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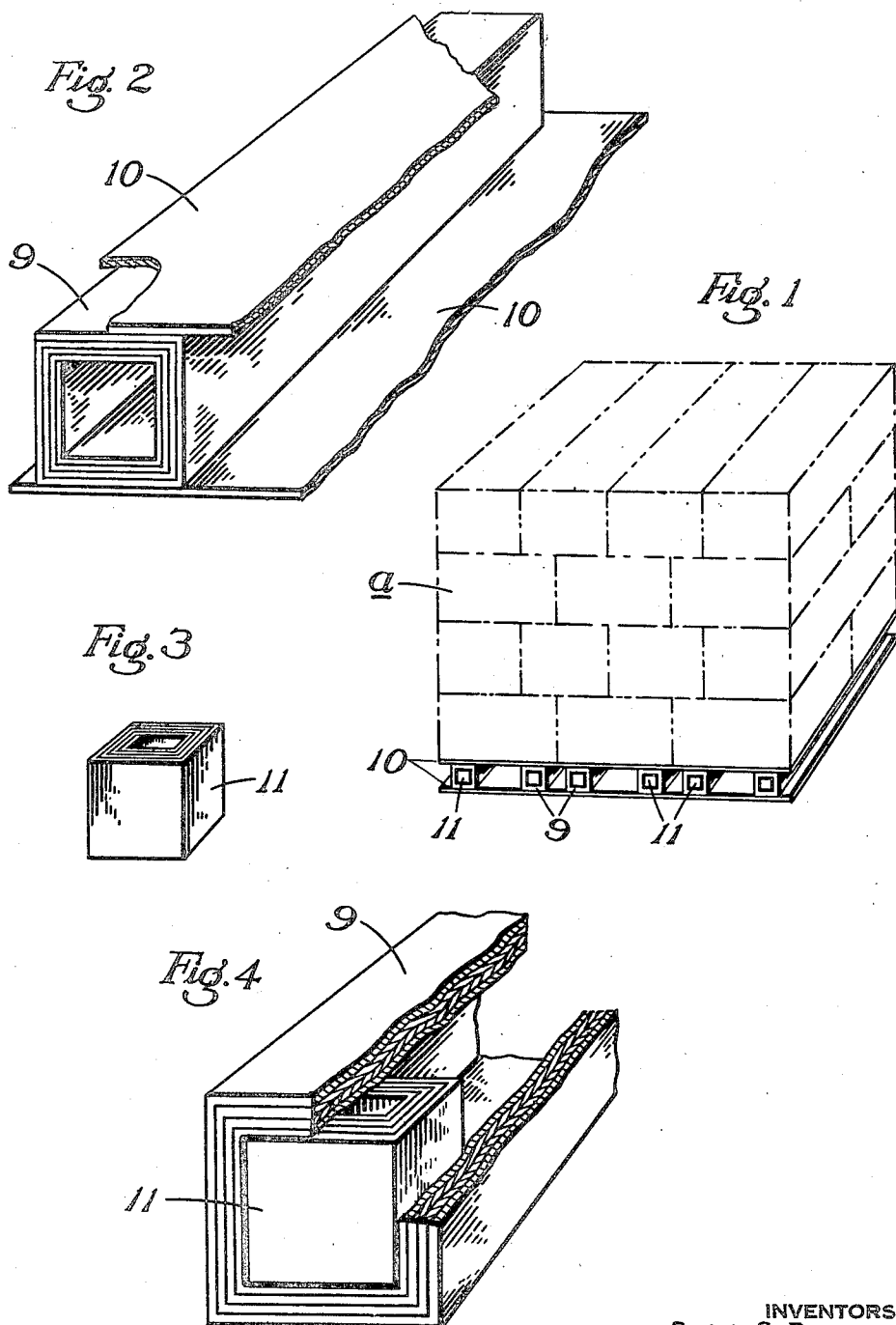
P. S. BOLTON ET AL

