Oct. 25, 1949. T. H. AINSWORTH 2,485,801

RAILWAY TRUCK STRUCTURE

Filed April 18, 1945 2 Sheets-Sheet 1

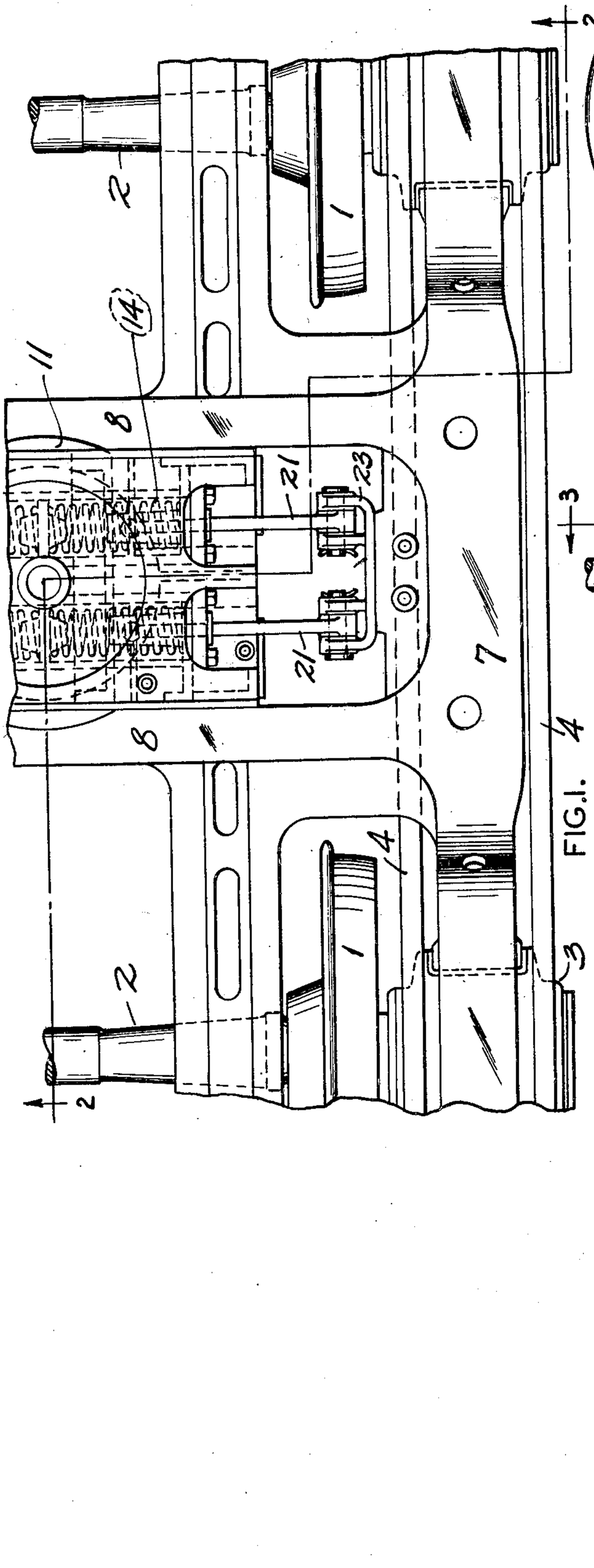

FIG. 1.

