June 7, 1955 W. T. ROSSELL 2,709,970

SWING BOLSTER CONTROL MEANS

Filed Oct. 13, 1950 2 Sheets-Sheet 1

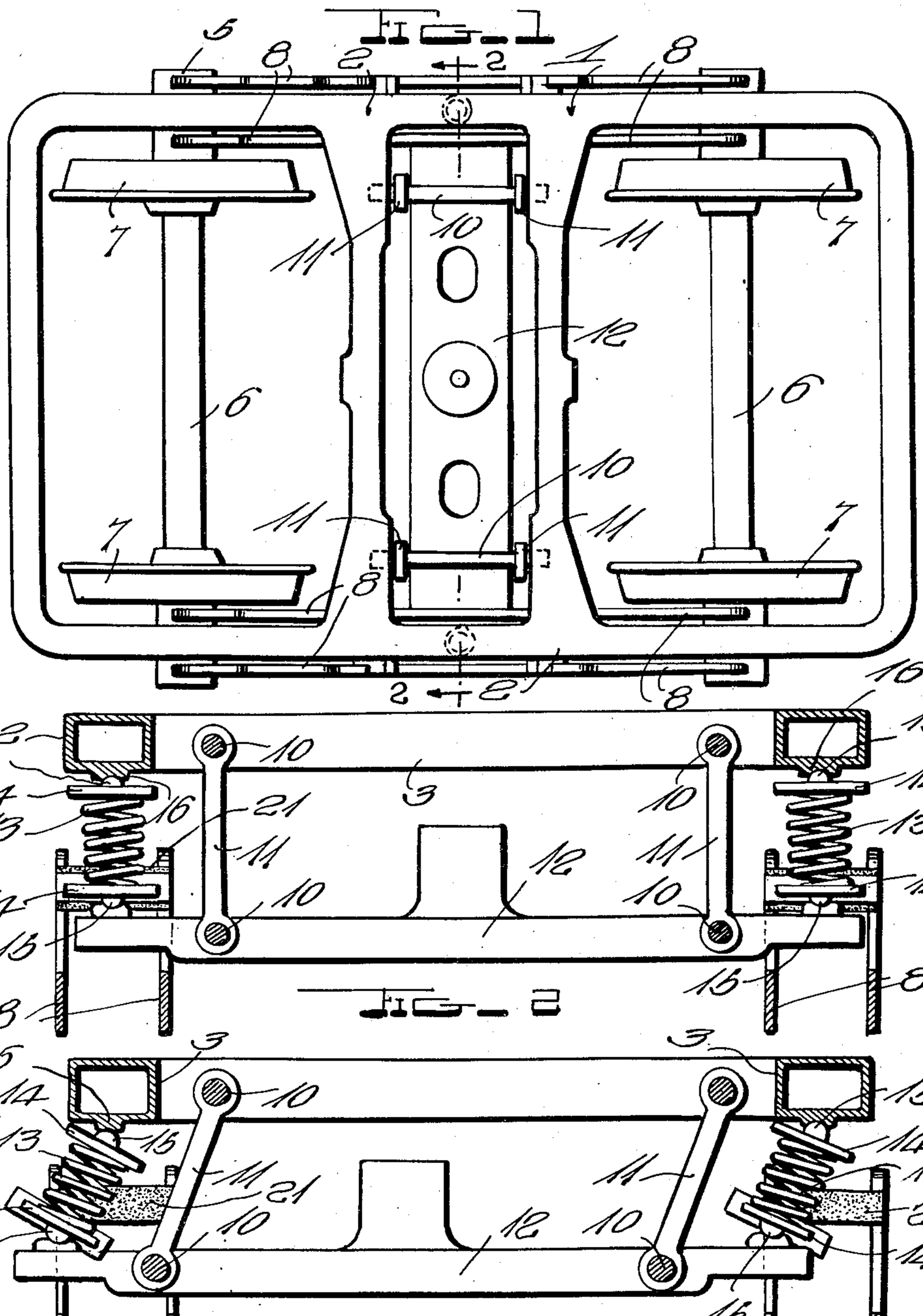

FIG. 2

FIG. 3

FIG. 4

FIG. 5

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FIG. 6

