

Dec. 20, 1949

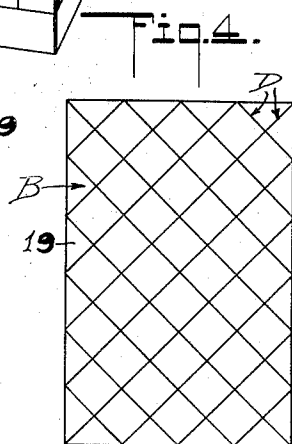
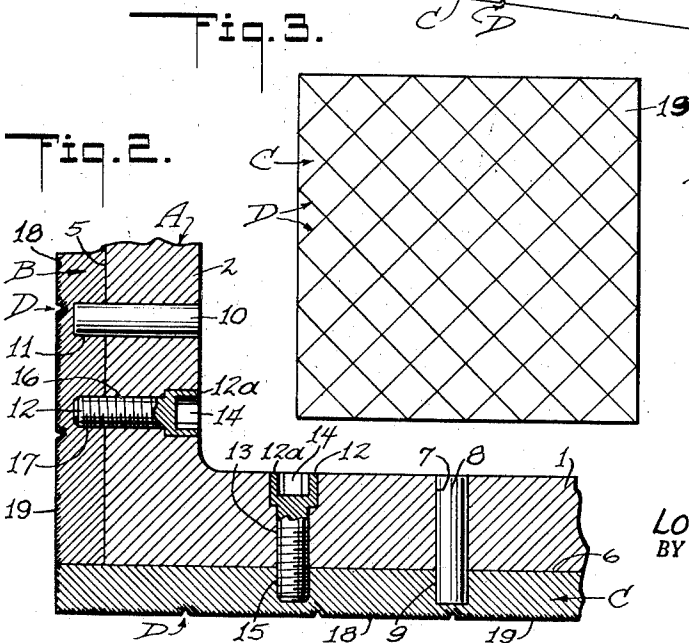
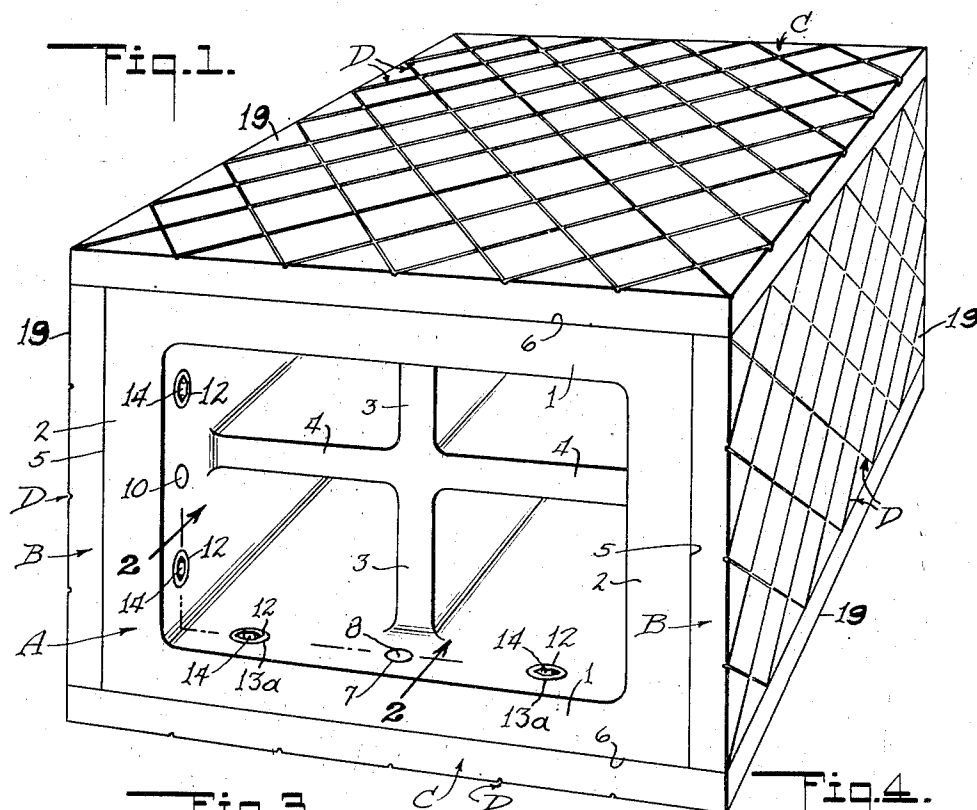
L. A. LOWENSTEIN

