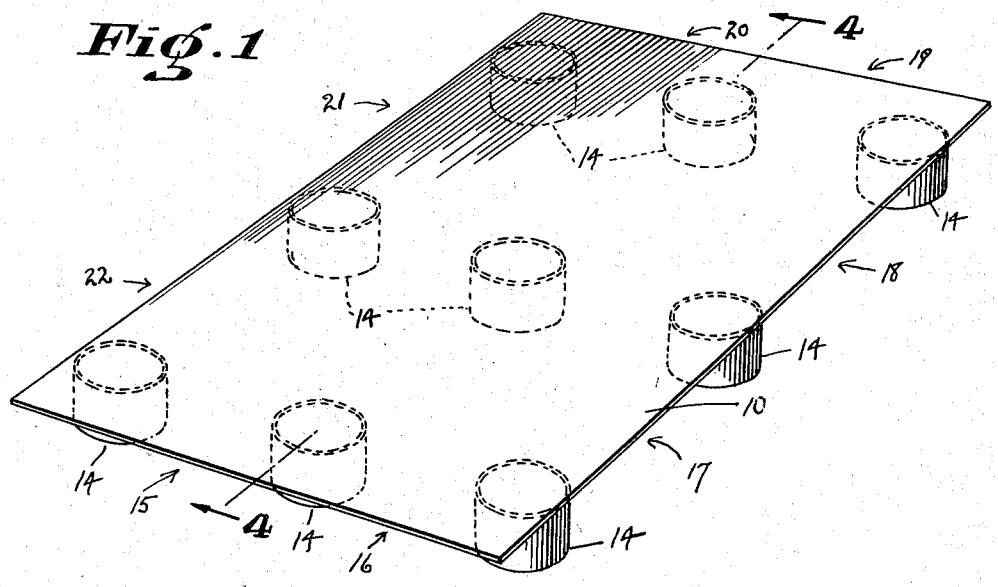
June 29, 1948. N. L. CAHNERS 2,444,184

EXPENDABLE PLATFORM

Filed April 12, 1946 2 Sheets-Sheet 1

Fig. 1



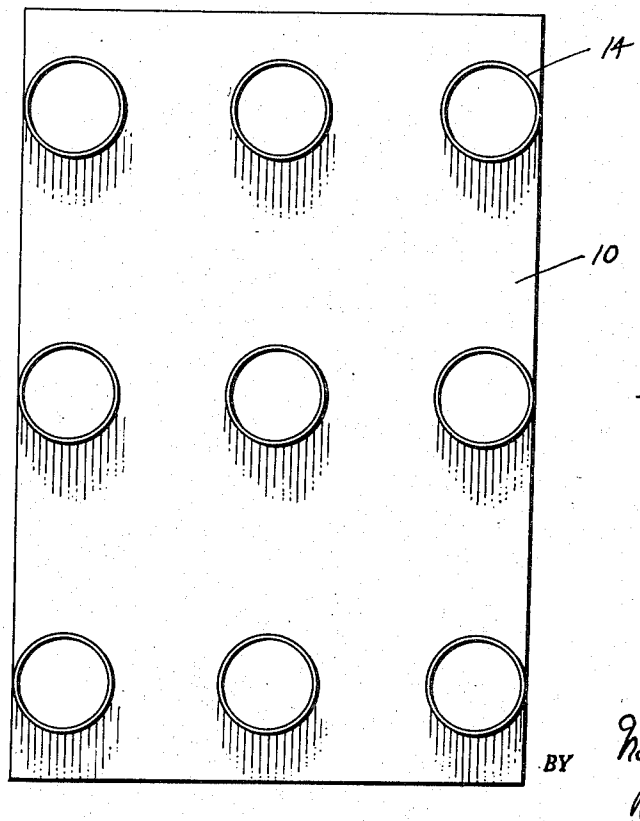




Fig. 2

INVENTOR.
Norman L. Cahners
BY Rowland Y. Patrick
ATTORNEY

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2 Sheets-Sheet 2

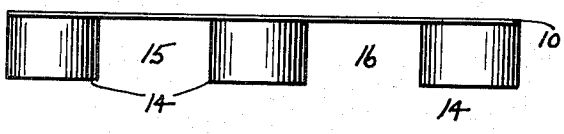
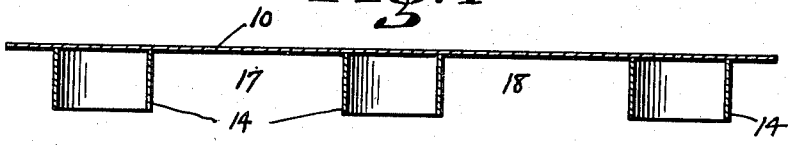