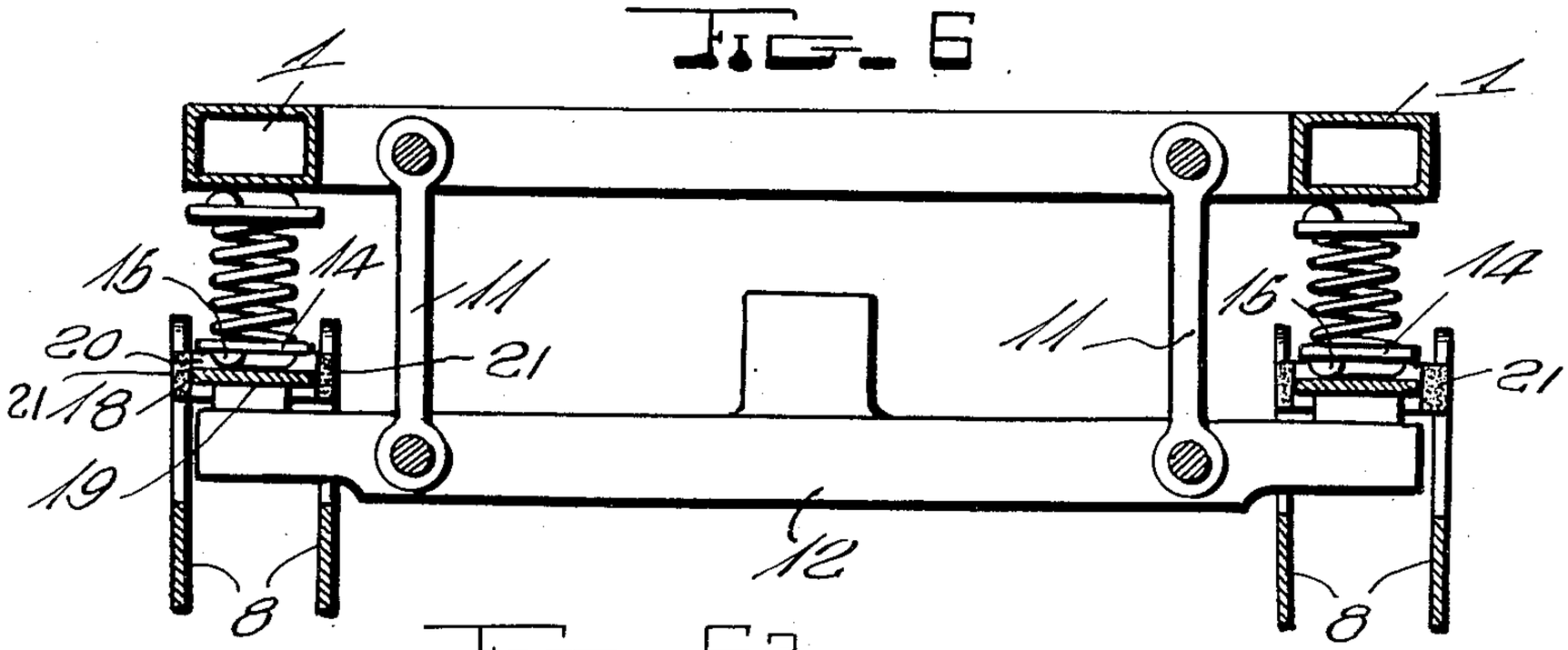


FIG. 6a

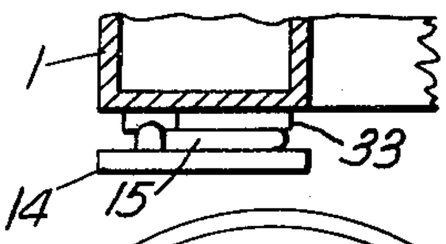
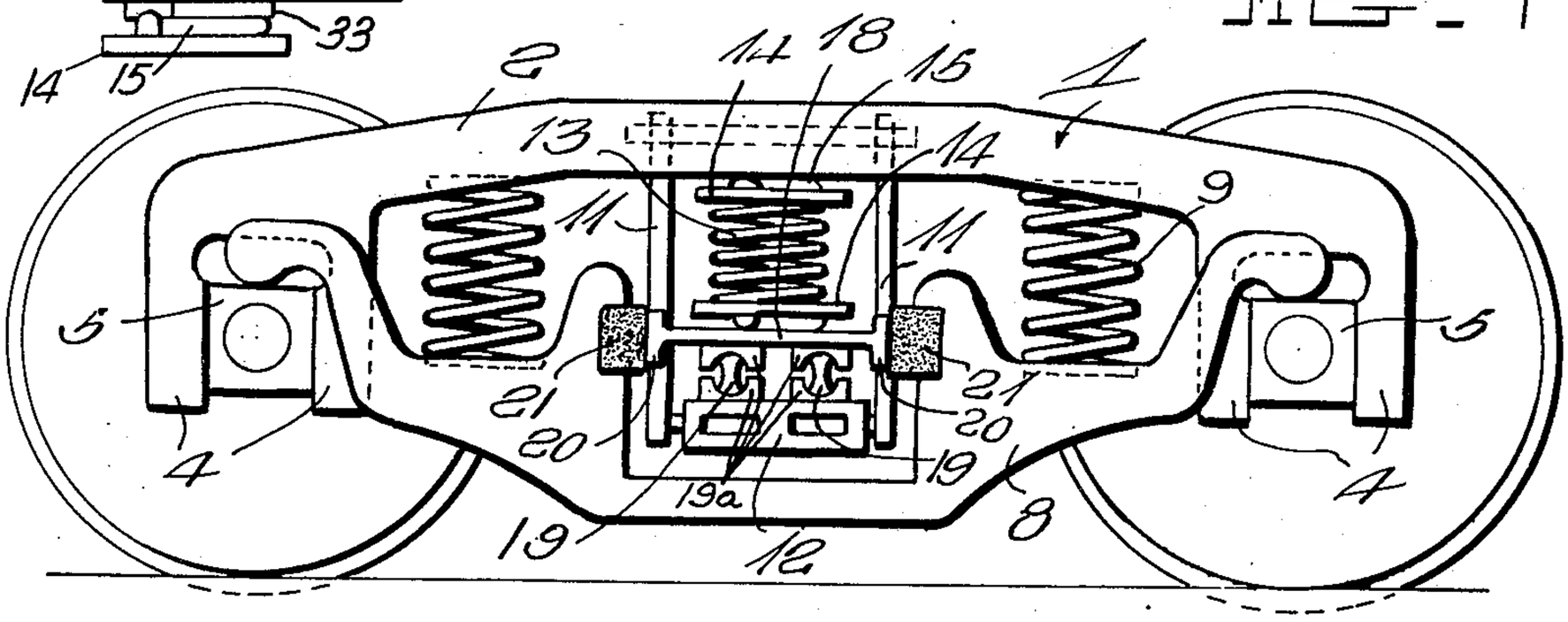