2,491,672

BOX PARALLEL

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2 Sheets-Sheet 1



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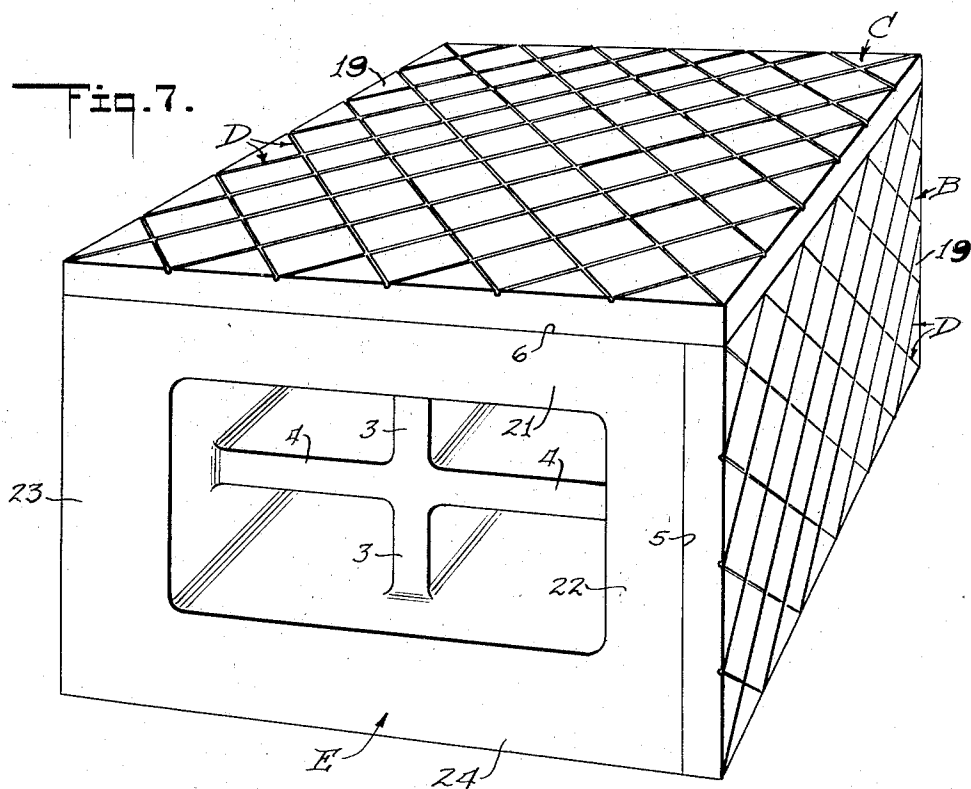
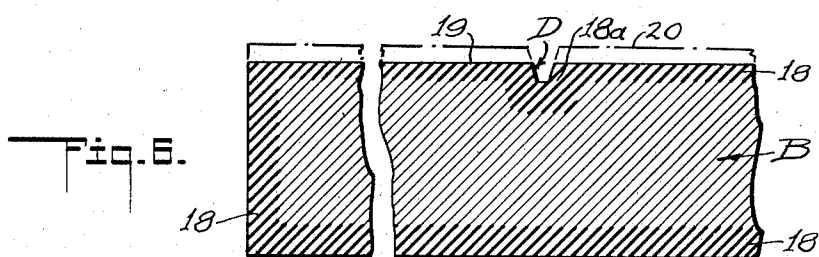
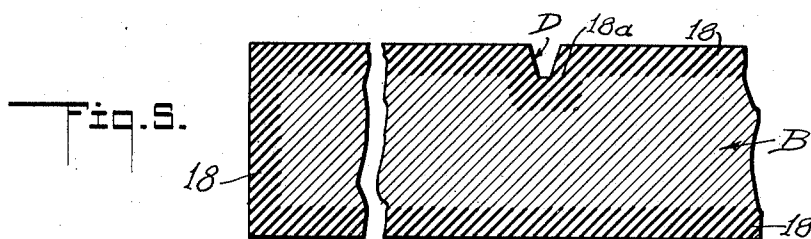
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BOX PARALLEL

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BOX PARALLEL

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8 Claims. (Cl. 33-174)

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An object of my invention is to provide a box parallel in which the box itself is made from a casting and the outer surfaces are covered with steel plates. The plates may be removed when worn and new ones substituted. This saves the expense of purchasing an entire new box parallel. Moreover the steel plates may be ground to true dimensions more readily than grinding the surfaces of the box parallel to a true size.