2,559,930

PALLET

Filed Oct. 22, 1946

2 Sheets-Sheet 1



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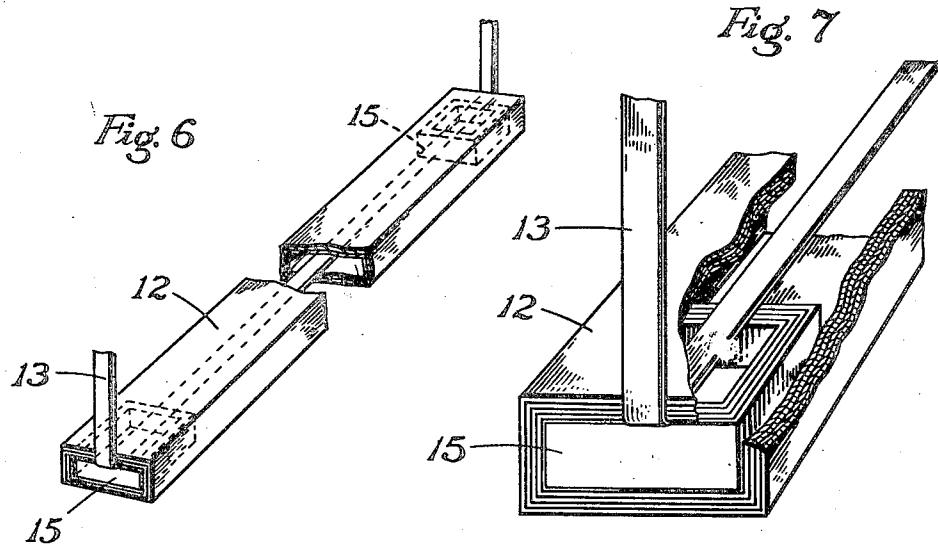
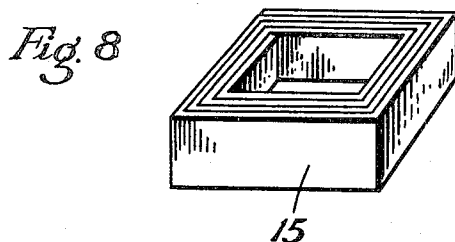
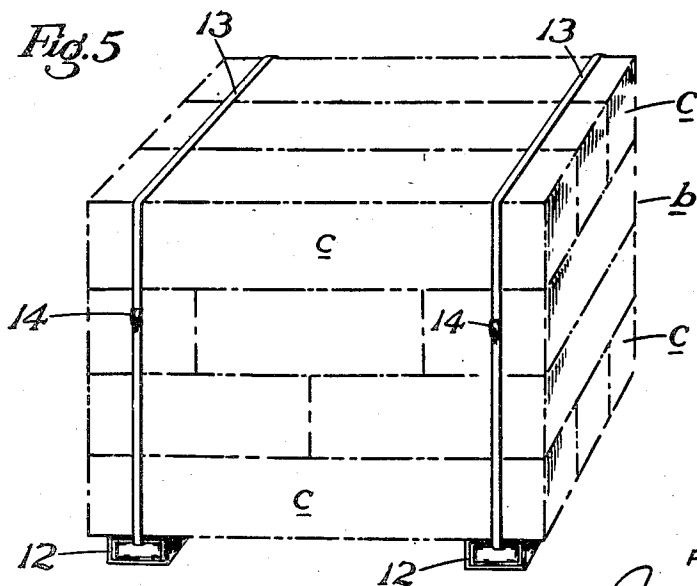
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PALLET

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2,559,930

PALLET

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2 Claims. (Cl. 248—120)

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The invention relates to shipping pallets.

Before the war the conventional method of designing a container was to build it to fit the contents and then trust to chance as to how these containers were to be handled and how they were to be fitted into a box car or hold of a ship for transportation. In fact the designing of most containers has been the last step in the production and handling of new merchandise.