FIG. 7



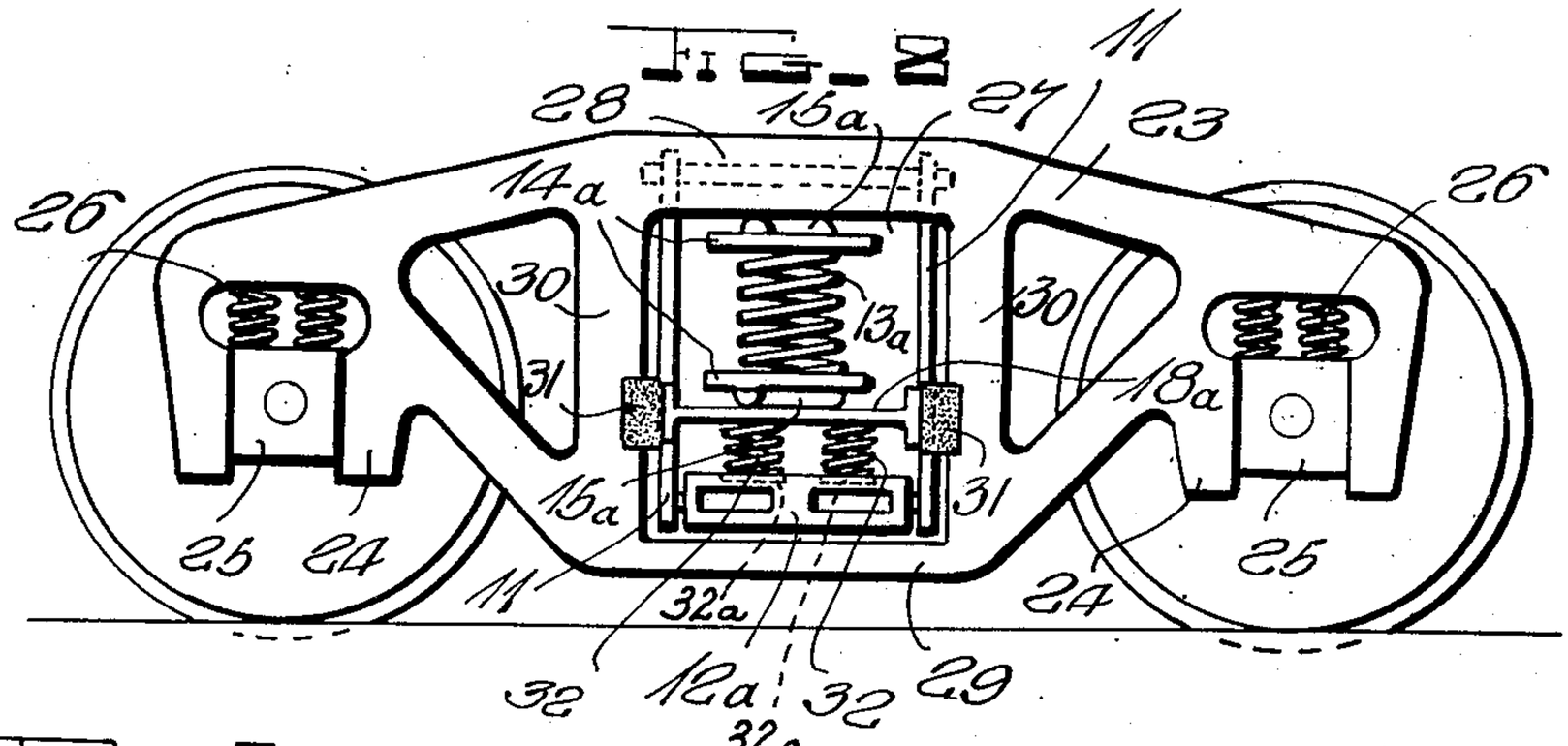
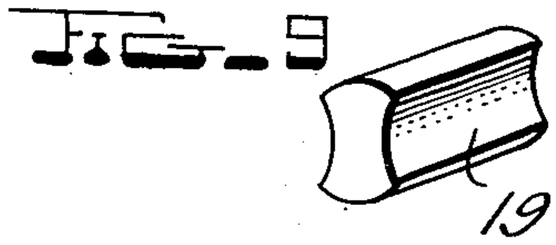


FIG. 9



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SWING BOLSTER CONTROL MEANS

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Application October 13, 1950, Serial No. 190,010

6 Claims. (Cl. 105—190)

This invention relates to rail trucks of the type employing swing hangers to support a bolster, directly, or to support a spring plank from which a bolster is supported. The object of the invention is to improve the riding quality of trucks of this type.

One of the drawbacks to the use of swing hangers is that their length is necessarily very limited with the result that the motions of the bolster can become rather violent. It is an object of this invention to provide resilient means operative in response to the swinging motions of the bolster or spring plank to add energy thereto in the direction of swinging and to store energy during reversal of the swinging movement. The apparent or effective length of the swing hangers is thereby considerably increased.

More particularly it is an object of this invention to provide a spring means operative in a manner directly analagous to that of a toggle switch and placed between the bolster or spring plank and the frame from which the bolster or spring plank is suspended whereby the swinging motions of the bolster will occur as though through the medium of substantially lengthened swing hangers.

