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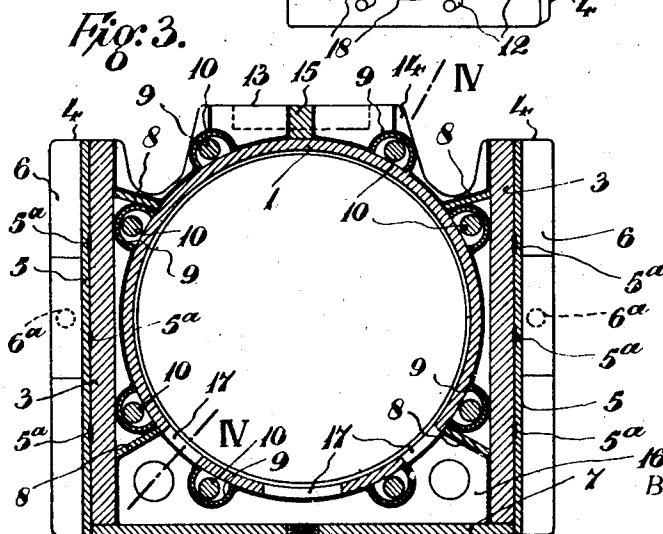
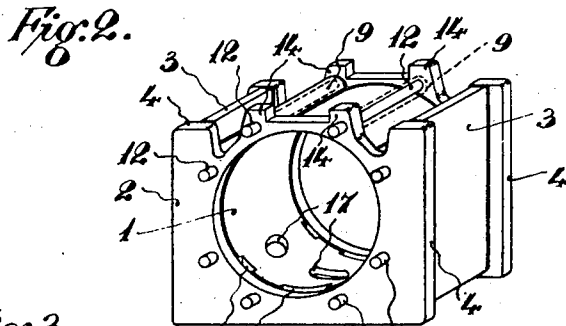
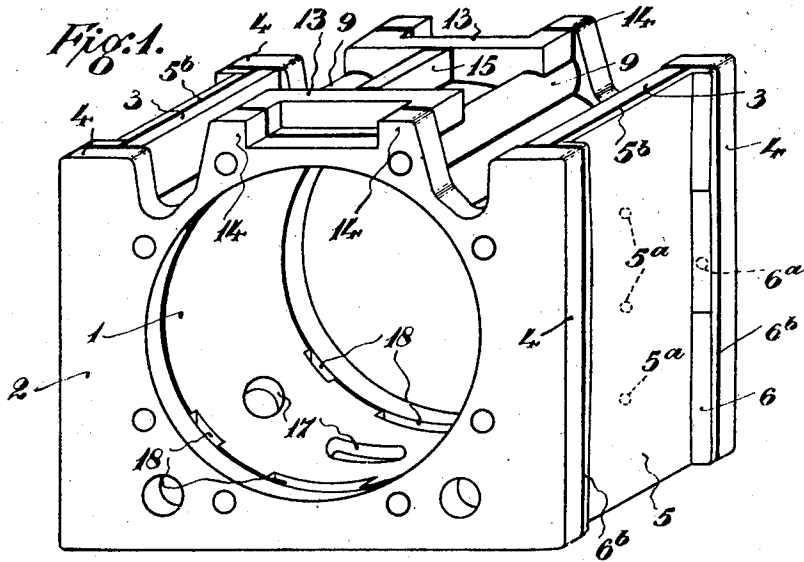
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2,448,655