The outer surfaces of the box parallel must be case hardened and it is easier to case harden steel plates rather than the entire outer surfaces of the box. When case hardening the plates, slight warpage takes place and a grinding of the plate surface is necessary to make it true. This makes the thickness of the hardened surface so thin that the softer steel interior creates tensions within the plate which in time will cause it to become warped again. One of the principal objects of my invention is to provide a novel truss-like reinforcing means or internal rib structure for holding the plate against warping which is normally produced by stresses inherent within a case hardened plate.

A further object of my invention is to provide a device of the type described in which the truss-like reinforcing ribs form a lattice work which is an integral part of the steel plate and the internal ribs have a thickness equal to the original thickness of the hardened surface prior to the grinding operation.

It is possible to provide the box parallel with steel plates on all four sides or to provide steel plates on only two sides. Novel means is used for removably securing the plates to the casting so that they may be renewed from time to time, as required.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming a part of this application, in which:

Figure 1 is a perspective view of the box parallel with four steel plates secured thereto;

Figure 2 is an enlarged sectional view taken along the line 2-2 of Figure 1;

Figure 3 is a plan view of two of the plates;

Figure 4 is a plan view of two other of the plates;

Figure 5 shows a hardened steel plate before grinding;

Figure 6 illustrates the same steel plate after grinding; and

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Figure 7 is a perspective view of a modified form of a box parallel using two plates instead of four.

While I have shown only the preferred forms of my invention, it should be understood that various changes or modifications may be made within the scope of the appended claims without departing from the spirit and scope of the invention.

In carrying out my invention I provide a hollow casting A for a box parallel. This casting has parallel sides 1-1 and 2-2 respectively. The sides are reinforced by webbing 3 and 4 that is integral with the sides and forms a cross-shaped reinforcing strut that extends substantially throughout the length of the box casting. In Figure 1, I show the ends of the webbing as being spaced inwardly from the ends of the casting approximately three-fourths of an inch, although I do not wish to be confined to this exact measurement.

The four outer wall surfaces 5-5 and 6-6 receive steel plates B and C respectively. The plates are identical in construction except that they differ in size. A plan view of the plate B is shown in Figure 4 and a plan view of the plate C is shown in Figure 3. Before describing the particular construction of the plates I will first set forth how they are removably secured to the box parallel.

In Figure 2 I show a section through one corner of the box parallel casting A and it will be noted that the side 1 of the casting has an opening 7 for receiving a dowel pin 8. The pin has a force fit in the opening so as to be permanently secured thereto. The pin projects beyond the outer surface 6 of the side 1 and is received in a recess 9 formed in the plate C. The recess 9 does not extend through to the exterior surface of the plate. The dowel pin 8 when received in the recess prevents transverse movement of the plate C with respect to the casting A. Each plate C is anchored against transverse movement by two dowel pins 8.

In like manner the plates B are anchored from moving transversely or longitudinally by dowel pins 10 received in the sides 2 of the casting A. Figure 2 shows the dowel pin 10 entering a recess 11 in the plate B. There are two dowel pins 10 for each plate B and since they are the same as the dowel pins 8 no further need of description is necessary.

The plates B and C are secured to the casting A by screws 12. Again referring to Figure 2, it will be noted that the side 1 has an opening 13

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for receiving the screw 12 and this opening is enlarged at 13a to receive the head 12a of the screw. The screw-head has a hexagonal recess 14 therein. The opening 13 is large enough to receive the screw shank when the screw projects beyond the surface 6 and is received in a tapped recess 15 in the plate C. Figure 1 shows that two screws 12 are provided at each end of the box casting A for securing the plate C to the box. Four screws therefore secure the plate C to the box and this is true for each plate C. I do not wish to be confined to the exact number of screws or dowel pins used because these may be changed according to the purpose desired.

The steel plates B are removably secured to the sides 2 by screws 12 which are received in openings 16 and in tapped recesses 17. There are four screws for each plate B, as well as two dowel pins. The plates C overlap the ends of the plates B, as shown in Figure 1.

The steel plates are case hardened on their outer surfaces by heat treatment in a well known manner and the thickness of the hardened surface is indicated by the heavy short lines 18 in Figures 5 and 6 of the drawings. In a plate that is three-fourths of an inch thick, the case hardened surface extends approximately one-sixteenth of an inch into the interior of the plate. The hardening of this surface causes a distortion to the plate which warps it.