Another disadvantage of the swing bolster has always been the difficulty of controlling its motions by snubbing. The result is that shock absorbers of various kinds, inferior to presently known improved snubbers, have been used. It may be said at this point that, in rail trucks which are subjected to severe service and which may, possibly, go for long periods of time without inspection and maintenance, friction snubbers are most reliable and most economical to maintain. Another object of the invention is to provide means for employing snubbing against a bolster supported by swing hangers.

More particularly it is an object to provide a toggle type spring assembly which will soften the swinging movements of the bolster and to utilize a portion of this spring assembly to bring about improved control of the motions of the bolster by a snubbing action.

The invention will be better understood with reference to the accompanying drawings wherein my invention is illustrated, by way of example, and in which

Figure 1 is a top elevation of a rail truck equipped with a swing bolster,

Figure 2 is a vertical transverse section taken along the line 2—2 of Figure 1 showing one portion of my invention applied thereto, with the bolster in centered position,

Figure 3 is a view of the left end of the construction of Figure 2 showing the bolster and springs in extreme swinging position to the left,

Figures 4 and 5 are detail views of two different types of spring receptacles as seen in Figures 2, 3, 5 and 6,

Figure 6 is a view similar to Figure 2 showing an additional support for the springs of Figure 2,

Figure 6*a* is an enlarged detail view showing a spring cap rocker assembly,

Figure 7 is a side elevation of a truck, having an equalizer bar with the invention of Figure 6 applied thereto,

Figure 8 is a side elevation of another type of truck showing the invention applied thereto, and

Figure 9 is a detail of a spring supporting rocker, as seen in Figures 6, 7 and 8.

Referring first to Figure 1, the numeral **1** refers to the frame of a rail truck composed of side rails **2** and integral crossmembers **3**. The side rails terminate in pedestal guides **4** between each pair of which a journal box **5** is located, as shown in Figure 7. The journal boxes house the usual journal bearings for the axles **6**, and wheels **7** are mounted on the axles for rotation therewith. Equalizer bars **8** are each supported at their ends by the journal boxes **5** on the same side of the frame **1** and support the frame therefrom through the springs **9**.

The crossmembers **3** support rods **10** from which the swing hangers **11** depend, the swing hangers pivotally supporting a bolster **12**. While the member **12** is herewith called a bolster, for purposes of this invention it may also be a swing plank in cases where a swing bolster is supported from a swing plank.

Referring now to Figure 2, it will be seen that a spring **13** is placed between each side frame **2** and each end of the bolster **12**. Each of these springs has top and bottom caps **14** each of which is provided with a projection **15** outwardly of the spring. The frame **2** has a fixed retainer **16** for the projection **15** of the upper cap and the bolster **12** has a fixed retainer **17** for the projection **15** of the lower cap.

The operation of the device thus far illustrated is as follows: The springs **13** are under substantial initial compression but are so positioned that when the bolster **12** is in its centered position they exert their combined force in the direction of the weight of the bolster and hence do not exert any force in any direction tending to displace the bolster in the direction of its swinging movement. Now suppose that the operation of the truck over rails causes the bolster to swing to the left toward the position indicated in Figure 3. The rockers or projections **15** will remain in their respective seats, the lower spring caps **14** will be displaced to the left by the bolster and the springs **13** will assume an angular position thus causing the upper caps **14** to tilt in their retainers. The springs **13**, being under strong initial compression, are now out of their position of equilibrium and the force they exert will now be divided into two components one of which still acts in the direction of gravity on the bolster while their other component acts in the direction in which the bolster is swinging. The action of the springs **13** is thus closely analagous to the action of a toggle switch. By adding a force in the direction of the swing of the bolster the operating effect is the same as though the swing hangers were made longer. The bolster **12** swings in a path normal to the side frames as required by the bearings of the swing hangers **11**.

The reason for pivoting the caps **14** is to cause the springs **13** to add a component in the direction of the bolster swing. If the caps were omitted and the springs **13** permitted to seat directly against the frame **2** and the bolster **12** then swinging of the bolster would be resisted by the torsional reaction thus set up in the springs. The operative effect would be a shortening instead of a lengthening of the swing hangers.

