March 22, 1932. V. E. SISSON 1,850,962

CORRUGATED METALLIC PLATE

Filed Oct. 27, 1930 3 Sheets-Sheet 1

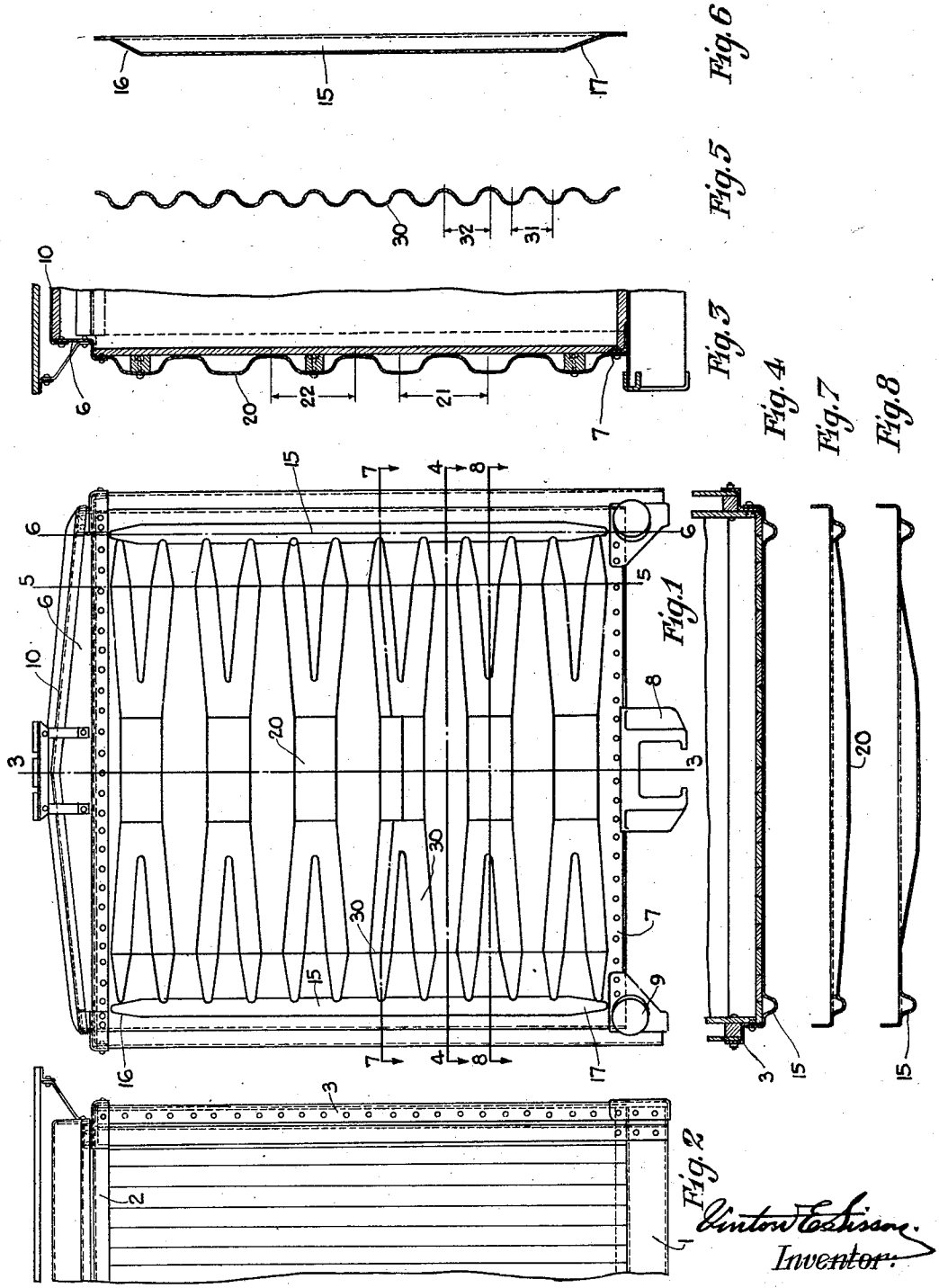


Fig. 6

Fig. 5

Fig. 3

Fig. 4

Fig. 7

Fig. 8

Fig. 1

Fig. 2

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CORRUGATED METALLIC PLATE