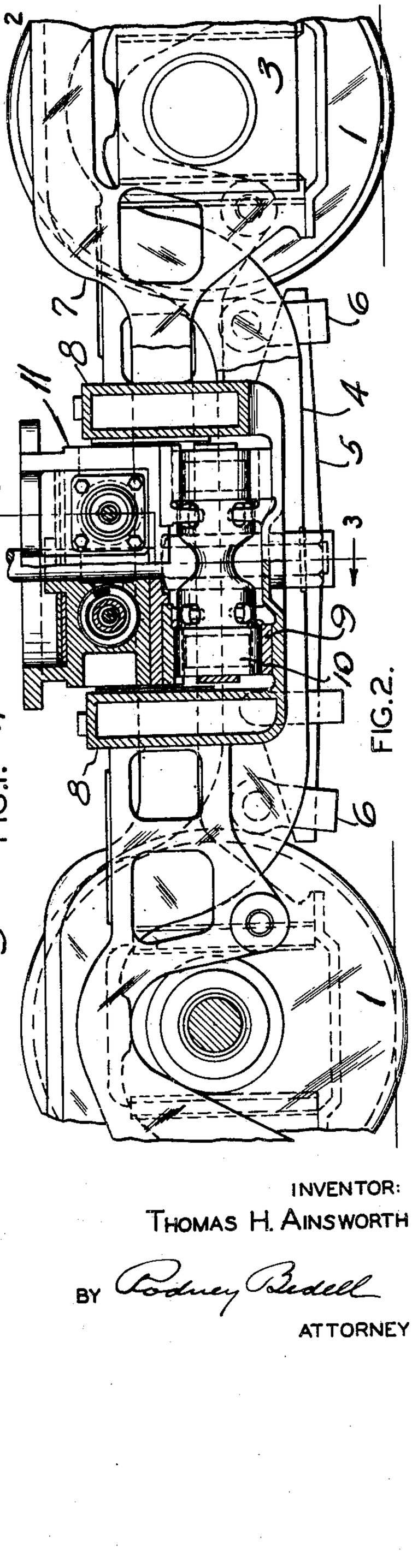

FIG. 2.

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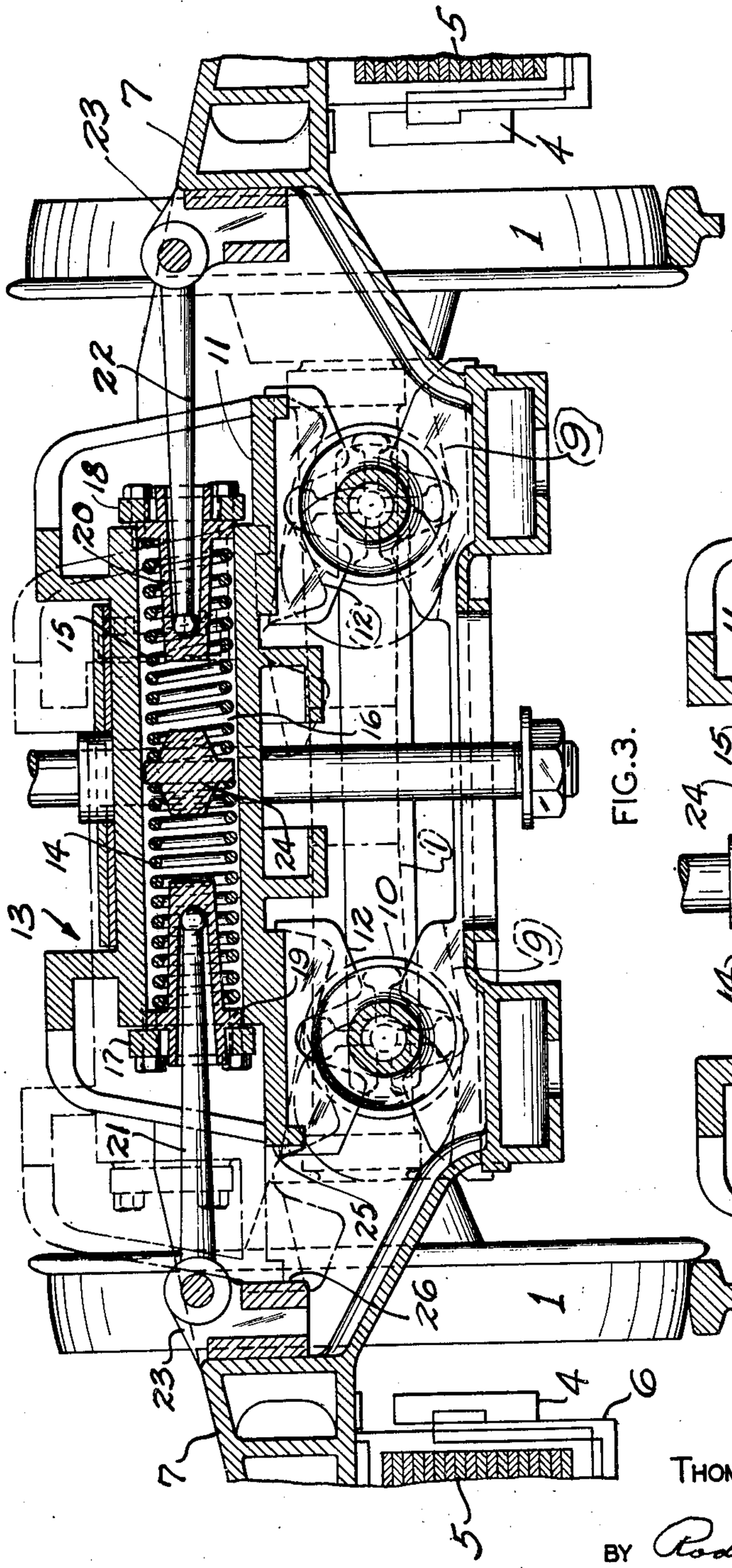

FIG. 3.