It may be noted that, in the device of Figures 2 and 3 the parts **15** have been designated as projections. They may be of hemispherical shape, or they may be more or less semicylindrical with their axis normal to the longitudinal axis of the bolster.

Refer now to Figure 6 in which all parts are exactly the same as in Figures 2 and 3 but in which the lower spring cap **14** has been elevated to permit insertion of a platform **18** and rockers **19**. The rocker **15** of the lower cap **14** rests on the platform **18** for rocking move-

ment with respect thereto and the platform is supported by the two rockers **19** which are supported by the bolster through the rocker seats **19***a*. The shape of the two rockers is best shown in Figure 9. These rockers **19** are positioned parallel to the longitudinal axis of the bolster and hence permit the platform to move thereon in a direction normal to the direction of swing of the bolster. This platform **18**, as best seen in Figure 7, is provided with wide edges or flanges **20** for rubbing contact with friction elements **21** fixedly secured in the equalizer bars **8**.

The operation is, now, as follows: the rockers **15** of the upper and lower spring caps **14** are now turned at an angle of the order of 45° to the direction of swing of the bolster **12**. When the bolster **12** swings the springs **13** lose their position of equilibrium, as previously described, and will exert a force now divided into one component which acts in the direction of the swing of the bolster and, because of the angled position of the rockers **15**, a second component normal to the first normal component which urges movement of the platforms. The movement of the platforms **18** is longitudinally of the truck and causes one flange **20** of each platform to contact a friction element **20** thus providing a snubbing action for the bolster. The snubbing action increases with increasing swinging movement and disappears as the bolster returns to its centered position. After a proper angle of rockers to direction of swing is selected rocker seats **33** may then be inserted between each rocker and the member with respect to which it rocks, as illustrated in Figure 6*a*. The seats **33** are firmly anchored to their adjacent truck member and may be used with both upper and lower rockers **15**, Figure 6. They may also be used with the rockers **15** in the construction shown in Figure 7 and with the rockers **15***a* in the construction shown in Figure 8.

I have thus provided means for increasing the effective or apparent length of the swing hangers together with means for snubbing the bolster without interfering, in any way, with the bearings of the swing hangers. In other words, there is no biasing or increased wear of the bearings.

The friction elements **21** have been described as being secured to the equalizer bars **8**. They can be secured, equally well, to the main frame if the frame lends itself or can be adapted to support them. In Figure 8 a different kind of truck is illustrated which employs side frames having integral pedestals **24**. Journal bearings **25** positioned between the guides of these pedestals support the side frames by coil springs **26**. The side frames are provided with large bolster openings **27** defined by the integral upper frame member **28**, a lower frame member **29** and vertical members **30**. In this case the friction elements **31** (equivalent to the friction elements **21** previously described) are secured in the vertical members **30**. The spring **13***a* has spring caps **14***a* each provided, outwardly of the spring, with a rocker **15***a*. The rocker **15***a* of the upper cap **14***a* has rocking engagement with the member **28** while the rocker **15***a* of the lower cap **14***a* has rocking engagement with a spring platform **18***a*. The platform **18***a* is supported by springs **32** which are the equivalent of the rollers **19**, the springs **32** seating in depressions **32***a* in the bolster **12***a*.

The operation of the bolster and of the snubbing device is exactly the same as has been previously described in connection with Figure 7, it being understood that the rockers **15***a* are positioned angularly of the direction of bolster swing. The springs **32** and the rollers **19** are interchangeable as modifications of each other in either type truck.

The invention has been illustrated as applied to two types of trucks. It is equally adaptable to all trucks employing swing planks and/or merely swing bolsters and is susceptible of rather wide variations in design appearance without departing from the novel principles herein

set forth. I therefore desire to be extended protection as defined by the scope of the appended claims.

I claim:

1. In a rail truck, a main frame, swing hangers pivotally attached to said frame, a bolster supported by said swing hangers, and a toggle spring device active against said bolster and reactive against said main frame, said toggle device comprising a spring pivotally mounted at each end at its point of operative contact with said bolster and said frame respectively, said spring being normal to said bolster and the frame member it contacts and hence said toggle device being in equilibrium when said bolster is in static centered position, said toggle device losing its equilibrium in response to swinging movements of said bolster and exerting a force on said bolster in its direction of swinging movement.