During the war the United States Navy made an entirely new approach to container design by relating it specifically to the materials' handling problem. This new approach resulted in the perfection of the so-called "palletized load." The use of pallets is not new, but never before have their full possibilities been so thoroughly explored. The urgency of war forced the Navy to carry the idea through to its logical conclusion. Containers were designed to fit the box car rather than to fit the contents, and these containers were loaded on standard sized pallets 4 foot square. The pallet has two parallel horizontal surfaces and thus can be handled by a fork truck, usually equipped with elevator apparatus, or by apparatus whose construction provides forks which can enter the pallet and lift the load for stacking in tiers.

Some of the economies resulting from the use of such palletized loads were almost unbelievable. For example, before the new system was adopted it took 14 men half a day to break out of stowage and load a car handling each container separately. With the palletized load one woman on a fork truck could load the same car in less than two hours. Yet in spite of this economy in handling, considerable resistance has been encountered in converting peacetime industry to the idea of making so revolutionary a change as that adopted by the Navy under the stress of war. For one thing, industry must take into account the cost of the pallets. The Navy was able to use pallets constructed of wood and it was not considered necessary that these be returned for re-use. The cost factor now looms large and it is a particular object of the present invention to provide an inexpensive pallet to take the place of the wood pallet. Accordingly we have devised a pallet which can be constructed entirely of paper and yet has the strength to support loads on the order of 2000 pounds and capable of being stacked safely in tiers three high.

The manufacturing cost of our new pallet is sufficiently low that it can be thrown away after one use and need not be returned to the original shipping point. In fact it has been an object of

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our invention to provide an improved expendable or "throw-away" pallet.

In the drawings illustrating our invention:

Fig. 1 is a perspective view of a palletized load employing a pallet of our preferred design.

Figs. 2, 3 and 4 are details in perspective of this same pallet. Fig. 2 shows one corner of the pallet with portions of the top and bottom cover sheets broken away to reveal the construction more clearly. Fig. 3 is a detail of one of the strengthening inserts employed in the construction, and Fig. 4 shows how this insert is fitted into the end of one of the tubular supports of the pallet, a portion of this tubular support being broken away to reveal this more clearly.

Figs. 5 to 8 inclusive illustrate a modified construction, Fig. 5 showing the complete palletized load, Fig. 6 a detail in perspective of one of the pallet supports or "runners," Fig. 7 a detail of one end of this support to an enlarged scale, and Fig. 8 a detail of one of the strengthening inserts for this support.

Reference will first be made to the preferred construction shown in Figs. 1 to 4 inclusive. Our pallet comprises, in its general arrangement, supports in the form of hollow rectangular paper tubes 9 arranged in spaced parallel relationship and stiff paper sheets 10 secured to either side of these tubes as by means of glue, staples or nails. The pallet rests on the floor of the warehouse or box car or on the top of another load, and supports the load *a* which is indicated diagrammatically in dot dash lines. Rectangular insert blocks 11 fit tightly into the ends of tubes 9 and reinforce them against collapsing under the influence of forces out of line with the vertical.

The hollow rectangular tubes 9 each comprises a length of paper wound in tight layers bonded together. Also in our preferred construction the rectangular inserts 11 are formed of paper wound in layers bonded together to form a hollow tube. These inserts are assembled with the supports 9 with their axes at right angles to the axis of the tube into which they are fitted, as clearly shown in Fig. 4.

In the modified construction shown in Figs. 5 to 8 inclusive, the load *b* is of such a nature as to be capable of support on two or more spaced "runners" 12 which are used without the stiff paper sheets 10 described with reference to Fig. 1. For example, a load of rigid form, or one having long cartons *c* arranged at the top and bottom can advantageously be supported in this manner. The runners or supports 12 comprise a length of

paper wound in tight layers bonded together in the manner which has been described with reference to supports 9. In the particular construction here shown, the supports are of somewhat flat rectangular form in cross-section rather than of the square form shown in Fig. 2. It will be appreciated that the form of these supports is something which is subject to some variation.