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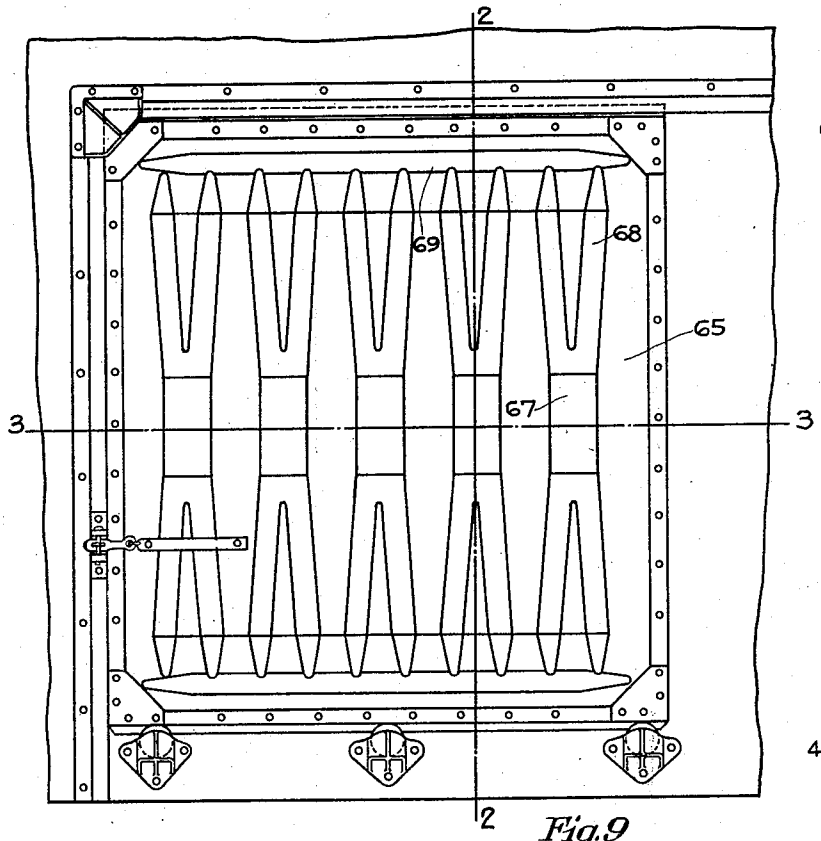


Fig. 9

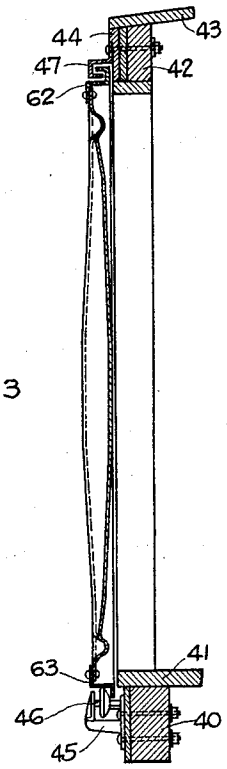


Fig. 10

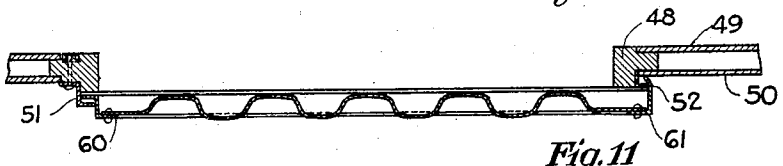


Fig. 11

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March 22, 1932. V. E. SISSON 1,850,962