AXLE BOX

Filed July 20, 1945

3 Sheets-Sheet 1



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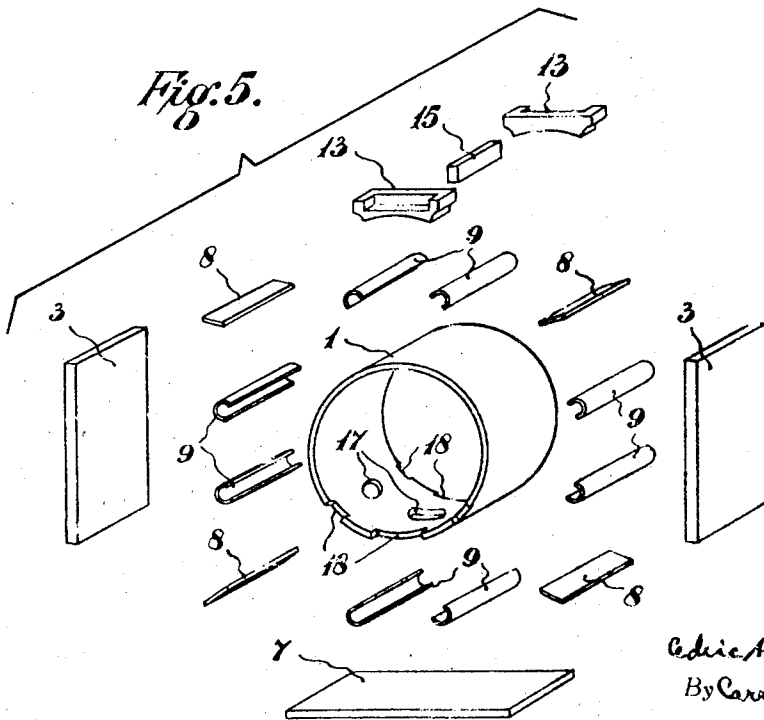
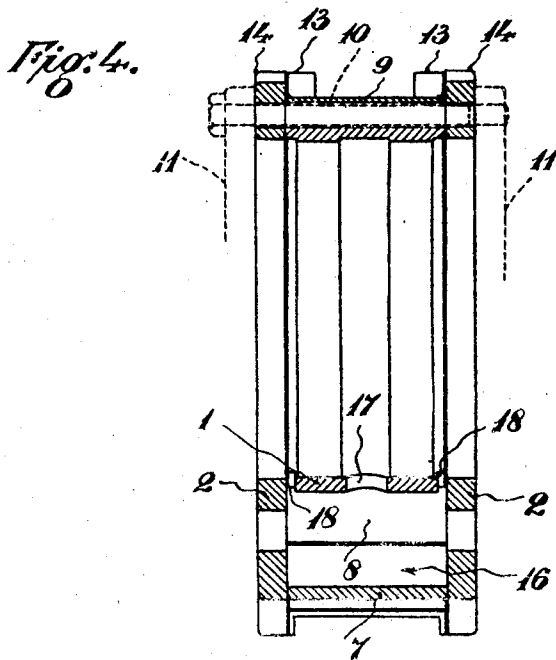
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2,448,655