Fig. 3

Fig. 4



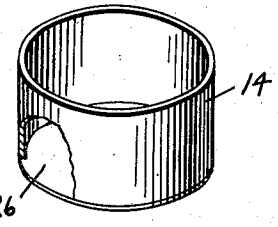




Fig. 5

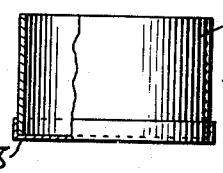



Fig. 6

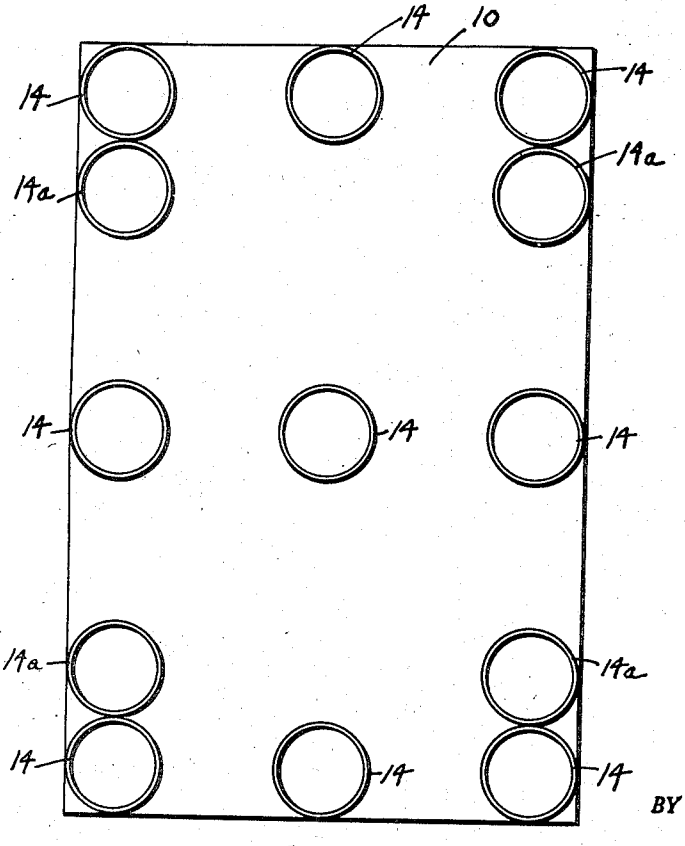



Fig. 9

Fig. 7

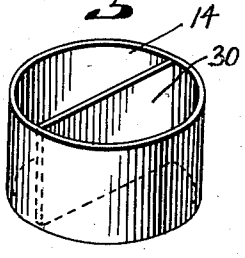
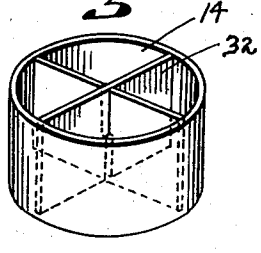



Fig. 8




INVENTOR.
Norman L. Cahners
Rowland V. Patrick
BY
ATTORNEY

Patented June 29, 1948

2,444,184

# UNITED STATES PATENT OFFICE

2,444,184

## EXPENDABLE PLATFORM

Norman L. Cahners, Brewer, Maine

Application April 12, 1946, Serial No. 661,556

4 Claims. (Cl. 248—120)

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This invention relates to portable platforms adapted for lift truck operations and is concerned specifically with an expendable platform. The term expendable is used to denote a platform economically adapted for one shipment use, to be thereafter discarded or thrown away. Its cost is so small as to be absorbable as a transportation expense instead of representing a capital investment.

Use of portable platforms, commonly referred to as pallets and skids, has been recognized as a source of substantial reduction in the labor cost involved in shipping commodities, particularly small items of uniform size and weight. Paleted commodity transportation has come into increasing use even where substantial capital investment in platforms is required, as with durable wood and metal pallets, costing from $4 apiece and upward, but it has been apparent all along that for through or long distance transportation use, the use of such pallets has serious limitations. In the first place, these platforms are, under Interstate Commerce Commission rates, subject, in less than carload lot shipments, to the going rate for the commodity carried, just as any shipping package or crate. Durable platforms often weigh as much as 100 pounds and therefore contribute a substantial part of the shipping cost in less than carload lot shipments. Secondly, where their cost represents capital investment some arrangement must be made for their return—with added transportation cost—or disposal at their destination. These obstacles have not been heretofore successfully overcome to my knowledge, mainly because the strength requirements of a general use pallet are now found only in heavy wood and steel constructions.