CORRUGATED METALLIC PLATE

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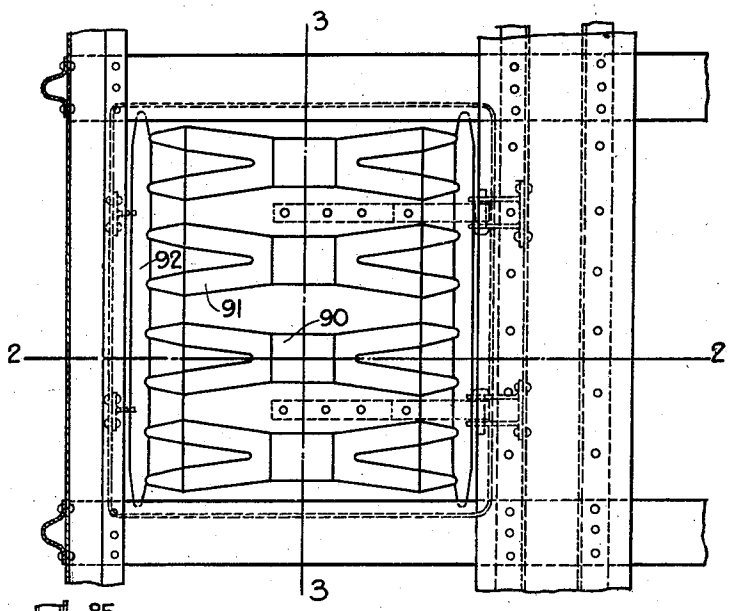


Fig. 12

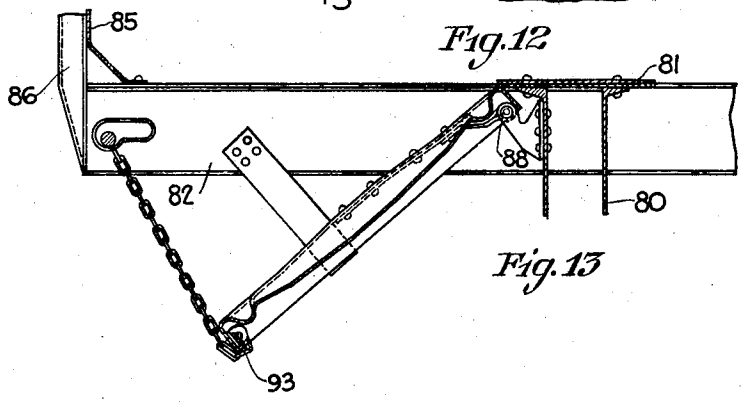


Fig. 13

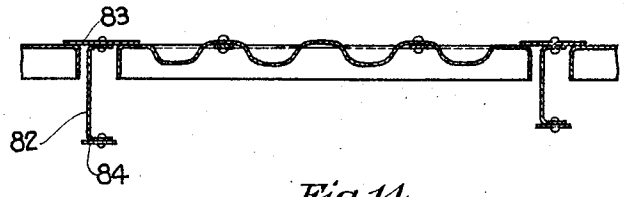


Fig. 14.

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Patented Mar. 22, 1932 1,850,962

UNITED STATES PATENT OFFICE

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CORRUGATED METALLIC PLATE

Application filed October 27, 1930. Serial No. 491,523.

My invention relates to means of reinforcing a metallic plate by forming a plurality of corrugations therein, which plates are particularly adapted to be used as end structures or walls for railway cars; however, the structure may be incorporated in the construction of car side walls; floors; roofs; side doors or hopper doors when used in connection with railway cars of various types.