The plate must be ground down to make the outer surface 19, see Figure 6, true and this grinding operation removes substantially one half the thickness of the hardened surface. The removed stock caused by the grinding operation is indicated by the broken line 20 in Figure 6. As already stated, the thinner hardened surface cannot withstand the stresses and strains produced by the relatively softer steel and therefore the plate will become warped in time. To overcome this disadvantage I provide a plurality of diagonally extending and intersecting V-shaped grooves D. These grooves are indicated diagrammatically in Figures 3 and 4 and are shown in detail in Figures 5 and 6. The grooves D are formed in the outer surface of the plate before the hardening of the surface takes place. The result is that the side walls and bottoms of the grooves will be strengthened by a case hardened surface one-sixteenth of an inch thick and indicated at 18a in Figure 5.

When now the exterior surface of the plate is ground to make it true, the thickness of the hardened wall 18a around the groove D will remain the same even though the thickness of the hardened surface is practically reduced by one-half. The thicker hardened steel groove walls 18a form a plurality of integral reinforced ribs for the surface 19, these ribs intersecting each other to provide a lattice-like truss effect for the entire case hardened surface 19. The integral trussing is strong enough to withstand any stresses of the relatively softer steel interior which would cause the plate to warp again. In this way the surface 19 is kept true throughout the entire life of the plate. The outer surfaces of both plates B and C are reinforced with an internal rib structure in this manner.

In Figure 7 I show a slightly modified form of the invention where the casting E has two thinner walls 21 and 22 and two thicker walls 23 and 24. The walls 21 and 22 receive two plates B and C while the walls 23 and 24 do not receive any plates. The plates B and C are secured to the

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casting E in the same manner as that described for the form shown in Figure 1. The thickness of the thin walls and plates equals the thickness of the walls 23 and 24. In all other respects the box parallel shown in Figure 7 is identical to that shown in Figure 1 and corresponding parts will be given like reference numerals.

The standard box parallel is made of solid metal and weighs about fifty-two pounds for the size of the device illustrated. My device weighs twenty pounds because it has a hollow interior. The casting may be made of a cheaper material and may be reinforced internally in any desired manner. The outer surface of the device is reinforced by the steel plates. A lighter material for the casting may be used such as aluminum.

I claim:

1. A box parallel comprising a hollow rectangular casting having four rectangular sides extending at right angles to each other, case-hardened steel plates covering the four sides of the box, and means removably securing the plates to the casting, said means including pins carried by the casting and receivable in recesses in the plates for preventing transverse and longitudinal movement of the plates with respect to the casting, and screws securing the plates to the casting, neither the pins nor the screws extending to the exposed surfaces of the plates.

2. A box parallel comprising a hollow rectangular casting having four rectangular sides, reinforcing webbing connected to the sides and extending through the hollow casting interior, case-hardened steel plates removably secured to the casting sides, the exposed face of the plate being reinforced with integral ribs that extend from the plate surface inwardly into the interior of the plate.

3. A box parallel comprising a hollow rectangular casting having four rectangular sides, reinforcing webbing connected to the sides and extending through the hollow casting interior, case-hardened steel plates removably secured to the casting sides, the exposed face of the plate being reinforced with integral ribs that extend from the plate surface inwardly into the interior of the plate, said ribs extending across the plate face and intersecting other ribs to form a lattice-like embedded reinforcing webbing to reinforce the exposed face of the plate.

4. In a device of the type described, a case-hardened steel plate having diagonally-extending grooves V-shaped in cross-section, the walls of the grooves being case-hardened to a depth greater than the depth of the case-hardening on the steel plate surface, whereby internal reinforcing V-shaped ribs integral with the plate are formed which will reinforce the plate to prevent it from warping due to any internal stresses in the plate interior or on the surface.

5. A device of the type described comprising a hollow casting, means disposed within the hollow casting for preventing the sides from sagging, and reinforcing steel plates mounted on the outer surfaces of the sides, the outer surfaces of the plates being provided with integral case-hardened ribs extending inwardly from the surfaces to prevent the plates from warping due to any internal stresses in the plate interiors or on the surfaces.

6. A box parallel comprising a hollow rectangular casting having four rectangular sides extending at right angles to each other, case-hardened steel plates covering the four sides of the box, and means removably securing the plates to the casting, said means including screws for

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securing the plates to the casting, the screws extending from the inside of the box through the casting side and into the plates without extending to the exposed surfaces of the plates.

7. In a device of the type described, a case-hardened steel plate having grooves in one face, the bottoms of the grooves being case-hardened to a depth greater than the depth of the case-hardening on the face, whereby internal reinforcing ribs integral with the plate are formed which will reinforce the plate to prevent it from warping due to any internal stresses in the plate interior or on the surface.

8. A box parallel comprising a hollow rectangular casting having two walls thicker than the other two walls, two case-hardened steel plates removably secured to the two thinner walls of the casting, the thickness of the thin walls and plates being equal to the thickness of the thicker walls.

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