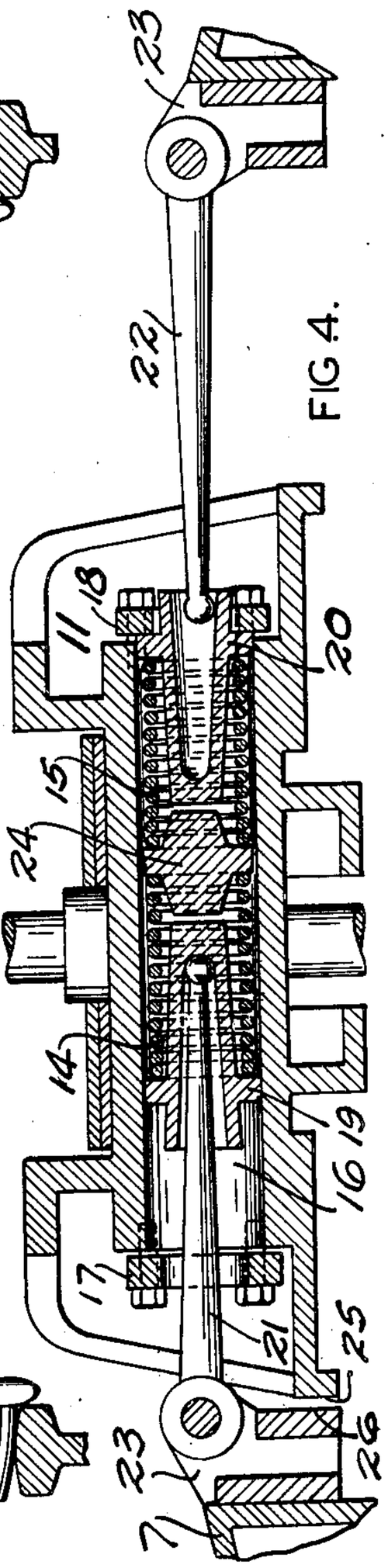

FIG. 4.

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RAILWAY TRUCK STRUCTURE

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8 Claims. (Cl. 105—186)

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The invention relates to railway rolling stock, and more particularly to truck structure such as is generally used under the forward end of a locomotive, and the invention consists in a novel form of centering device for the truck bolster center plate and in the associated bolster and other truck parts.

For the guiding of the locomotive, it has been found from experience that it is desirable to install a device between the frame and bolster which provides resistance to the lateral displacement of the bolster. To obtain this resistance with the swing link type, the rocker type or the roller type centering device, particularly when there is a large amount of lateral displacement, a rise in the bolster is obtained which is a factor of the lateral resistance, and it has been found that the lifting of the front end of the locomotive frame and super structure due to this rise in center plate takes some load off of the locomotive driving wheels which, in turn, is the reason for some locomotives being slippery on curves.

One object of the present invention is to obtain the desired lateral resistance to the transverse movement of the center plate and its load and, at the same time, avoid undue rise of the bolster, which is objectionable for the reason indicated above. A mechanism for this same general purpose involving spring resistance is described in J. C. Maris Patent No. 2,263,442, issued November 18, 1941.

Another object is to reduce the cost of a mechanism of this general type by providing a spring unit at the center of the truck, thus reducing the number of parts involved.

Another object is to minimize the extension of the centering device mechanism transversely of the truck, thus avoiding undue width of frame and possible difficulty because of clearance limits.

Another object is to make possible the application of the centering device to truck frames and equalizers which are in general use.

These and other objects are attained by the structure illustrated in the accompanying drawings, in which—

Figure 1 is a top view of the central portion of one longitudinal half of a four-wheel truck embodying the invention.

Figure 2 is in part a side elevation and in part a vertical longitudinal section of the structure shown in Figure 1 and is taken approximately on the line 2—2 of Figure 1.

Figure 3 is a vertical transverse section taken on the line 3—3 of Figure 2.

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Figure 4 is a detail section corresponding to a portion of the structure shown in Figure 3 but showing the center plate moved laterally to an extreme position.

The truck illustrated in the drawings includes the usual wheels 1, axles 2, journal boxes 3, equalizers 4 and leaf spring 5 disposed longitudinally of the truck and supported from equalizers 4 by hangers 6. The truck frame includes wheel pieces 7, resting on springs 5, and transverse transoms 8 the lower portions of which provide or mount seats 9 for rollers 10 of a gravity centering device.