This invention has for an object the provision of a platform, having the requisite strength for general use, which is so inexpensive to begin with that it is inherently economically capable of discard after one shipment use, and which is so light in weight that its contribution to transportation cost at the rate of the commodity carried is practically negligible.

To these ends, the platform of this invention is characterized by a structure constituted, in its preferred form, of an exceedingly small amount of inherently inexpensive lightweight materials but which produces a platform of adequate vertical compressive strength and resistance to lateral collapse for general commodity use.

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The novel structure of platforms of this invention is such that it provides, when desired, in addition to the above objectives, the advantageous features of, first, adaptation to use by low lift as well as by high lift fork trucks, and second, adaptation to four-way use.

With regard to the former, counterbalanced high lift fork lift trucks which operate on the cantilever principle may and often do have fairly thin forks so that platforms used therewith may be low, with passageways of just sufficient height to permit ingress of the forks thereunder, sometimes as little as ⅜". On the contrary, manually or power operated low lift trucks have wheels at the forward ends of the forks which are designed to be lowered after the forks are positioned beneath the platform to lift the platform with respect to the floor or other supporting surface. Forks of these trucks require about 3" clearance. As the height of the platform is increased to accommodate such forks, resistance to lateral collapse is greatly decreased, and compressive strength becomes an increased problem, particularly because the passageways must retain sufficient width to accommodate the width of conventional forks.

Platforms of this invention despite their low cost and light weight do have adequate passageway height to accommodate lift forks of low lift trucks and still have adequate resistance to lateral collapse and sufficient compressive strength in a vertical direction to support loads well over the maximum capacity loads of average lift trucks whether operating on the cantilever principle or otherwise.

Another desirable feature of platforms of this invention in connection with their use with low lift fork trucks is that the passageways are open-bottomed and offer no barrier to the lowering of the wheels of low lift trucks.

With respect to four-way entry, incorporation of this feature necessarily reduces the area of the platform beneath which direct support can be provided, thus decreasing resistance to vertical and lateral collapse. Nevertheless, the structure of platforms of this invention permits low cost, lightweight construction for four-way entry and the structure still has, even when the passage-

ways are of a height to accommodate low lift truck forks or platform trucks, adequate resistance to lateral collapse and compressive strength in a vertical direction exceeding the maximum load capacity of conventional lift trucks.

A further feature of platforms having the structure of this invention is that they may be grade rated for strength according to their designed use without departing from the basic construction or merely by the addition in certain instances of optional reinforcements.

The above and other advantages of platforms of this invention will be more fully understood when considered in connection with a description of forms of structure embodying the invention and shown in the accompanying drawings in which

Fig. 1 is a perspective view of a platform of the invention;

Fig. 2 is a bottom plan view thereof;

Fig. 3 is a front elevation;

Fig. 4 is a vertical cross-section along the line 4—4 of Fig. 1;

Fig. 5 is a perspective view, broken away for purposes of clarity, of a modified form of one of the elements utilized in the construction of Figs. 1 to 4;

Fig. 6 is an elevation, shown partly in section, of a further modified form of one of the elements utilized in the constructions of Figs. 1 to 4;

Figs. 7 and 8 are perspective views of still further modifications; and

Fig. 9 is a bottom plan view of a modified form of platform embodying the invention.