After the load has been assembled on the supports 12, strapping wires, flat steel bands 13, or other means for tying the load together are passed through the hollow interior of each support, thence around the load, and are secured at 14 in any suitable manner, for example, by means of a metal seal. Thereafter the reinforcing inserts 15, which may be constructed of paper wound into tubular form as has been described with reference to insert 11 (Fig. 3), are placed in each end of the supports as illustrated in Figs. 6 and 7. These inserts should fit snugly to afford maximum reinforcement against collapse under any stresses which may be applied at an angle to the vertical.

The securing straps 13 may, if desired, be employed in conjunction with the pallet and load illustrated in Fig. 1 and the manner of such application will be understood from the preceding description of Figs. 5 to 8 inclusive.

Figs. 2, 3 and 8 illustrate paper tubes as used for supports and inserts, and wound into convolute form from a single sheet of paper. By reason of the limitations of pen and ink drawings, the thickness of the paper layers has necessarily been somewhat exaggerated as has also the thickness of the walls of the hollow rectangular tubes themselves. Actually we have found that 10 or 12 layers of paper are quite suitable which, when made of 16 point chip, will produce a wall thickness of approximately $\frac{1}{4}$ inch. The corners of the tubes may be rounded to a certain extent. The amount of paper or "board" per unit length of support and the number of supports per pallet will vary according to the load specifications. In order further to assist others in the practice of this invention, it can be stated that we have had good results with supports wound on a mandrel the cross-section of which is 3" x 3", using 16 point chip, with an ordinary glue for the adhesive. With these supports we have employed inserts wound on a mandrel whose cross-section is $2\frac{1}{2}$ " x $2\frac{1}{2}$ " to produce inserts having a cross-section of 3" x 3" over all. These inserts are wound in the form of a long tube which is then cut to approximately 3" lengths for insertion into the ends of the supports with the axis of the inserts arranged vertically or at right angles to the axis of the supports. These inserts may be used in only the four extreme corners or they may be used in the ends of each of the supports, or if desired, two or more inserts may be inserted into each end of a support. However it has been our experience that one insert in each end of a support is entirely adequate and serves to eliminate any tendency for rolling or leaning when the pressure on the pallet is other than perpendicular as would be the case when a side pressure is

created by the swaying of a car during transit. For the sheets 10 we have specified 60 point chip although paperboard of other weights may be employed if desired.

The drawings illustrate the application of our invention in the construction of a 4' x 4' pallet. Fig. 1 indicates this pallet loaded with 12" x 16" cases. With the specific construction shown in Fig. 1, a three prong fork truck would be used to lift the pallet, spaces 6" wide being provided for each fork.

The strapping arrangement we have described represents an important feature of our invention, and the particular form of support is advantageous in this connection for it permits the insertion of the strapping wire or tape through the support, thereby making the support an integral part of the load.

Tests which we have conducted on full size pallets indicate that such pallets when constructed as we have described will sustain loads of more than 2000 pounds per pallet when stacked in three-high tiers.

The terms and expressions which we have employed are used in a descriptive and not a limiting sense, and we have no intention of excluding such equivalents of the invention described, or of portions thereof, as fall within the purview of the claims.

We claim:

1. A support for palletized loads comprising a hollow tube of generally rectangular form built up of many layers of paper tightly bonded together, and rectangular inserts arranged to fit tightly into the ends of said tubes, said inserts being in the form of hollow paper tubes arranged with their axes at right angles to the axis of the tube into which they are fitted.

2. A pallet comprising supports in the form of hollow rectangular paper tubes arranged in spaced parallel relationship, rectangular inserts arranged to fit tightly into the ends of said tubes, and stiff paper sheets secured to either side of said tubes, both the tubes and the inserts being formed of paper wound in layers bonded together, and the axes of the tubes and inserts being arranged at right angles to one another.

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