disc **5** through a given angle requires only a rotation of the shaft **1** through an angle α.

In the figure the initial and final positions of the components are symmetrical relative to the line connecting the center of the shaft **1** and the center **10** of the eccentric, so that the angles α_1 and α_2, which form together the angle α, are equal. However, these angles may alternatively be made different.

In the embodiment shown in FIGURE 3 the shafts **1** and **2** are journalled in a housing **15**. The shaft **1** is uniformly driven by a disc **16**. Seated on the shaft **2** is a Maltese cross **6** which is driven by the pin **4** on the disc **5**. This disc can rotate freely on the shift **1**.

The component **7** having a slot in the form of a slot **8** is rigidly connected to the shaft **1**. An eccentric **9** is rigidly connected to the housing **15** by means of pins **17** and has a bore which serves as a bearing for the shaft **1** and also has a bearing for the disc **11**, which can thus freely rotate eccentrically relative to the shaft **1**. Rigidly connected to the disc **11** is a pin **12** which coacts with the slot **8** of the component **7**. The disc **11** also has a slot formed by radial sliding surfaces **13**, into which a pin **14** on the disc **5** can slide. The sliding surfaces **13** and the active portion of the pin **14**, which form together the second slotted-link mechanism, are situated, as viewed in the axial direction, between the boundary surfaces of the component **7**, resulting in a very compact structure of the assembly. The boundary surfaces are indicated

by a dot-and-dash line in FIGURE 3 and provided with the reference numerals **18** and **19**.

It is to be understood that the invention is not limited to the embodiment here described. Thus, for example, the pins and slots of the slotted-link mechanisms can alternatively be interchanged.

What is claimed is:

1. An intermittent film drive having a film sprocket comprising a continuously driven rotatable drive shaft, a Geneva gear provided with an intermittently driven shaft, said film sprocket mounted on said latter shaft, a crank rotatable about said drive shaft provided with a pin engaging in the slots of said Geneva gear for intermittently rotating the latter, a first disc rigidly connected to said drive shaft, a second disc rotatable about said drive shaft and mounted eccentrically relative thereto, said first disc being provided with a first peripheral slot, a first pin mounted on said second disc and engageable in said first peripheral slot, said second disc provided with a second peripheral slot, a second pin secured to said crank and engageable in the second peripheral slot of said second disc whereby said crank is rotated at a greater speed than the rotation of said drive shaft.

2. An intermittent film drive having a film sprocket as claimed in claim **1** further comprising an additional shaft aligned with said drive shaft, said crank coacting with said Geneva gear being rotatably mounted thereon.

3. An intermittent film drive having a film sprocket as claimed in claim **1** wherein said first disc and associated structure is located between said second disc and said crank.

4. An intermittent film drive having a film sprocket as claimed in claim **1** further comprising a fixed eccentric, said drive shaft journalled in said eccentric, and said second disc journalled on said eccentric and being rotatable thereabout.

5. An intermittent film drive having a film sprocket as claimed in claim **1** wherein said crank is rotatably mounted on said drive shaft.

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