2. In a rail truck, a main frame, swing hangers pivotally depending from said frame, a bolster supported by said swing hangers, and a toggle device associated therewith, said toggle device comprising a pre-compressed spring having a spring cap at each end thereof, said spring caps each having rocker like projections thereon outwardly of said spring, one of said projections having rocking engagement with said frame, the projection of the other of said caps having rocking engagement with said bolster, said spring being normal to said frame and said bolster when said bolster is in centered position with respect to said frame, said spring exerting a portion of its force in the direction of swinging movement of said bolster when said bolster moves the spring cap and projection in contact therewith during swinging movements of said bolster thereby causing said cap to tilt, said spring increasing the proportionate amount of the force it exerts in the direction of movement of said bolster with increasing swinging movement of said bolster, said spring being restored to its initial compressed position upon return of said bolster to its centered position.

3. In a rail truck, a truck frame having swing hangers pivotally depending therefrom, a swing bolster supported by said swing hangers for swinging movements laterally with respect to said frame, and spring means located between said frame and said swing bolster, said spring means being under initial compression and, when said bolster is centered, exerting substantial force directly against each thereof without a component in the direction of swinging movement of said bolster, a receptacle having a rocker outwardly thereof receiving at least one end of said spring means, said bolster upon a swinging movement displacing one end of said spring means with respect to said frame thereby causing said spring means to tilt said receptacle and to exert a component of its pressure on said bolster in the direction of its swinging movement.

4. In a rail truck, a truck frame having swing hangers pivotally depending therefrom, a swing bolster supported by said swing hangers for swinging movements laterally with respect to said frame, and spring means located between said frame and said bolster, said spring means being under initial compression when said bolster is centered thereby imposing substantial pressure on said bolster and said frame without a component influencing initiation of swinging movement of said bolster, and a spring receptacle top and bottom of said spring means each having a rocker outwardly thereof for pivotal action with said spring means, said bolster upon swinging movement displacing one end of said spring means with respect to the other thereof thereby tilting said spring means on its rockers, said spring means upon tilting exerting a portion of its compressive force in the direction of the swinging movement of said bolster.

5. In a rail truck, a truck frame having swing hangers pivotally depending thereof, a bolster supported by said hangers for swinging movement laterally of said frame, a friction element, movable means supporting said friction element on said bolster for movement transversely

thereof, a toggle spring device between said frame and said bolster supported by said element, said device including a rocker for said toggle spring device located between the spring of said device and said element, said rocker being angularly disposed with respect to the direction of swinging of said bolster, said toggle spring rocking in response to swinging movement of said bolster, said rocker upon rocking with said spring causing said spring to exert a component of its force longitudinally of the truck thereby causing said movable means to move said friction element in a direction normal to the path of swing of said bolster, and a second friction element carried by said truck frame against which the first named friction element is moved.

6. In a rail truck, a truck frame having swing hangers pivotally depending therefrom, a bolster supported by said hangers for swinging movements laterally of said frame, friction pads carried by said frame adjacent said bolster, a spring toggle device between said frame and said bolster comprising a spring having a spring cap at each end, the upper one of said caps being pivotally mounted with respect to a member of said frame and positioned normal to said member and said bolster when said bolster is centered whereby said toggle device is in

equilibrium when said bolster is centered with respect to said frame, the spring of said toggle device exerting a force in the direction of movement of said bolster in response to such movement, a friction element between said toggle device and said bolster mounted for movement transversely of said bolster, and a rocker supporting the lower cap of said toggle device on said friction plate, said rocker being angularly disposed with respect to the direction of swinging movement of said bolster whereby the force exerted by said toggle spring is angularly directed with respect to movement of said bolster, said bolster being urged in the direction of increased swinging movement by one component of said force, said friction plate being urged against said friction pads by the other component of said force.

References Cited in the file of this patent

UNITED STATES PATENTS

1,101,955	Pflager	June 30, 1914
2,205,478	Janeway	June 25, 1940
2,242,190	Blomberg et al.	May 13, 1941
2,466,088	Endsley	Apr. 5, 1949