Jan. 6, 1953 J. C. SETTLES 2,624,291

RAILWAY TRUCK DAMPING DEVICE

Filed June 25, 1946 7 Sheets-Sheet 1

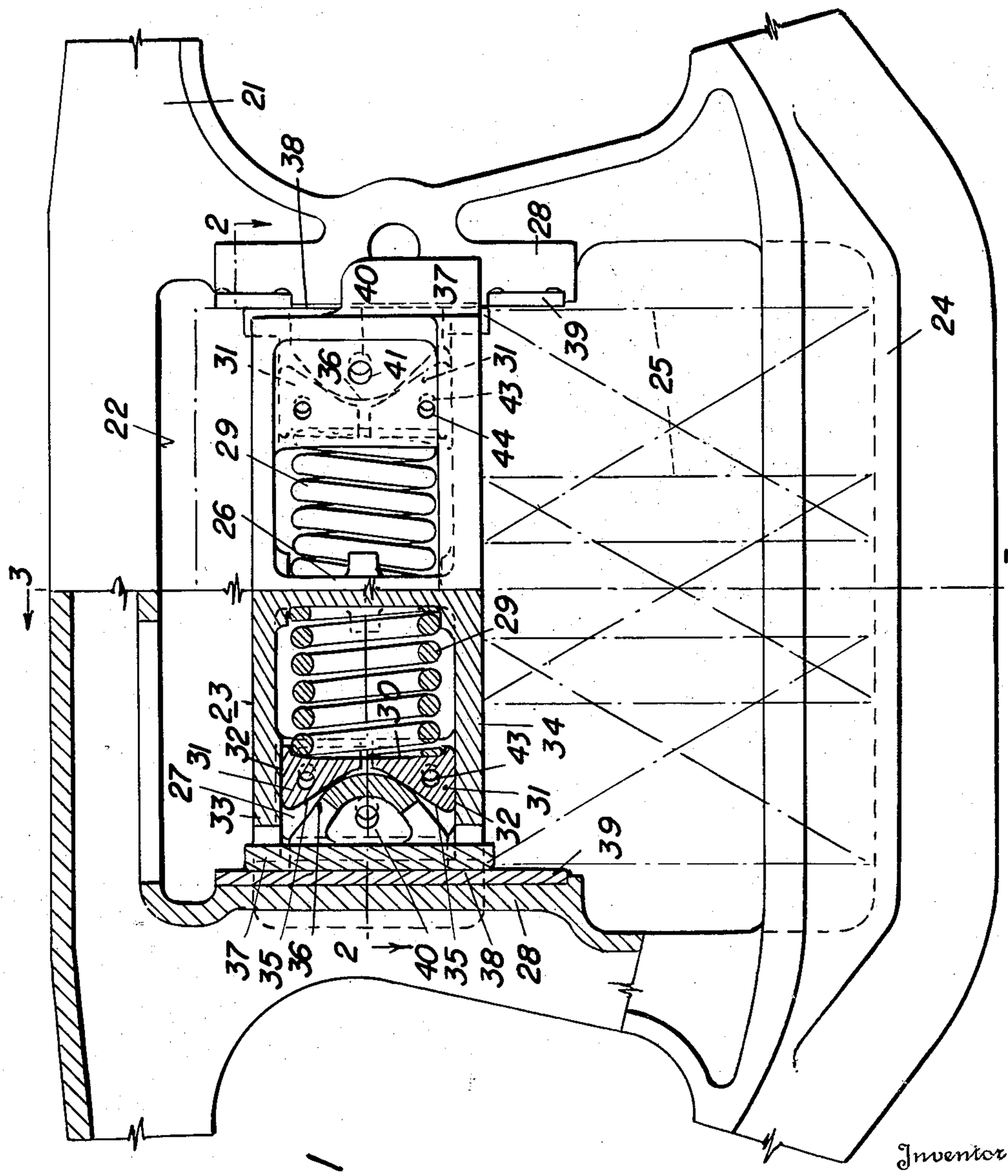

FIG. 1

Inventor

JAMES C. SETTLES.

By Barry + Cyr Attorneys

Jan. 6, 1953 J. C. SETTLES 2,624,291

RAILWAY TRUCK DAMPING DEVICE

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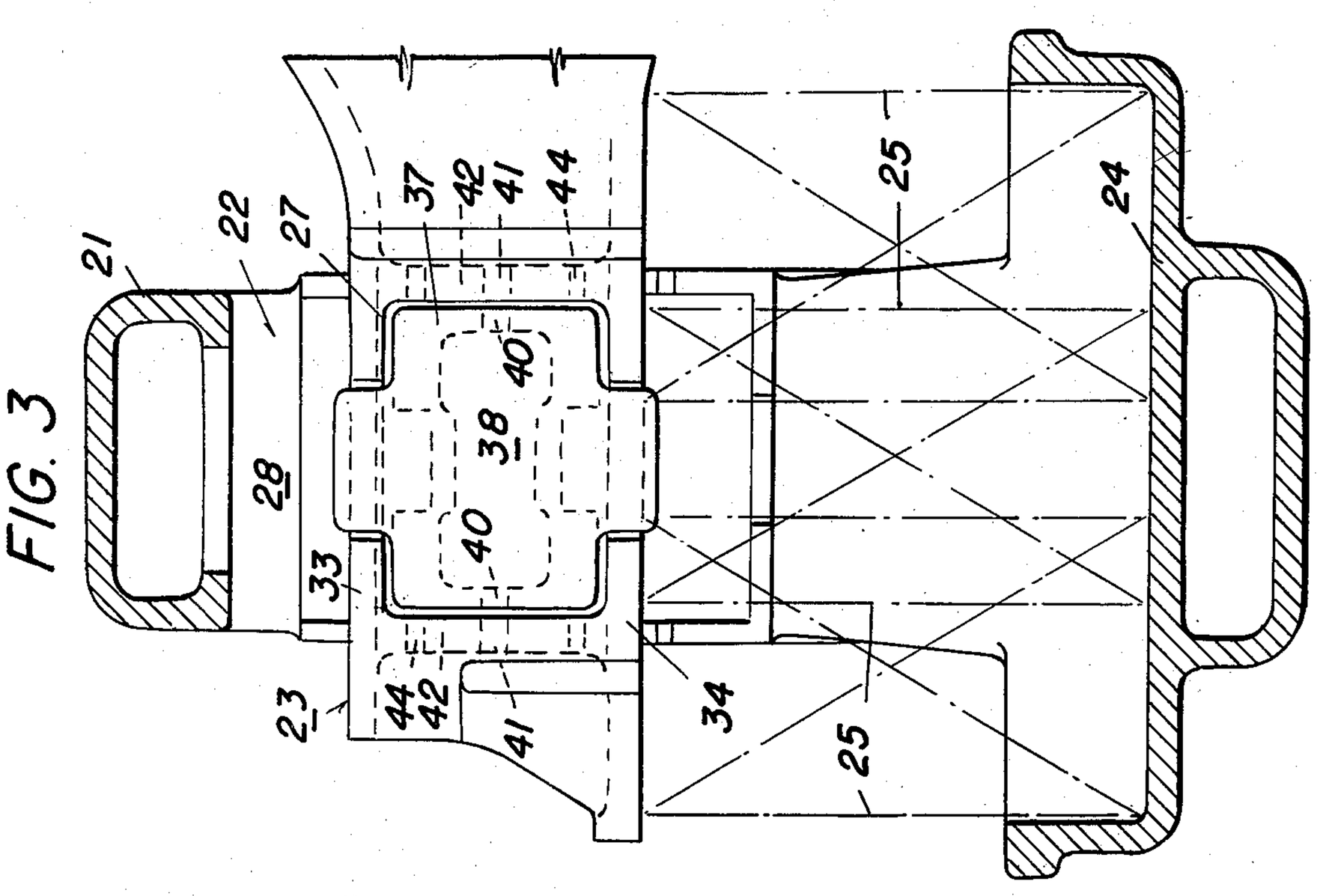

