

Oct. 15, 1963

L. PROSIN

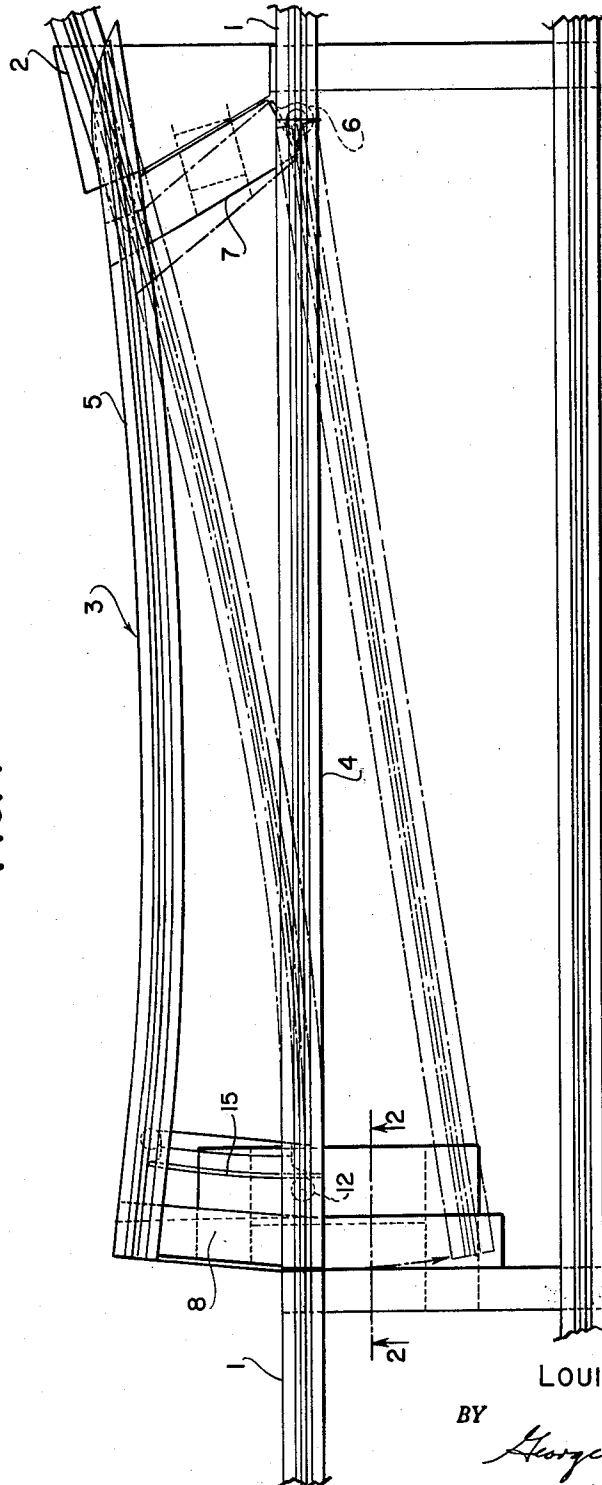
3,106,898

MONORAIL TRACK AND SWITCH

Filed Nov. 14, 1960

2 Sheets-Sheet 1

Fig. 1



INVENTOR.
LOUIS PROSIN

BY

George Sullivan
Agent

Oct. 15, 1963

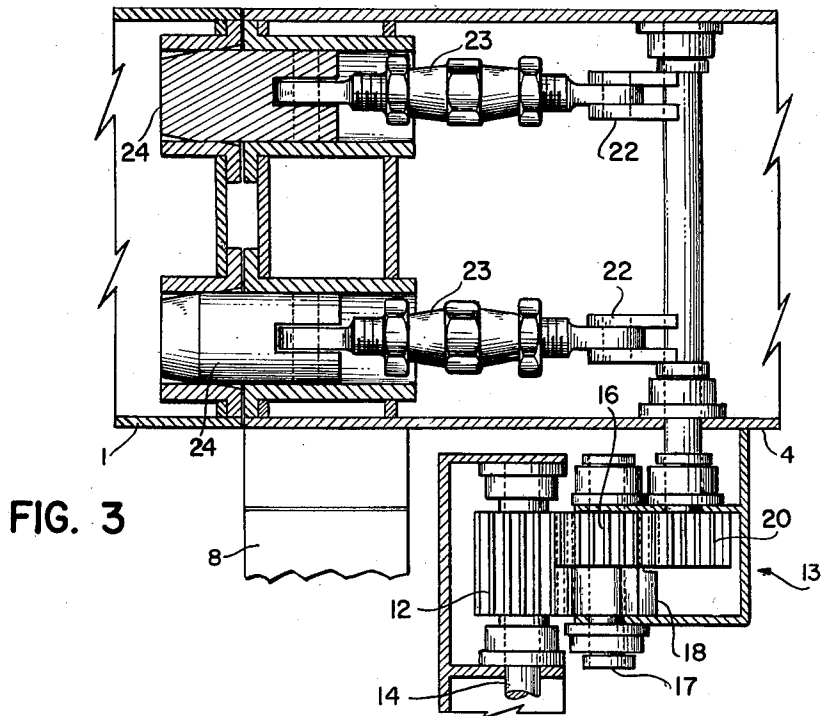
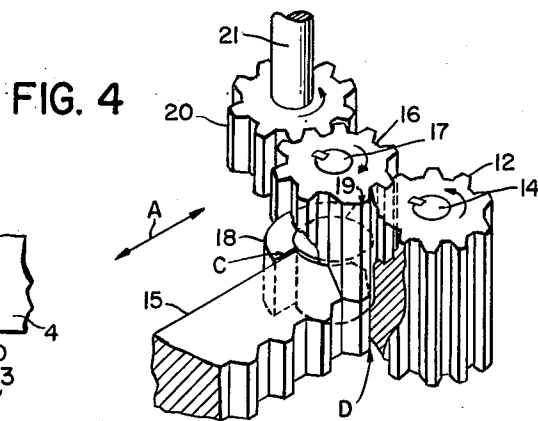
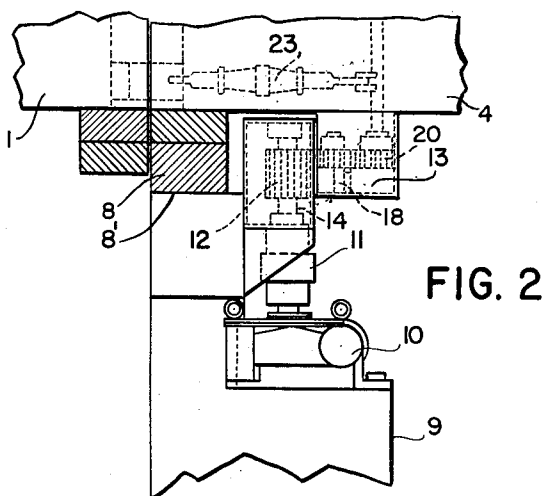
L. PROSIN

3,106,898

MONORAIL TRACK AND SWITCH

Filed Nov. 14, 1960

2 Sheets-Sheet 2



INVENTOR.
LOUIS PROSIN

BY

George J. Sullivan
Agent

1

3,106,898

MONORAIL TRACK AND SWITCH

Louis Prosin, Los Angeles, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Nov. 14, 1960, Ser. No. 69,068

1 Claim. (Cl. 104—130)

This invention relates to a switching arrangement for a monorail and more particularly to a mechanism for moving and locking a monorail switch.

From a reliability and safety viewpoint it is believed highly desirable that a single power source be utilized for operating the monorail track switching and locking mechanisms. Where separate sources are utilized there is no assurance that the track, when moved, will be firmly locked and rigidly held in one of its operative positions. The effects of a loose or free section of track are readily apparent.

It is therefore an object of this invention to provide a mechanism for providing fast and reliable switching and locking of a track section.

Another object is to provide switch and lock mechanism which is driven by the same prime mover.

These and other objects will be more apparent from the following detailed description, with reference to the drawings in which:

FIGURE 1 represents a plan view from above of a monorail switch section.

FIGURE 2 is a sectional view in the vertical taken along the line 2—2 of FIGURE 1.

