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TRANSPORT OPERATOR

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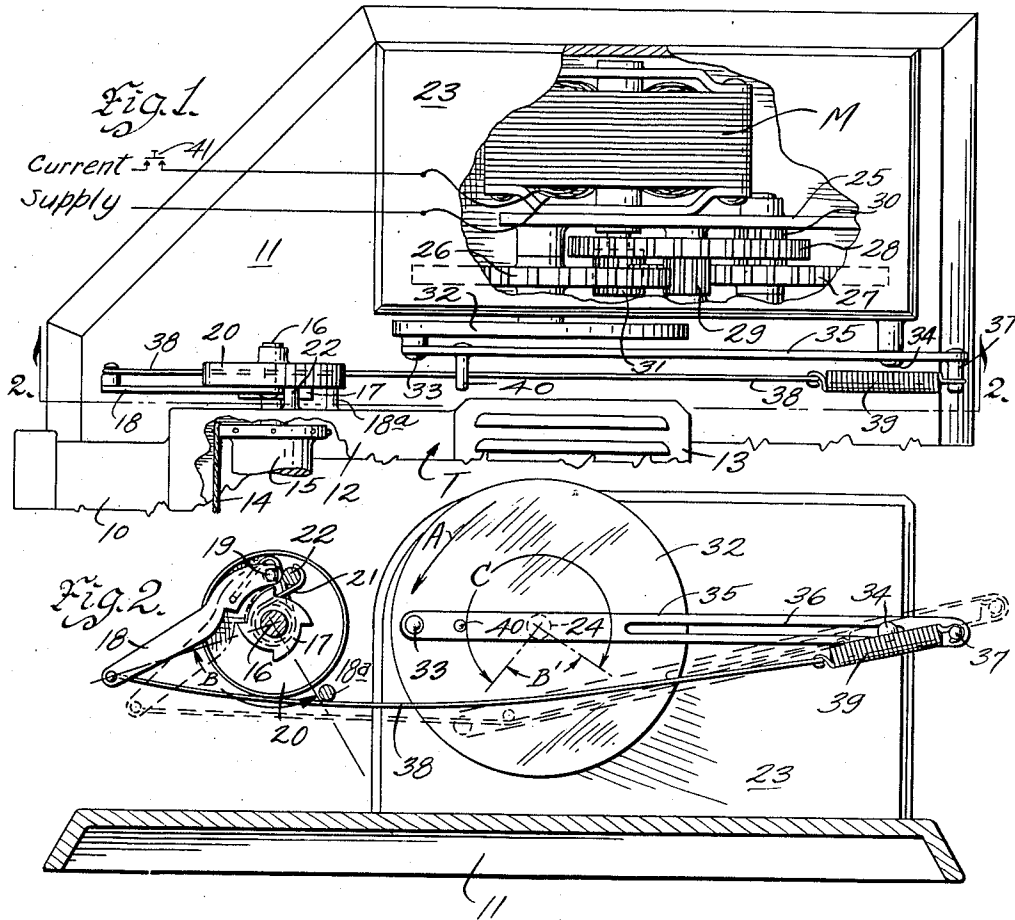


Fig. 2

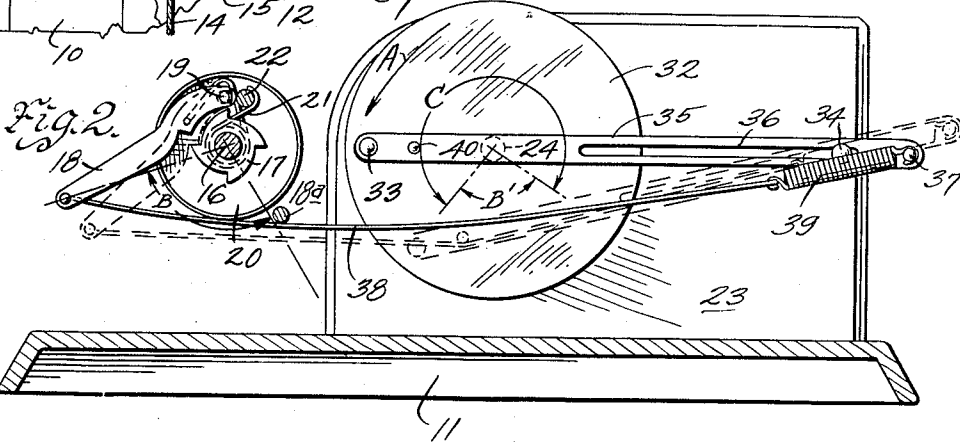
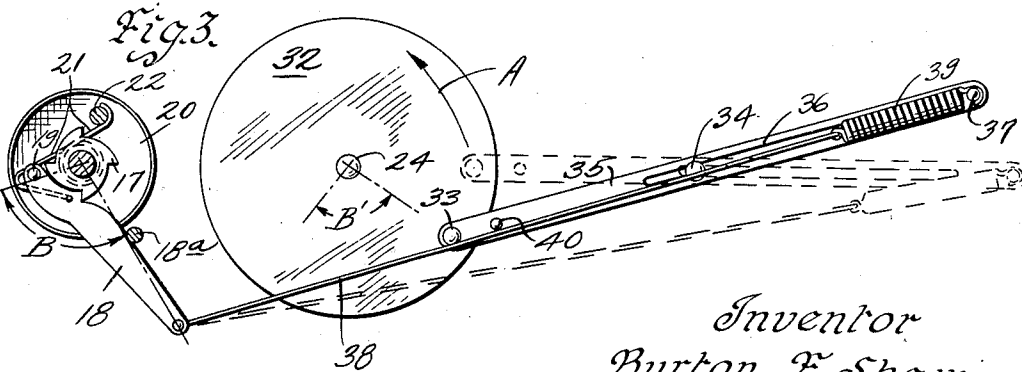