The platform shown in the drawing has an elevated plane platform **10** comprising a thin flat sheet of solid fiberboard, corrugated paper, chipboard, paperboard, plywood, veneer, pressed wood, or other suitable sheet material, preferably double-faced corrugated paper having a thickness of approximately $\frac{3}{16}$" or 80-point solid fiberboard. The size of the platform may be conveniently 32 x 48". The platform is permanently elevated by a series of supporting members comprising tubular elements, shown in the drawings as hollow cylinders **14** having inside and outside diameters exceeding their height, positioned as shown with the axes of their bores disposed normal to the plane of the platform. Preferably, the hollow cylinders **14** are spirally or convolute wound fiberboard or chipboard formed on the principle of mailing tubes. For a 32 x 48" platform such as that shown, I have found that tubes having approximately the following dimensions: outside diameter—6", wall thickness—$\frac{3}{16}$ to ¼", and height—3½ to 4", preferably 3¾", give adequate strength and resistance. These tubular elements are adhesively or otherwise affixed along their top rims to the undersurface of the platform **10** to provide, in the case of the platform in Fig. 1, nine supporting members in transverse and longitudinal rows of three each forming therebetween openings **15, 16, 17, 18, 19, 20, 21** and **22** leading to two intersecting pairs of open-bottomed parallel passageways. As indicated, with a platform and supports of the dimensions given, it is desirable to set the rows along the shorter sides of the platform about 3" in from the platform edges. This reduces the platform span between the supporting members in a longitudinal direction. As thus set in, the spans between the tubular elements in the 48" direction will be 12" each, whereas in the 32" direction they will be 7" each. The height of the openings and passageways will be equivalent to the height of the tubular elements, that is 3¾". The openings thus have adequate width and height to accommodate the forks of conventional lift trucks, but the openings **17, 18, 21, 22** on the longer sides conventionally used for lifting, being slightly wider, that is 12", thereby permitting less accuracy in approach on those sides. Four-way operation is, moreover, permitted by the presence of the intersecting 7" parallel passageways leading from openings **15, 16, 19, 20** and running longitudinally of the platform.



By the use of the hollow tubular members, therefore, support is provided over a relatively large area of the platform to minimize the intervening span of the platform, but the expense is kept low due both to the hollow nature of the tubular elements and to their cylindrical shape. With such structure, I have found that the platform **10** need not have the rigidity of wood planking, but may be of relatively lightweight material such as the corrugated paper previously suggested, it being unnecessary for the material constituting the spans to have such rigidity because the spacing of the supporting members is such that either individual units of the load will extend across the spans and be directly supported by two or more supporting members or else the weight of units directly supported by the supporting members so anchor the corrugated paper and tension the material constituting the spans that intervening units not directly supported by the supporting members do not collapse the platform. Thus, in the platform shown in the drawing, in the 32" direction, the aggregate of the maximum widths (outside diameters) of the supporting members is 3 x 6"=18", which constitutes more than one-half of the lateral 32" dimension of the platform; whereas in the 48" direction, the aggregate of the maximum lengths (outside diameters) of the supporting members is 18" which constitutes exactly half of the distance between the centers of the outside rows of supporting members. At the same time, the extent of each supporting member laterally and longitudinally, being greater than its height, provides good resistance to toppling.

As previously stated, highly satisfactory supporting members may be formed of fiberboard and may consist, for example, of adhesively laminated convolutions formed from seven 5½" widths of paper wound in overlapping relation on a mandrel spirally of the axis of the tube, for example at an angle of about 30° to a plane perpendicular to the axis, to a wall thickness of $\frac{3}{16}$ to ¼", each paper sheet having a caliper of .020 to 0.038", the whole when transversely cut forming one-piece open-ended units having endless walls of continuous laminated sheet material. Such tubes in $\frac{3}{16}$" thickness, 3¾" height and 6" outside diameter weigh something less than 5 ounces each, so that a total platform can be built which weighs only 6 to 6½ pounds even when the wall thickness of the supporting members is ¼". Each individual $\frac{3}{16}$" thick unit has been found to withstand a static load up to 1500 pounds without collapsing, and a platform such as shown in Fig. 1 and described herein. Properly loaded, has withstood, without collapse, a static load of over 5 tons, a tremendous and surprising carrying capacity considering the amount and character of material contained in the structure, and considering that they can be made available to shippers at about ⅕ to ⅛ the cost of wooden platforms of the type now available which do not even provide four-way entry. It is contem-

plated, however, that other fibrous or non-fibrous, non-metallic or metallic sheet material or resin bonded or molded material can be substituted for the fiberboard where cost is not a major factor.

The outstanding utility of platforms of this invention thus results from their unique structure which requires an exceedingly low amount and weight of material per unit of load carrying capacity. Usually, fork lift platforms of this invention have a ratio of static load carrying capacity in pounds to total weight in pounds of the order of 1500 to 1 or more, and preferably always exceeding 1000 to 1, and have overall weights of the order of 6 to 8 pounds and not exceeding about 12 pounds. In general, the tubular elements have outside wall thicknesses, at least at the point of minimum thickness, of not more than ⅛ of their greatest outside dimension.