FIG. 3

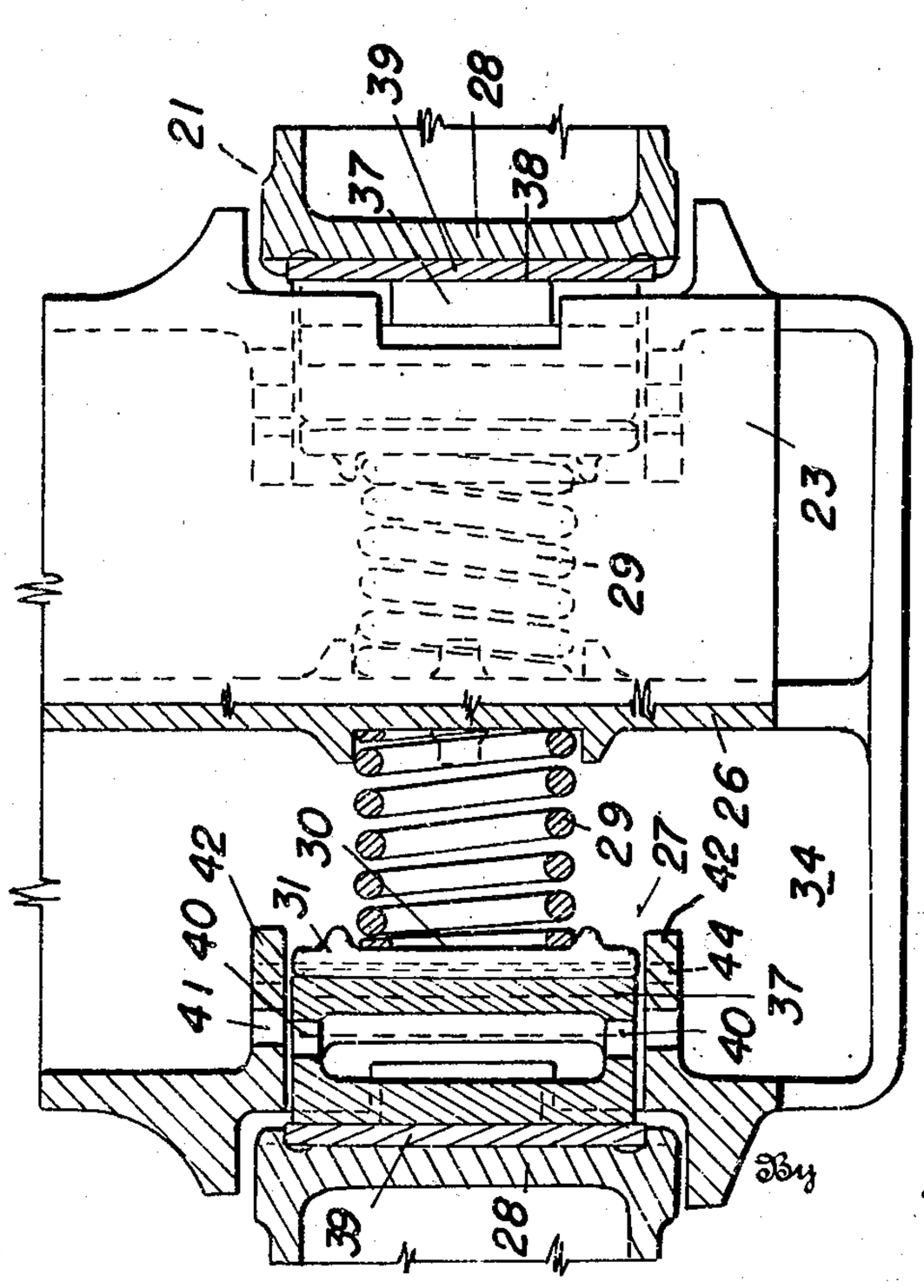

FIG. 2

Inventor

JAMES C. SETTLES.