Fig. 3



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TRANSPORT OPERATOR

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10 Claims. (Cl. 74—116)

An object of my present invention is to provide a transport operator of simple, durable and inexpensive construction.

A further object is to provide a remote controlled operating device for transports or picture projecting machines, the device being electrically driven and manually controlled in such manner that the operation of the transport for advancing film or the like therein, one frame at a time, is accurately under control of the user of the transport regardless of his position relative to the transport.

Still another object is to provide a transport operator for the kind of transport having a retractible operating lever, my mechanism being so designed and connected with the operating lever of the transport that my mechanism swings the lever through its predetermined movement with substantially less than a half revolution of a crank pin of the transport operator, the remaining portion of the revolution thereof being utilizable as space in which the operating mechanism can overrun after the lever has been operated through its range of movement.

Still another object is to provide a crank shaft and a crank pin for swinging a transport operating lever, a link being so connected with the crank pin and slidable relative to a stationary element with the means of connection between the link and the transport operating lever being so designed that a substantially small degree of rotation of the crank pin will operate the lever and the remaining portion of one revolution thereof is available for overrun of a remote control electric motor and a gear train connection between the motor and the crank pin.

Still a further object is to provide a connection between the link and the transport operating element in the form of a flexible connection and to provide an extension on the link adjacent the crank pin, which extension is effective to engage the flexible element and further facilitate operation of the lever particularly when it is in such position that the line of pull is adjacent dead center.

With these and other objects in view my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawing in which:

Figure 1 is a plan view of a portion of a transport and of my transport operator connected therewith, a portion of the casing of my operator

being broken away to show internal features of construction.

Figure 2 is a sectional view on the line 2—2 of Figure 1 showing the transport operator at the beginning of the throw of the operating lever of the transport; and

Figure 3 is a similar view showing the parts in their position adjacent the end of the throw.

On the accompanying drawing I have used the reference numeral 11 to indicate generally a base. The base 11 has mounted thereon a transport T which is a usual type of projector, the major portion of which is broken away as in Figure 1.

Briefly the transport T consists of a lens tube 10, a film housing 12 and a lamp housing 13. Within the film housing 12 a strip of film 14 is advanced by a film sprocket 15. The film sprocket 15 is mounted on a shaft 16 having thereon a ratchet wheel 17, the ratchet wheel 17 being adapted to be advanced one tooth at a time by an operating lever 18. The lever 18 is pivoted at 19 to a flanged disk 20. The disk 20 is rotatable on the shaft 16 and is normally retained in the position of Figure 2 by a spring 21. The spring 21 has one end engaging a stationary stop pin 22 and its other end engaging the lever 18 in such manner that it normally pulls the lever against the stop 22 and swings it outwardly from the ratchet as shown by solid lines in Figure 2.

The lever 18 is adapted to travel through an arc of a circle indicated by the dimension line B. It is shown at the limits of its movement by solid lines in Figures 2 and 3. Such movement results in rotation of the ratchet wheel 17 a quarter revolution for advancing the film 14 on the sprocket 15 one frame.

A transport of the kind thus far described is ordinarily operated by manually swinging the lever 18 or attaching a cord or the like to it for swinging the lever by pulling on the cord.

I provide a convenient type of remote control for the purpose of my transport operator, which will now be described.