FIGURE 3 is a detail view of certain elements of FIGURE 2.

FIGURE 4 is a perspective view of a portion of FIGURE 3, showing the relation of the gears and rack.

With reference to FIGURE 1, a main track 1 is coupled to a branch track 2 by means of the switch section generally designated at 3. The switch section has a straight portion 4 to couple the two main lines together and a curved portion 5 to couple the main line 1 to the branch line 2. A switching section similar to that just described is found in U.S. Patent 1,286,042 granted November 26, 1918. The switching section in the present invention pivots about the point 6 and utilizes the slide bushings 7 and 8 at either end of the section to hold the two track portions in rigid alignment and to provide a bearing surface 8¹ (FIGURE 2) for the moving section. In other words, the tracks 4 and 5 with bushings 7 and 8 comprise the section 3 and move as a single unit about the pivot point 6 from the solid line position to the dotted line position, or vice versa.

A track pier 9 supports a drive unit 10 (FIGURE 2) which may utilize either electric or hydraulic power to supply a driving force through a flexible coupling 11 to a stationary spur gear 12. The spur gear in turn drives a moving assembly 13 which is integral with the switch section. With reference to FIGURES 3 and 4, the spur gear 12 is keyed on shaft 14 which is attached to the flexible coupling, shown in FIGURE 2. Meshing with gear 12 is a rack 15 and a second spur gear 16. The rack 15 is rigidly attached between the two rails 4 and 5, as shown in FIGURE 1. The rack 15 and spur gear 16 are thus both mounted on the moving switch section 3 and move therewith.