By Barry & Cyr

Attorneys

Jan. 6, 1953 J. C. SETTLES 2,624,291

RAILWAY TRUCK DAMPING DEVICE

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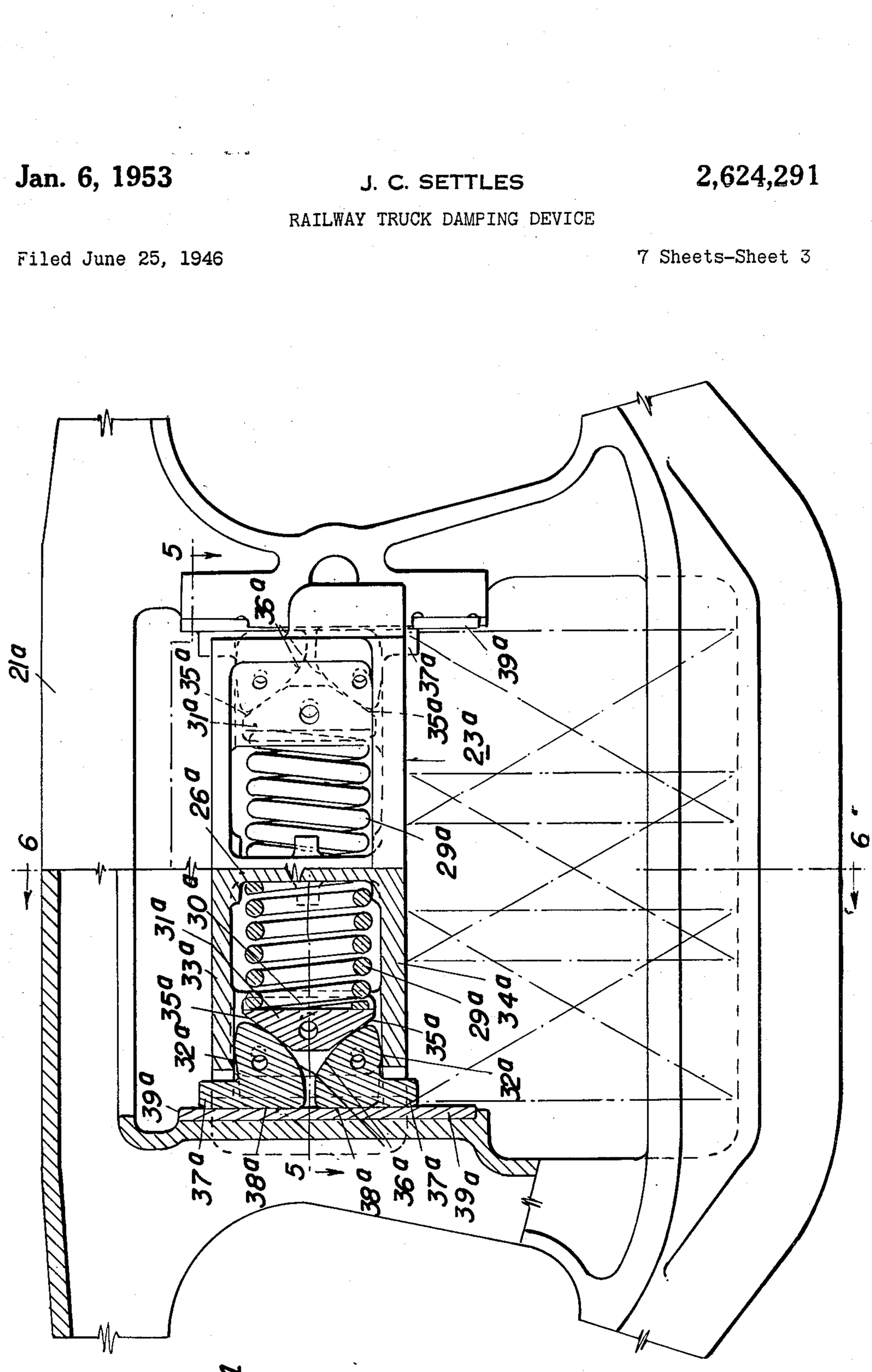

FIG. 4

Inventor

JAMES C. SETTLES.

By Barry & Cyr

Attorneys

Jan. 6, 1953 J. C. SETTLES 2,624,291

RAILWAY TRUCK DAMPING DEVICE

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FIG. 6

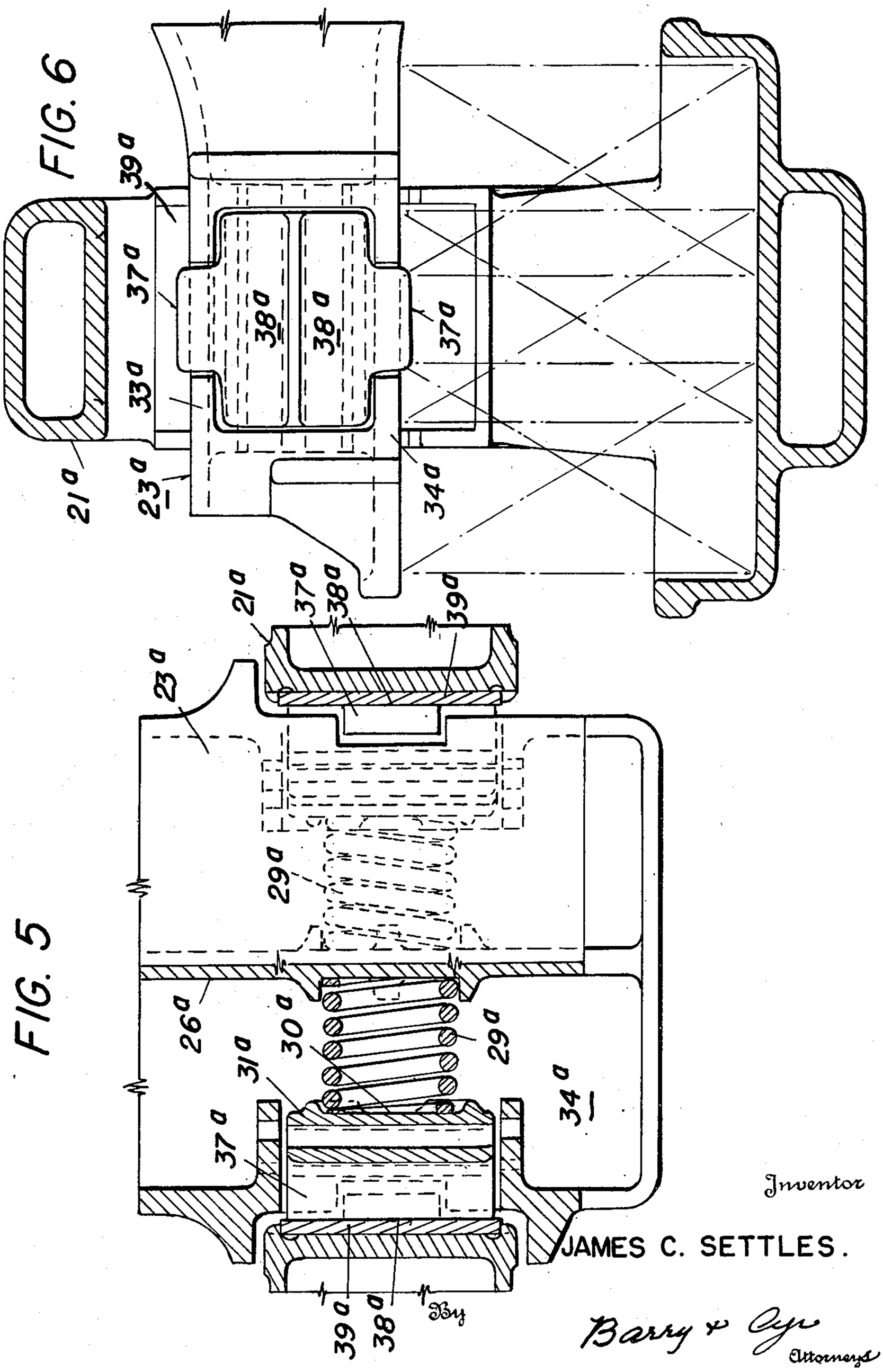

FIG. 5

Inventor

JAMES C. SETTLES.