AXLE BOX

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3 Sheets-Sheet 2



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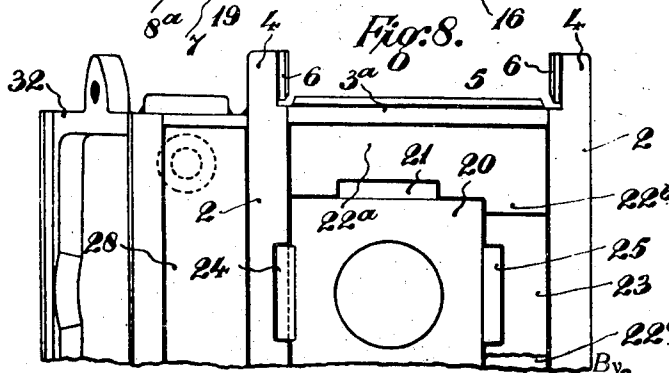
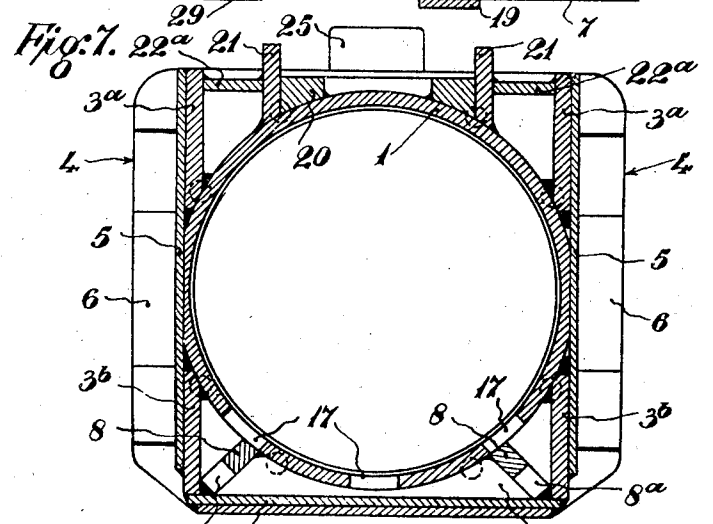
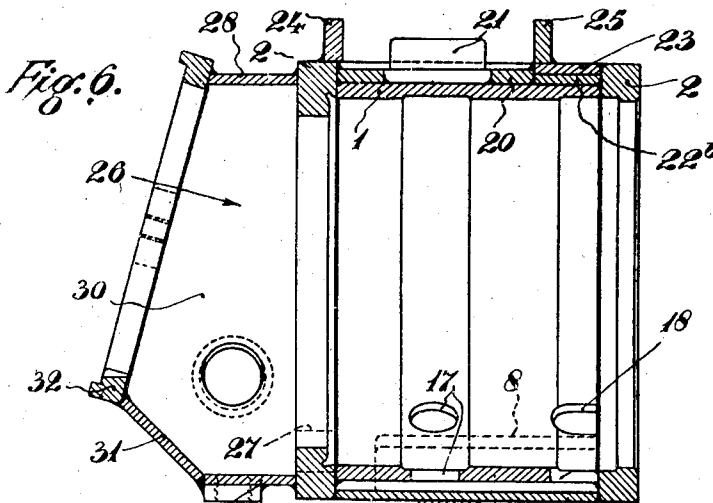
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AXLE BOX

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,448,655

AXLE BOX

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13 Claims. (Cl. 308—39)

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This invention relates to axle boxes for railway and other rolling stock, said axle boxes being of the built-up welded type comprising an internal tubular barrel or housing adapted to receive an antifriction axle bearing, in combination with an outer box-like frame or shell composed of separate plate members welded together and attached to the tubular barrel or housing so as to form a self-contained body unit.

The principal object of the present invention is to provide an improved construction of built-up welded axle box which obviates the use of cast metal, reduces the necessity of machining to a minimum, and ensures a strong and rigid but comparatively light structure.

Another object is to enable the horn guide plates to be readily machined to accurate dimensions before the axle box is built up.

A further object is to ensure a more effective welding of the horn guide liners and cheek liners when such liners are fitted.

A still further object is to provide an axle box, of the kind referred to, which is effectively sealed against the escape of lubricant, especially when longitudinal bolts pass through the ends of the box.

Another object is to provide an axle box designed for oil lubrication, which provides for the effective circulation of the oil without liability of leakage.

According to the invention a built up welded axle box of the kind referred to has the outer frame or shell braced or attached to the tubular barrel or housing by means of a plurality of longitudinally-extending stay or gusset plates disposed in longitudinal planes above the below the axis of the axle box and welded at their inner and outer edges respectively to said tubular barrel or housing or to a part thereon and to the outer frame or shell.

The sides of the outer frame or shell may consist of flat single plates which may form horn-guide face plates adapted to be machined to accurate dimensions before being secured in position on the tubular barrel or housing; or each of the said sides may consist of two or more plates welded to the side of the tubular barrel or housing as well as to vertical end plates.

The stay or gusset plates may be disposed between the inner faces of the side plates and the tubular barrel or housing at points below and above the respective top and bottom edges of the plates; or they may be disposed at the corners of the box.

Also, according to the invention, the axle box

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may comprise, in combination with the tubular barrel or housing, an outer frame or shell including vertical end plates applied and welded to the ends of said barrel or housing and vertical side plates welded between said end plates so that the edges of the end plates project beyond the side plates in the form of vertical flanges which, with the side plates, constitute horn guides.

The outer frame or shell may include end plates welded to the ends of the tubular barrel or housing, side plates welded between said end plates, and longitudinal hollow or channel-sectioned tie bars applied to the outer surface of the tubular barrel and welded to the end plates. The hollow or channel-sectioned tie bars may be arranged to receive bolts for securing end caps or covers, and may be welded to the surface of the tubular barrel so as to be sealed against the ingress of lubricant used in the axle box.