Spur gear 16 is keyed to shaft 17 and contacts the upper portion of gear 12 as shown in FIGURE 3 and on this same shaft a spacer 18 is keyed for rotation with gear 16. Spacer 18 has a reduced portion adjacent the rack 15 and an enlarged portion which abuts the back of the rack and acts as a stop, as viewed in FIGURE 4. As shown, the gear 16 is a modified spur gear, having an irregular toothed portion 19 for the transition from rotational movement to horizontal motion, as explained here-

2

inafter. Spur gear 16 meshes with and rotates a third gear 20, which is fixed to a shaft 21. Cranks 22 are attached to and rotate with the shaft, and actuate rods 23 which in turn move pins 24 from the fully retracted position to the locked position as shown in FIGURE 3.

Now referring to FIGURE 4, gear 12 is, as seen from FIGURE 2 of the drawings, stationary on the pier 9 and is driven by the drive unit 10 and coupling 11. Mounted on the swinging track section 3, and more specifically at the left end of the straight portion 4 and curved portion 5, are the gears 16, 20, spacer-stop 18 and rack 15. Rack 15 is driven by gear 12 and quickly swings track section 3 from one position (solid line in FIGURE 1) to the other (dotted line).

In the position of the gears shown in FIGURE 4, the track section 3 has moved to the approximate position (solid line) shown in FIGURE 1, and the last tooth of the rack and irregular tooth 19 of gear 16 are aligned and both are in contact with a tooth of gear 12 along the line D. As gear 12 continues turning (in the direction of the arrow) it pushes the entire track section including rack 15, gears 16, 20 and spacer 18 to the left a slight increment and gear 12 loses contact with rack 15. At this time the rack (and track section) come to the final position, and as gear 12 continues to rotate, the locking operation begins. Gears 16, 20 rotate as shown by the arrows, resulting in a turning of the shaft 21 which actuates cranks 22 and rods 23 to which the pins 24 (FIGURE 3) are attached, and locking the track in position. Motor drive 10 stops and gear 12 comes to rest.

The reverse is true when the track section is to be moved to the other extreme. The drive unit 10 is actuated and gear 12 starts turning clockwise (opposite to arrow), and when it is recalled that rack 15 and gear 12 are not in contact at this time, no relative motion along the arrow A takes place. Gear 12 turns gears 16, 20 and spacer 18 (keyed to shaft 17 with gear 16) and thereby withdraws pin 24. Spacer-stop 18 is noted to be in the same plane as rack 15, while gear 16 lies above spacer 18. Spacer-stop 18 and gear 16 are keyed to the same shaft 17 so that as shaft 17 turns with gear 16 the spacer is also turned through the same arc and as the irregular tooth portion 19 comes into alignment with the last tooth of rack 15, the stop on spacer 18 contacts the back of rack 15 as at C. At this time the pin 24 is fully withdrawn and the gears 16, 20 stop because of the stop on spacer 18.

Continued clockwise rotation of gear 12 starts moving the track section 3, including rack 15, spacer 18 and gears 16, 20 to the right along arrow A. Since gear 16 is locked with respect to rack 15 at this instant the irregular tooth 19 on gear 16 acts as an extension of rack 15, causing the assembly to start moving. As gear 12 comes into contact with rack 15, it loses contact with gear 16 and the section quickly swings to the right.

A similar set of gears 16, 20 and associated cranks and rods are provided at the other end of the rack so that either movable track 4 or 5 may be locked in position when the rack has reached its end limits. Limit switches may be provided in the mating holes to shut off the driving power.

Thus, it is believed apparent that the switching and locking mechanism provides a fast and reliable sequence of unlocking, transfer and locking operations which are dependent on a single source of driving power with a smooth transition from rotary to horizontal motion. It is to be noted that the usually high inertia effects are avoided since the transition begins in the modified spur gear which has been set in motion during the unlocking phase.

I claim:

In combination with a stationary track and support, and a movable track and support, a monorail switch and lock mechanism comprising a power driven rotary gear

mounted on the stationary support, a rack-type gear and a second rotary gear mounted on the movable support and consecutively engaged by said driven gear, means rigidly fixing the movable support to said rack-type gear whereby said movable support is moved into and out of engagement with the stationary track and support, and means for operatively connecting a locking means to the second rotary gear to provide positive locking when the stationary and movable tracks are engaged.

5

References Cited in the file of this patent

UNITED STATES PATENTS

1,091,677	Libby	Mar. 31, 1914
1,286,042	McClure et al.	Nov. 26, 1918
2,005,133	Dunlap	June 18, 1935
2,434,523	Sheets	Jan. 13, 1948
2,922,382	Pilipczuk	Jan. 26, 1960