By

Barry & Cyr

Attorneys

Jan. 6, 1953 J. C. SETTLES 2,624,291

RAILWAY TRUCK DAMPING DEVICE

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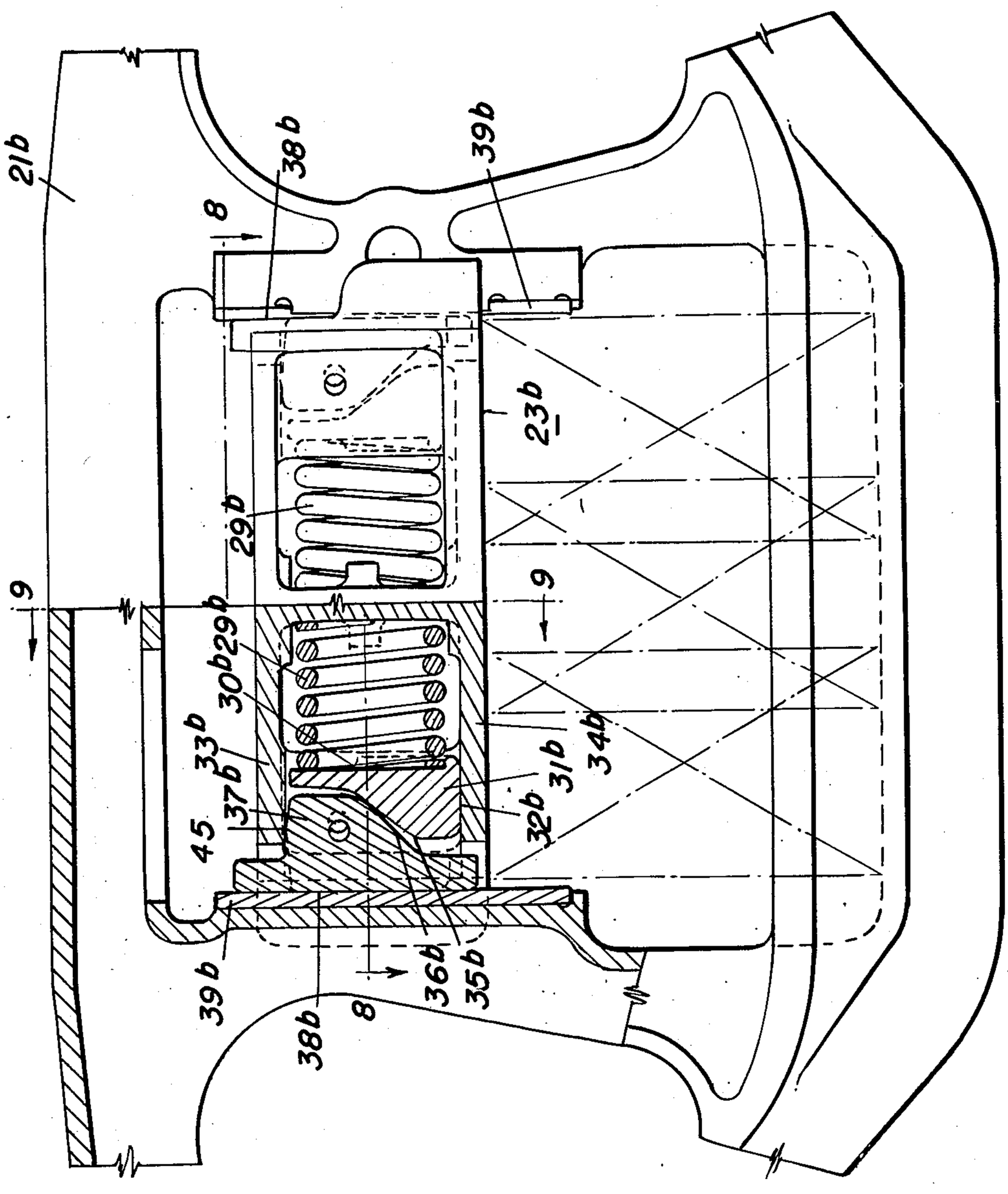

FIG. 7

Inventor

JAMES C. SETTLES.