A casing 23 is mounted on the base 11 for housing a portion of the mechanism of my operator. The casing 23 has mounted therein an electric motor M. A crank shaft 24 is journaled in a plate 25 and in one side of the housing 23. A gear train consisting of gears 26, 27 and 28 and pinions 29, 30 and 31 operatively connects the motor M with the crank shaft 24. The pinion 31 is mounted on the motor shaft while the pinion 29 rotates and is secured to the pinion 28 and the gear 30 is secured to the gear 27. Mounted on the gear shaft 24 exterior of the housing 23 is

a crank disk 32. A crank pin 33 is carried thereby.

A stationary pin 34 is mounted on the housing 23 and a link 35 is slidably mounted relative thereto. The pin 34 is headed and the link has a slot 36 whereby the slidable connection is made. One end of the link 35 is rotatable on the crank pin 33 and the other end carries a pin 37.

An operative connection is provided between the pin 37 and the operating lever 18 consisting of a flexible member 38 and a spring 39. The flexible member 38 may be a cord or cable.

The link 35 carries an extension such as the pin 40 adapted at times to engage the flexible member 38, as shown by dotted lines in Figure 2. The arrangement of the film, sprocket shaft 16, crank shaft 24 and the pin 34, it will be noted, is such that they are substantially in alignment, with the crank shaft located between the pin and the sprocket shaft. The link 35 is mounted so that it extends away from the sprocket shaft.

The motor M is adapted to be controlled from a remote point by a push button 41 (see Figure 1 wherein the circuit for the motor is shown diagrammatically). It will be obvious that depression of the push button will cause the crank disk 32 and the crank pin 33 to rotate and that rotation will stop after the push button is released as soon as the momentum of the motor and the gear train has been expended. A crank pin could be connected by a link with the lever 18 in an ordinary manner and result in swinging the lever in one direction during one-half the revolution of the crank pin and in the other direction during the other revolution thereof. This would give only a half revolution in which to release the push button and permit the momentum of the parts to be expended. Accordingly I have provided the arrangement of link 35, stationary pin 34, flexible connection 38, spring 39 and extension 40 designed as illustrated for the specific purpose of enabling the desired movement of the lever 18 counter-clockwise through its extent of movement indicated by the dimension line B, while the crank disk 32 is rotated about one-fourth of a revolution as indicated by the dimension line B'. This is accomplished by the link 35 being pivoted to the crank pin and slidable on the element 34 so that from the full line position to a position past the dotted line position in Figure 3 there is substantially very little movement of the pin 37 toward or away from the sprocket shaft 16. Likewise, during the movement prior to the position shown in Figure 2 (the disk 32 rotating counter-clockwise as indicated by the arrow A), there is very little movement toward or away from the sprocket shaft. The lever 18 is close to alignment with the shaft 16 in Figure 2 or, in other words, adjacent a dead center position. Accordingly, by providing the extension pin 40, the pin will engage the flexible member 38 as shown by dotted lines in Figure 2 and tend to counteract the direct pull due to this position adjacent dead center or, in other words, tend to pull somewhat downwardly on the lever 18 as well as toward the right.

When the position indicated by dotted lines in Figure 2 is assumed the beginning of the necessary movement for rotation of the ratchet wheel 17 a quarter turn is started and continues to the position shown by full lines in Figure 3. This degree of movement is indicated by the dimension line B'.

From the full line to the dotted line position in Figure 3 after the lever 18 has engaged a stationary stop 18a, there will merely be a slight

tensioning of the spring 39 without any further movement of the lever 18. Accordingly, anywhere between the full line position of Figure 3 and the dotted line position of Figure 2, motor M can be deenergized and stopped with assurance that the particular frame of the film 14 brought into focus by the operation of the motor M will not be disturbed by the beginning of the next operation.

The user of the machine can watch the screen and as soon as a frame has been brought into position, release the button 41 and will be assured thus of proper positioning due to the extensive part C (see Figure 2) through which the mechanism can travel before starting the next ratchet rotating operation. The spring 39 eliminates the necessity of a fine adjustment on the link of the flexible element 38.

The arrangement of the parts according to the foregoing specification gives the desired result of considerable leeway in overrun after the push button 41 is released, yet insures a quick movement of the film from exposure of one frame to exposure of the next one during rotation of the disk 32.

Some changes may be made in the construction and arrangement of the parts of my transport operator without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. For use with a transport having a lever adapted when swung through a predetermined arc to operate the transport and means to retract said lever, a transport operator comprising a crank shaft spaced from said lever, a crank pin thereon and means for operatively connecting said crank pin with said lever whereby the lever can be swung through its said predetermined arc by substantially less than a half revolution of said crank shaft, comprising a stationary element spaced from said crank shaft opposite said lever, a link slidable relative to said stationary element and rotatably mounted on said crank pin and a flexible and resilient connection between said link and said lever.