When horn guide face liners and cheek liners are fitted these may be welded all around to the side plates and end plates respectively before these plates are secured to the tubular barrel or housing.

When oil lubrication is to be employed, a closed lower oil chamber is formed below the tubular barrel by a bottom plate or closure, said tubular barrel having openings in it to allow for the circulation of the oil through the chamber and through the bearings in the barrel.

Figure 1 of the accompanying drawings is a perspective view of a welded axle box body in accordance with the present invention.

Figure 2 is a perspective view, on a smaller scale, showing one of the stages in the assembly of the axle box.

Figure 3 is a transverse section through the axle box.

Figure 4 is a longitudinal vertical section on line IV—IV, Figure 3.

Figure 5 is an exploded perspective view showing the various component parts of the axle box body except for the end plates.

Figure 6 represents a longitudinal vertical section of a modified construction of axle box in accordance with the invention.

Figure 7 is a cross-section of this modification.

Figure 8 is a plan view.

Referring to Figures 1 to 5 of the drawings, the axle box body therein shown comprises an interior tubular barrel or housing adapted to house and support suitable ball or roller bearings, the axle box shown being designed for receiving two axially-spaced bearings or a two-row type of bearing. Welded to the ends of the barrel are

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wide vertical end plates 2, 2, whilst welded in position between these end plates are vertical side plates 3, 3, which are positioned adjacent the sides of barrel 1 and at some distance inwards of the edges of the end plates 2 so that the latter project beyond the side plates in the form of vertical flanges 4 which, with the side plates, constitute channel-sectioned horn guides to the faces of which main liner plates 5 and cheek or side liner plates 6 may be spot welded at 5^a, 6^a. These liner plates may also be welded to the side plates 3 and end plates 2 respectively all round their edges, as indicated at 5^b, 6^b, in Figure 1, and when it is necessary to employ these liner plates they are preferably welded to the side and end plates before the latter are assembled, as by this procedure they can be welded all round their edges.

The bottom of the box is completed by a plate 7 which is fitted between the end plates 2 and beneath the side plates 3, being welded along its edges to these plates. The end plates 2, side plates 3 and bottom 7 thus form the outer frame or shell of the axle box. The side plates 3 of this frame or shell are braced to the barrel 1, at points above and below the axis of said barrel, by means of four longitudinally-extending stay or gusset plates 8 disposed in longitudinal oblique planes and welded at their longitudinal edges to the inner faces of said plates 3 and to the barrel 1 respectively as well as being welded at their ends to the end plates 2. The end plates 2 are also connected together and joined to the barrel 1 by means of longitudinal hollow tie-bars 9 of half-round section, as shown, or of other channel section, which are seated upon the outer surface of the barrel, being welded thereto along their edges and also being welded at their ends to the inner faces of the end plates. These hollow tie-bars 9 are adapted to receive and house bolts 10 used for securing end caps or covers (indicated by dotted lines at 11 in Figure 4). The use of these hollow tie-bars 9 obviates drilling that would be necessary in a cast box and prevents possible damage to the through bolts 10 that would otherwise be exposed in the welded box described.

In building up the axle box, the barrel 1, end plates 2, side plates 3, and gusset plates 8 are first assembled together, as shown in Figure 2, by the aid of locating rods 12 which are passed through holes in the end plates, and the parts are welded together whilst so located. The hollow tie-bars 9 are then welded in place and the bottom is welded to the side plates and end plates, but where, as shown in Figure 3, the gussets 8 effectively seal off the two tie-bars 9 at each side, these tie-bars may be welded to the barrel and end plates before application of the side plates. The said tie-bars at the sides, however, may be omitted if desired.

The top of the axle box body is completed by a balance beam or spring seat portion consisting of transverse front and back recessed members 13, 13, of channel shape in plan, seated upon and welded to the barrel 1 and also welded to the inner faces of spaced projections 14 on the end plates 2; and a longitudinal member 15 fitting between and welded to the members 13 and also welded to the barrel 1. The said seat portion could, if desired, be made in one piece instead of comprising the separate parts 13, 15.