By Barry & Cyr

Attorneys

Jan. 6, 1953 J. C. SETTLES 2,624,291

RAILWAY TRUCK DAMPING DEVICE

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FIG. 8

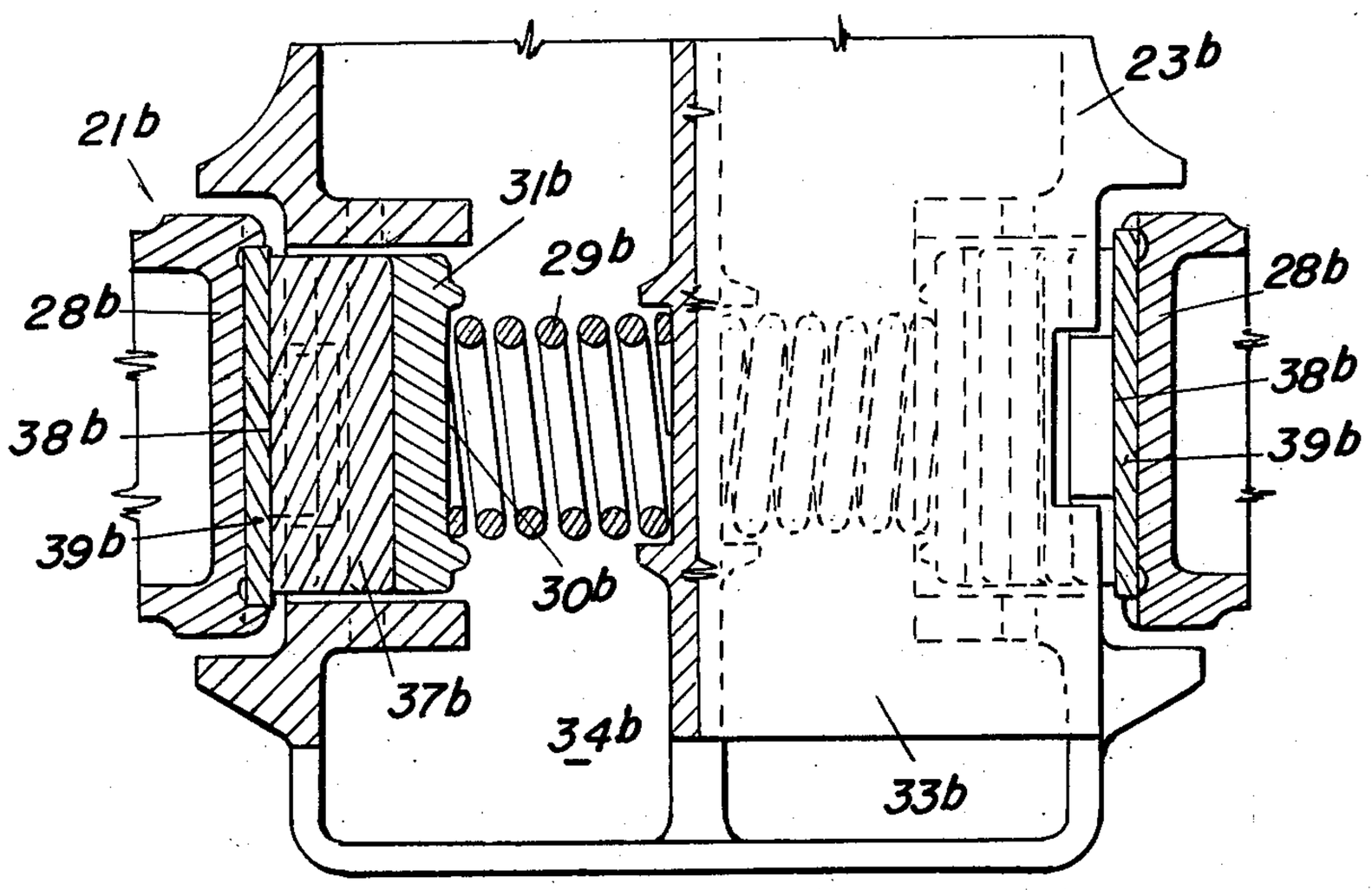
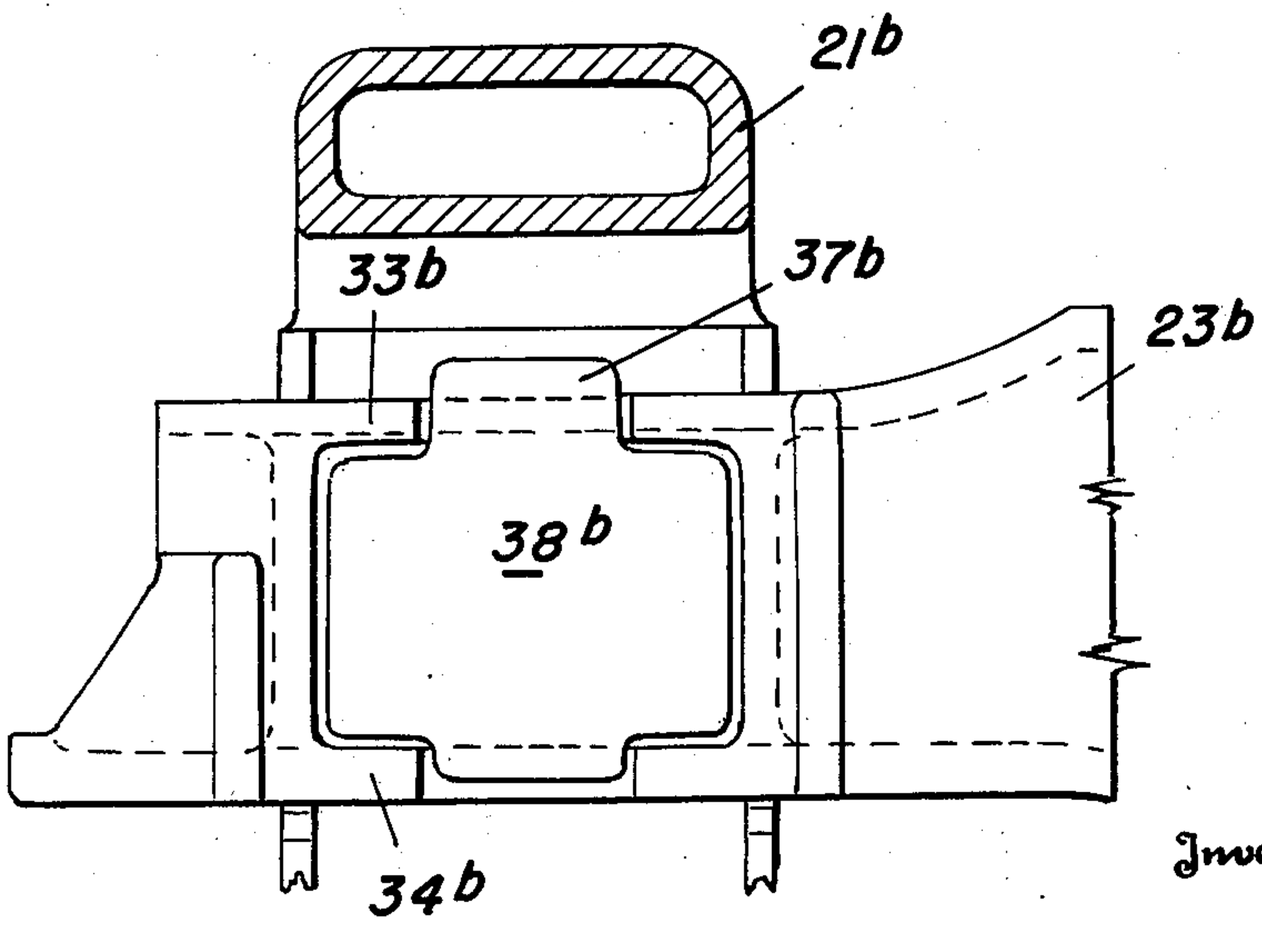


FIG. 9



Inventor

JAMES C. SETTLES.