It is well known that the end wall of railway cars is more likely to be broken or otherwise injured than the side walls. This is due to the inertia thrusts and pressures caused by the shifting of the cargoes when the train starts or stops. It is, therefore, advisable to provide an end wall which is resilient and which is so tied to the car as to transmit the thrust of the shifting cargo to the frame members of the car. Side doors for railway cars are preferably formed of metallic plates with reinforcing corrugations formed therein to prevent the side door from buckling, to maintain its rectangularity and to resist the thrust exerted by the cargo on the side door. The roofs of the cars are preferably made of metallic plates reinforced with stiffening reinforcing corrugations so as to transmit the load imposed on the roof and the running board to the opposite side plates of the car and a hopper door is preferably so reinforced to carry the load to the supporting members or spreader and to the hinges. A general service car is an open top gondola car having the floor formed of a plurality of doors hinged to the center construction of the car and such general service doors are preferably reinforced with a series of corrugations to carry the load of the lading to the supporting elements of the door.

The object of my invention is to reinforce a metallic plate with an embossment positioned adjacent each opposite side of the plate preferably with the ends of the embossments terminating within the plate and a plurality of other corrugations extending substantially normal to the embossments which corrugations have their end portions divided into a greater number of corrugations which merge into the embossments, thereby forming the central portion of the plate into a resilient structure which transposes the stresses imposed thereon to the pair of relatively stiff embossments. This plate is preferably attached to the car structure at the ends of the vertical embossments.

In the drawings:

Fig. 1 shows an end elevation of a railway car incorporating my invention.

Fig. 2 is a fragmentary side elevation of Fig. 1.

Fig. 3 is a section on line 3—3 of Fig. 1.

Fig. 4 is a section on line 4—4 of Fig. 1.

Figs. 5, 6, 7 and 8 are sections on lines 5—5; 6—6; 7—7 and 8—8, respectively, of Fig. 1 showing the plate by itself.

Figs. 9, 10 and 11 show my improved construction used to reinforce the side door of a railway box car.

Figs. 12, 13 and 14 show my improved construction used to reinforce a drop door of a railway general service car.

Figs. 1 to 8, inclusive, show metallic plates reinforced according to my improvements used as an end wall of a railway box car wherein the usual parts of the car are shown, such as side sill 1; side plate 2; corner post 3; end plate 6; end sill 7; striking casting 8; push pole pocket 9 and roof 10.

The end wall comprises a metallic plate formed with vertical embossments 15 positioned adjacent each opposite side of the plate or plates; that is, near the corner post 3 of the car, having their opposite ends 16—17 terminating within the plate adjacent the side sill 1 and side plate 2. The central part of the plate is formed into a plurality of corrugations 20 preferably of greater depth than the embossments 15 and extending substantially normal to the embossments 15, wherein corrugations 20 are spaced apart distances 21 substantially equal to their widths 22. The end portions of these corrugations are divided into a greater number of preferably shallower corrugations 30 which are preferably also spaced apart distances 31 substantially equal to their widths 32 and which merge into the embossments 15. The end portions of the corrugations are preferably of lesser depth than the embossments where they merge into them. (See Fig. 4.)

This construction provides an end wall of great strength adjacent the middle of the plate which becomes relatively resilient adjacent the sides of the plate or the wall of the car where the ends of the horizontal corrugations merge into the vertical embossments so that any load imposed upon the horizontal corrugations is transferred to the vertical embossments and thence to the longitudinal frame member of the car, such as the sill and plate.

While I have shown and described the embossments positioned vertically and corrugations positioned horizontally, these elements may be reversed in their position and still come within the scope of the invention, or in fact, the corrugations may be diagonally positioned.

Figs. 9, 10 and 11 show metallic plates reinforced according to my improvements used as a side door of a railway box car wherein the usual parts of the car are shown, such as side sill 40; flooring 41; side plate 42; roofing 43; fascia 44; supporting brackets 45 provided with anti-friction rollers 46; hood 47; door post 48; lining 49; sheathing 50; front spark strip 51 and rear spark strip 52.

The door comprises front vertical riser 60; rear vertical riser 61; upper rail 62; and lower rail 63 forming a frame for the margins of the door to which the reinforced metallic plate 65 is secured. The central part of the plate is formed with a plurality of corrugations 67 which are divided to form a greater number of corrugations 68 which merge into embossments 69 which are positioned substantially normal to the corrugations.