A bolster 11 has depending seats 12 resting on rollers 10 and has a center plate 13, or center plate fit, adapted to receive the superstructure center plate (not shown) in the usual manner. Seats 9 and 12 are inclined oppositely to each other and in opposite directions from the normal centered position of the bolster so that as the bolster moves transversely of the truck from its normal position, it will be raised and the lifting of the weight of the superstructure will resist the lateral movement and tend to return the bolster to its normal centered position when the force causing the lateral movement is expended. However, the inclination of seats 9 and 12 and the resistance to the relative lateral movement of the bolster and frame afforded by these parts are best supplemented by coil springs 14 and 15 which are received in a passageway 16 in the body of the bolster elongated transversely of the truck and closed at the ends by removable caps 17, 18 forming stops for the outer ends of spring seats 19 and 20. Each seat 19, 20 has an elongated portion extending inwardly of the spring coil.

Pairs of strut-like members 21, 21 and 22, 22 are pivoted to brackets 23 on the frame wheel pieces 7 and extend inwardly therefrom and are received in seats 19 and 20. A follower 24 is positioned between the inner ends of springs 14, 15 and normally opposes but is spaced from the inner ends of seats 19, 20.

If the bolster moves transversely of the truck from its normal central position shown in full lines in Figure 3 to the position shown in dot and dash lines, cap 18 will move seat 20, spring 15 and follower 24 to the left (see Figure 4) and springs 14 and 15 will be compressed throughout this movement. Such movement will be positively limited by the outer edge 25 of the bolster striking the inner face of member 26 on wheel piece 7. However, the amount of lateral movement of the bolster relative to the truck frame is governed by the longitudinal dimensions of the locomotive and the particular curve in the track on which the

locomotive is travelling. When the force tending to produce the lateral displacement of the bolster relative to the frame has been expended, gravity and the thrust of springs 14, 15 will return the bolster to its normal central position. Obviously, if the bolster is moved in the opposite direction, the right hand strut 22 will function to prevent the right hand movement of seat 20 and the left hand seat 19 will be moved to the right with the parts moving similarly but oppositely to the positions shown in Figure 4.

Strut like members 21, 22 preferably extend inwardly of associated seats 19, 20 a sufficient distance and are of sufficient length so that they do not withdraw from seats 19 or 20 as the seats move laterally of the truck with the bolster away from member 21 or 22 to their maximum displacement when an outer edge 25 of the bolster strikes an inner face of member 26. Also the arrangement of strut like members 21, 22 and associated seats 19, 20 preferably is such that they cooperate with springs 14, 15 and caps 17, 18 to effect a centering force on bolster 11 irrespective of the bolster position.

It can readily be seen that by using the combination of inclined roller bearings and springs to provide lateral resistance between the bolster and truck frame, the degree of inclination of the roller bearing surfaces can be made less than that required if no springs were used and a predetermined amount of lateral resistance is to be provided for. The steeper the incline of the roller bearings for a given amount of lateral displacement, the greater will be the lateral resistance and the amount of rise or lift of the locomotive super structure.

All of the spring structure, as well as the roller structure, is positioned between the frame side members and does not require any more space than that now required for the usual rocker centering device. All of the spring structure functions in resisting lateral movement of the bolster and in returning the bolster to its normal central position, irrespective of the direction in which the bolster moving force is applied. The usual equalizers may be utilized and the only change required in the usual truck frame is the addition of brackets 23 which may be formed integrally with the frame or formed separately and welded or otherwise secured to the frame.

The details of the structure may be varied substantially without departing from the spirit of the invention, and the exclusive use of those modifications coming within the scope of the claims is contemplated.

What is claimed is:

1. In a railway truck, a truck frame, a bolster supported from the frame and movable relative thereto vertically and transversely of the truck from a normal position and including a center plate portion, a spring structure beneath said center plate portion, and movable vertically therewith, opposing seats on said bolster for said spring structure spaced apart transversely of the truck and movable on the bolster transversely of the truck, a link member associated with each side of the truck frame and the adjacent spring seat and limiting the movement of the associated seat towards the associated side of the truck, said link member being pivoted on the truck frame and spring seat to accommodate their relative vertical movement, and means on the bolster for moving said spring seat with the bolster when the bolster moves away from the adjacent side of the truck, whereby the spring structure is distorted during transverse movements of the bolster in opposite directions from its normal central position and yieldingly thrusts the bolster towards said position.