By Barry & Eyre

Attorneys

Jan. 6, 1953 J. C. SETTLES 2,624,291

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FIG. 10

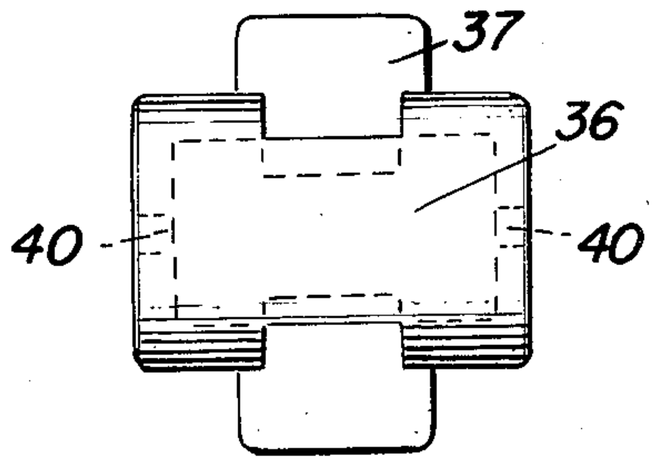


FIG. 11

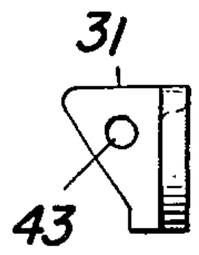


FIG. 12

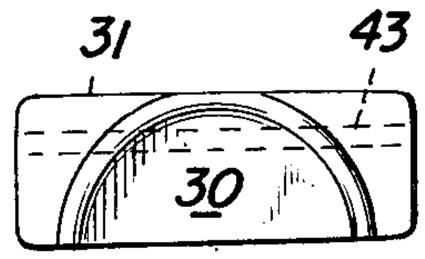


FIG. 13

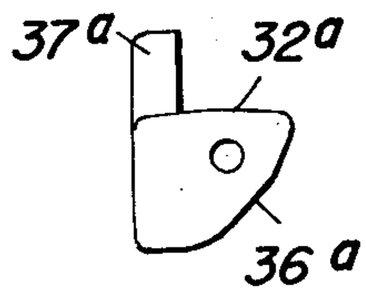


FIG. 14

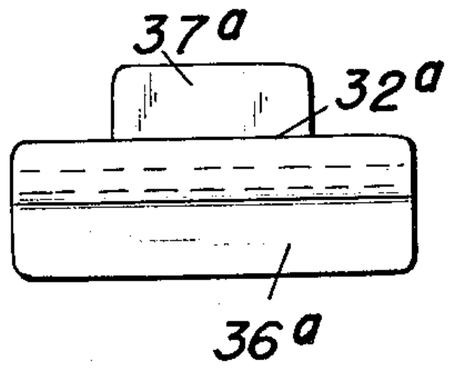


FIG. 15

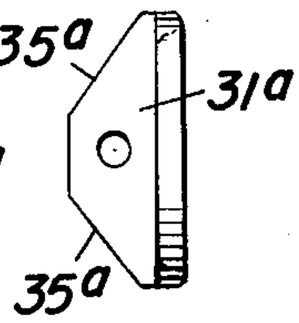


FIG. 16

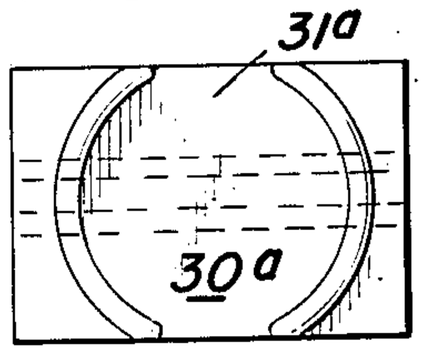


FIG. 17

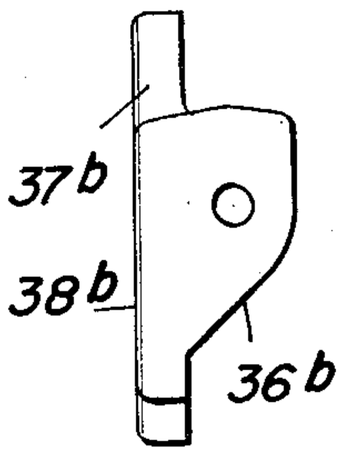


FIG. 18

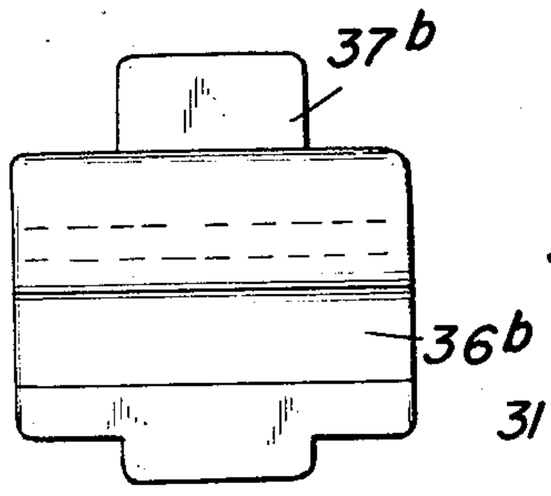


FIG. 19

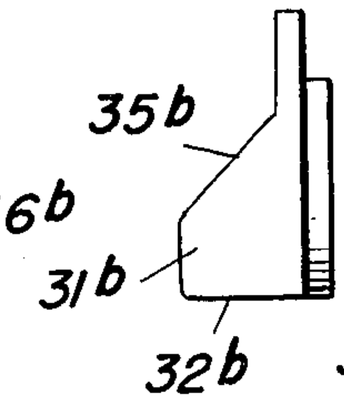
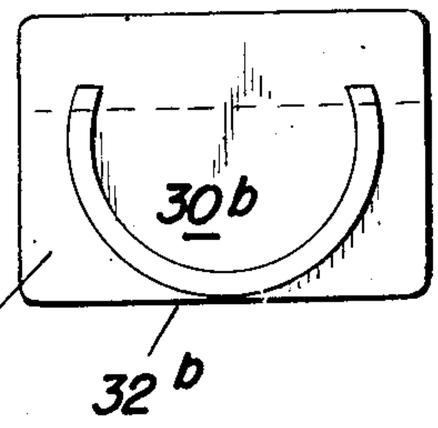


FIG. 20



Inventor

JAMES C. SETTLES

By Barry & Cyr

Attorneys

Patented Jan. 6, 1953 2,624,291

UNITED STATES PATENT OFFICE

2,624,291

RAILWAY TRUCK DAMPING DEVICE

James C. Settles, Columbus, Ohio, assignor to The Buckeye Steel Castings Company, Columbus, Ohio

Application June 25, 1946, Serial No. 679,284

4 Claims. (Cl. 105—197)

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This invention relates to improvements in railway trucks, and more particularly to novel damping means for controlling the oscillations of the load supporting springs commonly employed in car trucks.