At the lower part of the axle box, the stay or gusset plates 8 form an enclosed oil chamber 16 and the barrel 1 is provided with openings 17 at the middle and with gaps 18 at the ends which

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provide for the circulation of oil through said chamber 16 and through the bearings in the barrel. The hollow tie-bars 9 in this chamber 16 are sealed against the ingress of oil and thus oil cannot escape past the bolts.

Where through bolts are not used, then the bolts 10 would be omitted, studs being fitted to the end plates for the attachment of the covers.

The side plates 3 may be readily machined to accurate dimensions before being secured in position on the tubular barrel or housing.

In the modification represented in Figures 6 to 8, the axle box body therein shown comprises a tubular barrel 1, end plates 2 welded to the ends of the barrel so as to project laterally therefrom and form horn guide flanges 4, and a pair of vertical plates 3^a, 3^b, at each side, these two plates at each side being disposed in spaced vertical alignment above and below the axis of the barrel and being welded to said barrel and to the end plates 2. A liner plate 5 is welded over these two plates at each side, so as to bridge them, and liner plates 6 are welded to the guide flanges 4. These liner plates 6 may be welded all round to the end plates before these plates are assembled. A bottom plate 7 is welded at its side edges to the lower part of plates 3^b and at its ends to the end plates 2, 2, whilst a frame stop 19, consisting of a flat steel bar or strap, is welded to the underside of the bottom plate.

At the top of the box a spring seat plate 20 having a central aperture is shaped on its underside to fit the barrel 1 and is welded thereto as well as to the adjacent front end plate 2, and at opposite sides of said seat plate vertical spring-seat side flanges 21 are seated at their lower edges upon and are welded to the exterior of the barrel 1. A top horizontal gusset plate of substantially U-shape in plan is fitted around the spring seat device, its side portions 22^a being recessed on their inner edges to fit around the side flanges 21 and being arranged to fit closely between said flanges 21 and seat plate 20 on the one hand and the upper side plates 3^a on the other hand to which parts its respective inner and outer edges are welded. The transverse portion 22^b of this gusset plate fills the space between the spring seat plate 20 and the rear end plate 2, its edges being welded to these parts; and on top of this transverse portion 22^b an upper frame stop plate 23 is welded to the end plate 2 and to the seat plate 20. Front and back vertical spring-seat flanges 24, 25, are welded respectively upon the front end plate 2 and upon the frame stop plate 23.

At the lower part of the axle box oblique longitudinal gusset plates 8 are disposed between the bottom corners of the box and the barrel 1, being welded along their edges to said barrel and to the lower side plates 3^b and bottom plate 7. These gusset plates 8 are located in a bottom oil chamber 16 and are apertured at 8^a to allow of circulation of oil through openings 17, 18, in the barrel 1 and through the said chamber.

On the forward end of the axle box body is a front chamber 26 serving as an oil reservoir and communicating with the oil chamber 16 in the base of the box body through one or more openings 27 in the front end plate 2. The chamber 26 is composed of top plate 28, bottom plate 29, side plates 30, inclined plate 31 and front apertured plate 32 all welded together and to the end plate 2 as shown.

In the drawings the various welded joints are indicated by thick lines.

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Instead of the ends of the barrel butting against the inner faces of the end plates, as shown, they may be located and welded within the bores of the end plates, especially in the case of axle boxes carrying an underslung load.

I claim:

1. A built-up welded axle box comprising an internal tubular barrel unit, an outer box-like frame composed of separate plate members welded together and permanently attached to the barrel unit to form a body unit, and a plurality of longitudinally-extending gusset plates disposed in longitudinal planes above and below the axis of the axle box and welded at their inner and outer edges respectively to the said barrel unit and to the outer frame.

2. A built-up welded axle box comprising an internal tubular barrel, vertical end plates welded to the ends of the barrel, and vertical side plates welded between and to said end plates so that the edges of the end plates project beyond the side plates in the form of flanges which, with the side plates, constitute horn guides.

3. A built-up welded axle box comprising an internal tubular barrel, vertical end plates welded to the ends of the barrel, vertical side plates welded between said end plates to form horn guides, and a bottom plate welded between the end plates and to the side plates to form a chamber below the barrel.