2. For use with a transport having a lever adapted when swung through a predetermined arc to operate the transport and means to retract said lever, a transport operator comprising a crank pin, a crank shaft therefor and means for operatively connecting said crank pin with said lever whereby the lever can be swung through its said predetermined arc by substantially less than a half revolution of said crank shaft, comprising a stationary element spaced from said crank shaft, a link slidable relative thereto and having one end rotatably mounted on said crank pin and a resilient connection between said link and said lever.

3. For use with a transport having a lever adapted when swung through a predetermined arc to operate the transport and means to retract said lever, a transport operator comprising a crank pin, a crank shaft therefor and means for operatively connecting said crank pin with said lever, comprising a stationary element spaced from said crank shaft, a link slidable relative thereto and rotatably mounted on said crank pin and a connection between said link and said lever.

4. For use with a transport having a lever adapted when swung through a predetermined

arc to operate the transport and means to retract said lever, a transport operator comprising a crank pin, a crank shaft therefor and means for operatively connecting said crank pin with said lever whereby the lever can be swung through its predetermined arc by substantially less than a half revolution of said crank shaft, comprising a stationary element spaced from said crank shaft, a link having its intermediate portion slidable relative thereto and one end rotatably mounted on said crank pin and a flexible connection between the other end of said link and said lever.

5. For use with a transport having an operating element adapted when being moved through a predetermined distance to operate the transport and means to retract said operating element, a transport operator comprising a crank shaft and means to operate said operating element through its said predetermined distance with substantially less than a half revolution of said crank shaft, including a crank pin carried by said crank shaft, a stationary element, said crank shaft being located between said stationary element and said operating element, a link rotatable on said crank pin, said link extending past said stationary element and being slidably supported thereby and means of connection between said operating element and said link, comprising a flexible element and a resilient element, said link adjacent said crank pin having an extension to engage said flexible element during a portion of the revolution of said crank pin.

6. For use with a transport having an operating element adapted when moved through a predetermined distance to operate the transport and means to retract said operating element, a transport operator comprising a crank shaft, a crank pin carried by said crank shaft, a stationary element, said crank shaft being located between said stationary element and said operating element, a link rotatable on said crank pin, said link extending past said stationary element and being slidably supported thereby and means of connection between said operating element and the other end of said link, comprising a flexible element, said link having an extension to engage said flexible element during a portion of the revolution of said crank pin and thereby change the angle of pull of the flexible element on the operating element.

7. For use with a transport having an operating element adapted when moved through a predetermined distance to operate the transport and means to retract said operating element, a transport operator comprising a crank shaft and means to operate said operating element through said predetermined distance with substantially less than a half revolution of said crank shaft, including a crank pin carried by said crank shaft, a stationary element, a link having one end ro-

tatable on said crank pin, said link extending past said stationary element and being slidably supported thereby and means of connection between said operating element and the other end of said link.

8. For use with a transport having an operating element adapted when moved through a predetermined distance to operate the transport and means to retract said operating element, a transport operator comprising a crankshaft and means to operate said operating element through said predetermined distance with substantially less than a half revolution of said crank shaft, including a crank pin carried by said crank shaft, a stationary element, a link rotatable on said crank pin, said link extending past said stationary element and being slidably supported thereby and means of connection between said operating element and said link, including a resilient element.

9. A transport operator for a transport having a ratchet and pawl film advancing mechanism comprising a crank shaft having a crank pin and means of operative connection between said crank pin and said ratchet and pawl mechanism whereby substantially less than one-half revolution of said crank shaft operates the mechanism, said operative connection comprising a stationary element spaced from said crank shaft, said stationary element, crank shaft and the axis of said ratchet and pawl mechanism being substantially in alignment with each other with the crank shaft located between the stationary element and the pawl and ratchet mechanism, a link slidable relative to said stationary element and rotatable relative to said crank pin and a flexible connection between said ratchet and pawl mechanism and a portion of said link beyond said stationary element, said link adjacent said crank pin having an extension to engage said flexible connection and bend it out of normal aligned position during a portion of the revolution of the crank shaft.

10. A transport operator for a transport having a ratchet and pawl film advancing mechanism comprising a motor driven crank shaft having a crank pin and means of operative connection between said crank pin and said ratchet and pawl mechanism whereby substantially less than one-half revolution of said crank shaft operates the mechanism, said operative connection comprising a stationary element spaced from said crank shaft, said element, crank shaft and the axis of said ratchet and pawl mechanism being substantially in alignment with each other, a link slidable relative to said stationary element and rotatable relative to said crank pin and a connection between said ratchet and pawl mechanism and said link.

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