The primary object of the invention is to provide a damping device wholly contained within each end of the bolster and including wedge means actuated by horizontal springs which bear at their inner ends against a central vertical rib of the bolster and at their outer ends against certain of the wedges to cause other of the wedges to frictionally engage the bolster guide columns of the truck; the parts being so arranged that the entire device remains fixed in a vertical direction with the bolster and moves therewith, even for every small movements of the bolster, and also produces constant frictional resistance to relative movement between the bolster and side frame, regardless of whether the bolster is moving upwardly or downwardly.

With the foregoing objects outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a side elevation of a portion of a railway truck with one embodiment of my invention incorporated therein, and with certain parts in vertical longitudinal section to facilitate illustration.

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section view, partly in elevation, taken on the line 3—3 of Fig. 1.

Fig. 4 is a view like Fig. 1, but illustrating another modification.

Fig. 5 is a horizontal sectional view taken on the line 5—5 of Fig. 4.

Fig. 6 is a vertical sectional view, partly in elevation, taken on the line 6—6 of Fig. 4.

Fig. 7 is a view like Figs. 1 and 4, but illustrating still another modification.

Fig. 8 is a horizontal sectional view on the line 8—8 of Fig. 7.

Fig. 9 is a vertical sectional view, partly in elevation, on the line 9—9 of Fig. 7.

Fig. 10 is a rear elevation of one of the outer wedges of the damping means, illustrated in Figs. 1 to 3, inclusive.

Fig. 11 is a side elevation and Fig. 12 is a rear elevation of one of the inner wedges of the structure illustrated in Figs. 1 to 3, inclusive.

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Fig. 13 is a side elevation and Fig. 14 a rear elevation of one of the outer wedges used in the device shown in Figs. 4 to 6, inclusive.

Figs. 15 and 16 are a side elevation and rear elevation, respectively, of one of the inner wedges used in the structure illustrated in Figs. 4 to 6, inclusive.

Fig. 17 is a side elevation and Fig. 18 a rear elevation of one of the outer wedges illustrated in Figs. 7 to 9, inclusive.

Figs. 19 and 20 are a side elevation and rear elevation, respectively, of one of the inner wedges of the structure illustrated in Figs. 7 to 9, inclusive.

Referring to the embodiment of the invention illustrated in Figs. 1 to 3, inclusive, the side frame 21 may be of the usual truss-type (although the application of the device is not limited to this type of side frame), having a bolster opening 22 for the reception of a bolster end 23. The bolster is supported on the side frame spring seat member 24 by means of bolster coils or load supporting springs 25 in the conventional manner. The bolster is provided with a fixed internal central vertical rib 26 and a pocket 27 adjacent each side frame column 28. Each vertical face of the rib 26 forms a seat for the inner end of a horizontally disposed spring 29 which bears at its outer end against the vertical inner faces 30 of identical upper and lower wedges or inner wedge means 31. Each of these wedges has a horizontal surface 32 which bears against the inner surface of either the horizontal top or bottom 33 or 34, respectively, of the bolster, and an inclined outer surface 35 which bears against the inner arcuate convex surface 36 of a friction shoe or outer wedge means 37. The friction shoe 37 has a vertical outer face 38 bearing against a wear plate 39 secured to the side frame column 28.

In order to hold the wedge spring 29 under compression and the other parts in assembled position while the bolster is being applied to, or removed from the side frame, each friction wedge 37 is provided with holes 40, adapted to align, when springs 29 are compressed, with corresponding holes 41 formed in side walls or rectilinear guides 42 of the pocket 27 for receiving retaining pins (not shown). If preferred, aligned holes 43 and 44 in wedges 31 and side walls 42, respectively, can be used in a similar manner for holding the springs 29 under compression.

In operation, the constant horizontal force from springs 29 is transmitted through surfaces

30 and 35 of wedges 31 and surfaces 36 of friction wedges 37 to force the vertical faces of wedges 37 into contact with the wear plates 39. This horizontal spring force or pressure against wear plates 39 is not changed by upward or downward movement of the bolster relative to the side frame and the device accordingly provides equal snubbing action for both the compression and recoil of bolster supporting springs 25.

The wedging action at the inclined surface 35 of each wedge 31 forces the horizontal surface 32 of each wedge into contact with the inner surface of the top or bottom of the bolster. This action serves to position the damping device with respect to the bolster in a vertical direction, and to insure its moving with the bolster at all times. Heretofore, damping devices using horizontal springs have not provided wedges, such as 31, and in these devices, the horizontal springs 29 bear directly against a vertical seat on the inner surface of the friction shoe 37. In these devices, the necessary manufacturing and operating clearances between the bolster top and bottom and the friction shoe, permits some vertical movement of the bolster without movement of the friction shoe along its connected surface with the side frame column. Hence, such bolster movements are undamped, and the battering action which occurs in service due to impact between the friction shoe and the top and bottom plates of the bolster tends to increase the original vertical clearances in these parts and to permit increasingly larger amplitudes of undamped bolster movements. The present invention eliminates this undesirable action, yet allows normal manufacturing and application clearances and tolerances in the various parts.

The arcuate or convex surface 36 of friction shoe 37 may be formed as two inclined planar surfaces parallel respectively to surfaces 35, of wedges 31. It is preferred, however, to make these surfaces as a single arc-shaped surface struck from a single center, as shown, in order to accommodate in service relatively angular movements in a vertical plane between the side frame and the bolster.

The rib 26 of the bolster, in addition to being an important structural element thereof, as before stated, serves as a seat for the inner ends of the wedge coils. The equal and opposite pressures from these wedge coils or springs, acting between the side frame columns and the rib 26, serve to keep the bolster centrally located in the bolster opening and in square relation with the side frame, yet permit resiliently resisted unsquaring action between frame and bolster which is desirable when the truck passes around a curve. In other words, the damping device is self-centering and provides a flexible, but self-squaring truck.