2. In a railway truck, a truck frame, a bolster supported from the frame and movable relative thereto transversely of the truck from a normal central position and including a center plate portion, coil springs arranged end to end transversely of the truck beneath said center plate portion, a follower between the inner ends of said springs, a seat for the outer end of each spring slidable in said passage and including a sleeve-like part extending inwardly of the spring coil and terminating in a portion normally spaced from and opposing said follower, and a strut-like member at each side of the truck having one end secured to the adjacent side of the truck frame and having its other end slidable in the sleeve-like part of the adjacent spring seat and adapted to engage the inner end of the same to limit the movement of the seat towards the adjacent side of the truck.

3. In a railway truck, a truck frame, a bolster supported from the frame and movable relative thereto transversely of the truck from a normal central position and including a center plate portion and a passage beneath said center plate portion elongated transversely of the truck, coil springs arranged end to end in said passage, a follower between the inner ends of said springs, a seat for the outer end of each of said springs slidable in said passage and having a sleeve-like extension within the spring coil with its inner end closed and opposing, but normally spaced from, said follower, strut-like rods pivoted to the sides of the frame and each extending from the frame into the adjacent spring seat sleeve and limiting the movement of the seat towards the adjacent side of the frame, and a member at each side of the bolster for engaging the corresponding spring seat to move it with the bolster towards the opposite side of the truck.

4. In a railway vehicle truck, a truck frame, a bolster, elements carried by and movable laterally of the truck frame and supporting the bolster for relative movement transversely of the truck, the bolster having a center plate portion including an upright passage for a center pin by which the truck is connected to a vehicle body carried by the truck, passageways in said bolster extending transversely from side to side of the truck at opposite sides of said upright passage above said elements and below said center plate, coil springs in each of said transversely extending passageways, said passageways closely surrounding said springs from end to end and means associated with the sides of the truck frame and with the bolster and receivable in said passageways and engaging said springs to distort the springs when the bolster is moved transversely of the truck and yieldingly thrusting the bolster towards a normal central position intermediate the sides of the frame.

5. A railway truck bolster unit comprising an upwardly facing center plate portion, there being a passage extending horizontally through the bolster beneath said portion and forming an elongated housing for a coil spring mounted in said housing, seats on the outer ends of said springs, caps holding said seats to the bolster, said springs being accessible through the ends of the passage, there being downwardly facing bearings beneath said bolster for engaging lateral motion bolster support elements.

6. A railway truck bolster having an upwardly

facing center plate portion and a downwardly facing portion for engaging rolling supporting elements, there being a passage extending horizontally through the bolster between said portions and forming an elongated housing for a coil spring accessible through the ends of the passage.

7. In a railway truck, a truck frame, a bolster supported from the frame and movable relative thereto vertically and transversely of the truck from a normal position and having a center plate portion, a laterally yielding spring structure beneath said center plate portion and movable vertically therewith, seats on said bolster for said spring structure spaced apart transversely of the truck and movable on the bolster transversely of the truck, a link member pivotally associated with each side of the truck frame and extending into the adjacent spring seat and limiting the movement of the associated seat towards the adjacent side of the truck, and means on the bolster for engaging said spring seat when the bolster moves away from the adjacent side of the truck, whereby the spring structure is distorted during transverse movement of the bolster in opposite directions from its normal central position and yieldingly thrusts the bolster towards said position.

8. In a railway truck, a truck frame, a bolster supported from the frame and movable relative thereto vertically and transversely of the truck from a normal position, a laterally yielding spring structure movable vertically therewith,

seats on said bolster for said spring structure spaced apart transversely of the truck and movable on the bolster transversely of the truck, a link member associated for relative movement with each side of the truck frame and extending into the adjacent spring seat and limiting movement of the associated seat towards the adjacent side of the truck, and means on the bolster for engaging said spring seat when the bolster moves away from the adjacent side of the truck, whereby the spring structure is distorted during transverse movement of the bolster in opposite directions from its normal central position and yieldingly urges the bolster towards said position, said members extending inwardly of the associated seat a sufficient distance and being of sufficient length so that portions of said members are received within said seats irrespective of the bolster position.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
639,273	Nicewaner	Dec. 19, 1899
948,067	Taylor	Feb. 1, 1910
1,632,077	Jablow	June 14, 1927
1,646,433	Tomlinson	Oct. 25, 1927
1,769,359	Phillips	July 1, 1930
2,263,442	Maris	Nov. 18, 1941