4. A built-up welded axle box comprising an internal tubular barrel having oil openings in its lower part, vertical end plates welded to the ends of the barrel, vertical side plates welded between said end plates to form horn guides, and a bottom plate welded between the end plates and to the side plates to form a chamber below the barrel and in communication with the interior of the latter through the openings therein.

5. A built-up welded axle box comprising an internal tubular barrel, vertical end plates welded to the ends of the barrel, vertical side plates welded between said end plates to form horn guides, and hollow tie-bars applied to the outer surface of the barrel and welded to the end plates.

6. A built-up welded axle box comprising an internal tubular barrel, vertical end plates welded to the ends of the barrel, vertical side plates welded between said end plates to form horn guides, hollow tie-bars applied to the outer surface of the barrel and welded to the end plates, and bolts passing through said hollow tie-bars for securing end covers to the axle box.

7. A built-up welded axle box comprising an internal tubular barrel, vertical end plates welded to the ends of the barrel, vertical side plates welded between said end plates, hollow tie-bars welded to the surface of the barrel and also to the ends plates, and bolts passing through said hollow tie-bars for securing end covers to the axle box.

8. A built-up welded axle box comprising an internal tubular barrel, vertical end plates welded to the ends of the barrel, vertical side plates welded between said end plates so that the edges of the end plates project beyond the side plates in the form of flanges which, with the side plates, constitute horn guides, and horn guide face liners and cheek liners fitted to the side and end plate flanges, being welded all round to the said plates and flanges before the plates are secured to the barrel.

9. A built-up welded axle box comprising an internal tubular barrel, end plates welded to the ends of the barrel, flat single side plates welded

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at their ends to the end plates, and longitudinal gusset plates disposed between the inner faces of the side plates and the surface of the barrel at points above and below the axis of the box, said gusset plates being welded along their edges to the said parts.

10. A built-up welded axle box comprising an internal tubular barrel, end plates welded to the ends of the barrel, and a plurality of separate side plates disposed in vertical alignment at each side of the barrel, being welded to said barrel and to the end plates, so that the edges of said end plates project beyond the side plates to form flanges which, with the side plates, constitute horn guides.

11. A built-up welded axle box comprising an internal tubular barrel, end plates welded to the ends of the barrel, a plurality of separate side plates disposed in vertical alignment at each side of the barrel, being welded to said barrel and to the end plates so that the edges of said end plates project beyond the side plates to form horn guides, a bottom plate welded to the end plates and to the lower side plates, and obliquely-disposed longitudinal gusset plates interposed between and welded along their edges to said barrel and side plates.

12. A built-up welded axle box comprising an internal tubular barrel, end plates welded to the ends of the barrel, a plurality of separate side plates disposed in vertical alignment at each side of the barrel, being welded to said barrel and to the end plates so that the edges of said end plates project beyond the side plates to form horn guides, a bottom plate welded to the end plates and to the lower side plates, obliquely-disposed longitudinal gusset plates welded along their edges to said barrel and to the lower side plates, a spring seat device welded to the top of the barrel, and gusset plates disposed between said spring seat device and the upper side plates, being welded at their edges to said parts.

13. A built-up welded axle box comprising an internal tubular barrel, end plates welded to the ends of the barrel, a plurality of separate side plates disposed in vertical alignment at each side of the barrel, being welded to said barrel and to the end plates so that the edges of said end plates project beyond the side plates to form horn guides, a bottom plate welded to the end plates and to the lower side plates, obliquely-disposed longitudinal lower gusset plates welded along their edges to said barrel and to the lower side plates, a spring seat plate shaped to fit upon the top of the barrel and welded thereto, vertical side flanges seated upon and welded to the barrel so as to form with the seat plate a spring seat device, and a U-shaped gusset plate fitted around the spring seat device, its side portions fitting between and being welded to the seat device and the side plates and its transverse portion filling the space between the seat plate and one of the end plates, being welded thereto.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
287,572	Pagan	Oct. 30, 1883

FOREIGN PATENTS

Number	Country	Date
512,843	Great Britain	Sept. 27, 1939