In the modification shown in Figs. 4 to 6, inclusive, two outer wedges and one inner wedge are employed at each side of the bolster instead of the structure illustrated in Figs. 1 to 3, inclusive. As shown in Figs. 4–6, the two inner wedges are replaced by a single member 31*a* having a vertical inner face 30*a*, against which the outer end of wedge coil 29*a* bears, and identical upper and lower inclined outer faces 35*a* which diverge towards the central rib 26*a*. The friction shoe is formed in two parts, consisting of an identical upper and lower wedge 37*a*, each having a vertical face 38*a*, which bears against the side frame column wear plate 39*a*, an inclined face 36*a* which bears against the corresponding inclined face 35*a* of member 31*a*, and a substantially horizontal surface 32*a* bearing against the inner horizontal surface of the top or bottom plate 33*a* or 34*a* of the bolster. Surfaces 35*a* and 32*a* have slightly crowned contours to accommodate relative angular movement in a vertical plane between the bolster 23*a* and the side frame 21*a*. The vertical pressures which hold the device in fixed vertical relation with the bolster are exerted through the horizontal surfaces 32*a* of friction wedges 37*a*. The operation and advantages of this form of the invention are the same as described above for the device shown in Figs. 1 to 3, inclusive.

In the modification shown in Figs. 7 to 9, inclusive, the outer end of each of the wedge springs 29*b* bears against the inner vertical surface 30*b* of wedge 31*b*. The latter has a horizontal bottom surface 32*b* which bears against the inner horizontal surface of the bottom plate 34*b* of the bolster, and an inclined outer surface 35*b* which bears against a similarly inclined surface 36*b* of an outer wedge member or friction shoe 37*b*. The shoe has an upper horizontal surface 45 which bears against the inner horizontal surface of the top plate 33*b* of the bolster, and a vertical outer surface 38*b* which bears against wear plate 39*b*, secured to the side frame column 28*b*. Surfaces 36*b* and 45 of friction shoe 37*b* are slightly crowned to accommodate relative angular movement in a vertical plane between the bolster 23*b* and side frame 21*b*. The device is fixed for movement with the bolster in a vertical direction by the vertical pressures exerted by surfaces 45 and 32*b* on bolster top and bottom plates 33*b* and 34*b*, respectively. The operation and advantages of this modification are also the same as described for that shown in Figs. 1 to 3, inclusive. If preferred, the wedges can be inverted from the positions shown in Figs. 7 to 9, inclusive, without altering the operating of the device.

While I have disclosed some preferred embodiments of my invention by way of example, it will be manifest to those skilled in the art that changes may be made in the structures described and illustrated without departing from the spirit of the invention, as expressed in the following claims:

What I claim and desire to secure by Letters Patent is:

1. In a damping mechanism for a railway car truck provided with bolster guide columns, a bolster having an end portion extending between said guide columns, a substantially horizontal top wall and a substantially horizontal bottom wall on the bolster end portion, a centrally disposed vertical rib arranged longitudinally of the end portion of the bolster connecting the top and bottom walls, an inboard transverse wall connecting the top and bottom walls of the bolster, an outboard transverse wall connecting the top and bottom walls of the bolster, said transverse walls and said top and bottom walls defining an unobstructed rectangular pocket at one side of the bolster, a wedge member having a substantially horizontal under surface extending throughout the entire width of the wedge between said transverse walls, a horizontally disposed helical spring within the bolster with one end thereof bearing against said rib and the other end engaging said wedge member, an inclined surface on said wedge member sloping downwardly and outwardly in proceeding towards the side of the bolster and said inclined

surface extending throughout the width of the wedge between said transverse walls, a friction shoe having a vertical face arranged to engage one of the guide columns, said friction shoe having a substantially horizontal surface on the top portion thereof extending throughout the width of the friction shoe between said transverse walls, and an inclined surface carried by the friction shoe extending throughout the width thereof between said transverse walls engaged by the inclined surface on the wedge member whereby the vertical face on the shoe is urged into engagement with the guide column and the friction shoe is shifted upwardly with the substantially horizontal surface thereon into engagement with the under surface of the top wall of the bolster and the wedge member is shifted downwardly with the horizontal surface thereon into engagement with the upper surface of the bottom wall of the bolster.

2. In a damping mechanism for a railway car truck, a side frame provided with spaced guide columns, a bolster having an end portion extending between said guide columns, a substantially horizontal top wall and a substantially horizontal bottom wall on the bolster, a centrally disposed vertical rib arranged longitudinally of the end portion of the bolster connecting the top and bottom walls, an inboard transverse wall at one side of the bolster connecting the top and bottom walls, an outboard transverse wall at said side of the bolster connecting the top and bottom walls, a wedge member mounted between the top and bottom walls of the bolster and between said transverse walls, a spring bearing on said rib and engaging said wedge member, an inclined surface on the wedge member having the same slope throughout the space between said transverse walls, a friction shoe having a flat face arranged along one guide column, a substantially horizontal surface on the friction shoe arranged along one wall of the bolster substantially throughout the space between the inboard and outboard transverse walls, an inclined surface on the friction shoe having the same inclination throughout the space between the transverse wills engaging the inclined surface on the wedge member whereby the spring moves the friction shoe into engagement with the guide column and the reaction set up between the inclined surfaces urges the horizontal surface on the shoe into engagement with one bolster wall and a portion of the wedge member into engagement with the other bolster wall.

3. In a railway car truck, a side frame having spaced columns with friction faces, a bolster resiliently supported between said columns, said

bolster having pockets in opposite sides open towards said friction faces, each of said pockets being defined by a top bolster wall and a bottom bolster wall and spaced inboard and outboard walls and a rear bolster wall, said top and bottom walls presenting horizontal oppositely facing surfaces within each pocket, a friction shoe and wedge means in each pocket, resilient means under compression between said wedge means and said rear bolster wall, each of said wedge means having wedging engagement with the associated friction shoe forcing the wedging means into engagement with one of said oppositely facing surfaces, each of said friction shoes having wedging engagement with the wedge means forcing the friction shoes into engagement with the other of said oppositely facing surfaces and urging the friction shoes into engagement with said friction faces.

4. In a railway car truck, a side frame having spaced guide columns, a friction face on one of said guide columns, a bolster end portion resiliently supported between said guide columns, said bolster having a pocket in one side open towards said friction face, said pocket being defined by a bolster top wall and a bolster bottom wall and spaced inboard and outboard walls and an intermediate bolster wall, said top and bottom walls presenting horizontal oppositely facing surfaces within said pocket, a friction shoe and a wedge in said pocket, resilient means under compression between said wedge and said intermediate bolster wall, said wedge having wedging engagement with the friction shoe forcing the wedge into engagement with one of said oppositely facing surfaces and forcing the friction shoe into engagement with the other of said oppositely facing surfaces and urging the friction shoe into engagement with said friction face.

JAMES C. SETTLES.

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