Figs. 12, 13 and 14 show metallic plates reinforced according to my improvement used as a drop door for a general service car wherein the usual parts of the car are shown, such as center sills 80; center sill cover plate 81; cross diaphragm 82; diaphragm upper plate 83; diaphragm lower plate 84; wall 85 and side stake 86.

The drop door is hinged at 88 to the center sill and is arranged to drop in the position shown in Fig. 13 to discharge the lading.

The central part of the plate is formed with a plurality of corrugations 90 which are divided to form a greater number of corrugations 91 which merge into the embossments 92 which are positioned substantially normal to the corrugations and which reinforce the metallic plate in a direction normal to the corrugations.

The load imposed upon the door is carried by the corrugations 90—91 to the embossments 92 and thence to the hinge elements 88 on one side of the door and to the supporting elements 93 at the other side of the door.

While I have shown and described the construction adapted to use as an end wall, side door and drop door for railway cars, the same principles of design and invention are adaptable to use in side walls, roofs, other doors and other parts of railway car structures.

While I have shown an end wall of a railway car (Figs. 1–8 inclusive) and a side door for a railway car (Figs. 9, 10 and 11) made of one steel plate, it is understood that these constructions, or any other constructions, may be made of two or more plates secured together and still come within the scope of the invention.

The accompanying drawings illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof, within the scope of the claims, will occur to persons skilled in the art.

I claim:

1. A metallic plate formed with embossments positioned adjacent opposite sides of the plate with their ends terminating within the plate, and a plurality of corrugations extending substantially normal to the embossments having their end portions divided into a greater number of corrugations which merge into said embossments.

2. A metallic plate formed with embossments positioned adjacent opposite sides of the plate, and a plurality of corrugations of greater depth than said embossments adjacent their middles extending substantially normal to the embossments having their end portions divided into a greater number of corrugations which merge into said embossments.

3. A metallic plate formed with embossments positioned adjacent opposite sides of the plate, and a plurality of corrugations extending substantially normal to the embossments having their end portions divided into a greater number of shallower corrugations which merge into said embossments.

4. A metallic plate formed with embossments positioned adjacent opposite sides of the plate, and a plurality of corrugations extending substantially normal to the embossments having their end portions divided into a greater number of corrugations which merge into said embossments, said end portions of the corrugations being of lesser depth than the embossments where they merge into them.

5. A metallic plate formed with embossments positioned adjacent opposite sides of the plate with their ends terminating within the plate, and a plurality of corrugations extending substantially normal to the embossments spaced apart distances substantially equal to their widths having their end portions divided into a greater number of corrugations which merge into said embossments.

6. A metallic plate formed with embossments positioned adjacent opposite sides of the plate with their ends terminating within the plate, and a plurality of corrugations extending substantially normal to the embossments having their end portions divided into a greater number of corrugations spaced apart distances substantially equal to their widths which merge into said embossments.

7. A metallic plate formed with embossments positioned adjacent opposite sides of the plate with their ends terminating within the plate, and a plurality of corrugations extending substantially normal to the embossments spaced apart distances substantially equal to their widths having their end portions divided into a greater number of corrugations spaced apart distances substantially equal to their widths which merge into said embossments.

8. A metallic plate formed with embossments positioned adjacent opposite sides of the plate, and a plurality of corrugations extending substantially normal to the embossments spaced apart distances substantially equal to their widths having their end portions divided into a greater number of shallower corrugations spaced apart distances substantially equal to their widths which merge into said embossments, said end portions of the corrugations being of lesser depth than the embossments where they merge into them.

9. In a railway car, the combination of longitudinally extending frame members and an end wall secured to said frame members, said end wall consisting of a metallic plate formed with vertical embossments positioned adjacent opposite sides of the plate with their ends terminating within the plate adjacent said frame members, and a plurality of corrugations extending substantially normal to the embossments having their end portions divided into a greater number of corrugations which merge into said embossments.

VINTON E. SISSON.