With respect to the tubular elements, for minimum cost and minimum material use for a given strength, particularly against lateral collapse, cylinders are especially recommended, but other forms, with probable increased cost and/or weight, may be utilized. In the absence of reinforcing elements, as hereinafter described, the tubular elements should, however, for maximum resistance to lateral collapse, have for a given wall thickness at least substantially the resistance to lateral collapse inherent in tubular elements of uniform or non-uniform circular cross-section and/or diameter having the same wall thickness, and include tubular walls having continuously curved or at least intermittently curved or reversely curved or high polygonal cross-sections arranged, preferably, like a cylinder, symmetrically about the axis or substantially so. If the tubular elements are rectangular in shape, reinforcing elements are essential to avert lateral collapse.

The compressive and lateral strength of platforms of this invention may be varied merely by varying the thickness of the walls of the supporting members **14**. The invention therefore provides a platform which can be readily modified in cost to suit particular requirements.

In some cases where unusual amounts of pushing and sliding may occur, or where stacking is contemplated, the supporting members may be provided with bases **26** as of chipboard or other material, adhesively secured across the bottom face of each tube, as shown in Fig. 5. In some instances these base members **26** may be waterproofed as by impregnating the material or, if desired, the supporting members may be capped with a metallic or non-metallic flanged cap **28** such as shown in Fig. 7. These act also to improve resistance to lateral collapse and/or may be useful to resist water damage.

For unusually heavy duty, a platform of this invention may be given added capacity or margins of safety, by fitting into the tubular members or hollow sleeves, internal reinforcing elements. For example, as shown in Fig. 7, a strip **30** of fiberboard, corrugated paper, chipboard, pressed wood, wood, plywood or other strengthening material of substantially less volume than the bore of the sleeve and of dissimilar shape, and for example of $\frac{1}{16}$" or more thickness depending upon the reinforcement desired, may be fitted, wedged, or adhesively or otherwise secured diametrically of the sleeve. Or an X-shaped element **32** of slotted, intermeshed and interlocked strips may be similarly placed, as shown in Fig. 8.



These strips can be made of the same type of materials as the element **30** of Fig. 7.

In some cases, decidedly greater support may be secured by utilizing more than nine tubular elements. In Fig. 9, thirteen are shown, each corner containing a supporting member composed of two hollow cylinders aligned along the long dimension of the platform. By setting eight of the cylinders **14** out flush with the edges of the platform **10**, four inside extra hollow cylinders **14a** may be affixed to the platform. If these elements **14a** are of identical size with those used in the platform of Fig. 1, the width of the lateral parallel passageways will be cut down from 12 to 9" each, but will remain adequate for normal fork lift truck use. The addition of these four extra elements will, however, add to the cost of the item.

When devices of this invention are likely to be exposed to outdoor weather conditions, it may be advisable and it is within the contemplation of this invention to treat a portion or all of the structure, if made of paper or other absorbent material, to render it, or parts of it, waterproof or water-resistant as by the application thereto or impregnation thereof of water-repellent materials of types known to the art, such as resins, natural or synthetic rubbers, inorganic silicates, bituminous materials, coal tars or other pitches or insolubilized glues.

I claim:

1. A portable materials handling accessory adapted for use in lift truck operations comprising a platform and a plurality of spaced supporting members elevating said platform and defining therebetween openings for lift truck entry beneath said platform, said supporting members comprising rigid paperboard tubes affixed beneath said platform with the axes of the bores of said tubes disposed normal to the plane of said platform, each of said supporting members extending both laterally and longitudinally of said platform a distance at least as great as the height of the member and the bore of each tube being of a width at least as great as the thickness of the wall of the tube.

2. A portable materials handling accessory adapted for use in lift truck operations comprising a platform and a plurality of spaced supporting members elevating said platform and defining therebetween openings of greater width than height for lift truck entry beneath said platform, said supporting members comprising rigid cylindrical paperboard tubes affixed beneath said platform with the axes of the bores of said tubes disposed normal to the plane of said platform, and each of said tubes having a bore of greater diameter than the minimum radial thickness of the wall of the tube.

3. A portable materials handling accessory adapted for use in lift truck operations comprising a paperboard platform and a plurality of spaced supporting members elevating said platform and defining therebetween openings of greater width than height for lift truck entry beneath said platform, said supporting members comprising rigid cylindrical paperboard tubes of chipboard wound spirally of the axes of the tubes affixed beneath said platform with the axes of the bores of said tubes disposed normal to the plane of said platform, and each of said tubes having an external diameter at least as great as the height of the tube and a bore of greater diameter than the minimum radial thickness of the wall of the tube.

4. A portable materials handling accessory adapted for use in lift truck operations comprising a platform and a plurality of spaced supporting members elevating said platform and defining therebetween openings leading to unobstructed open-bottomed passageways of greater width than height for lift truck entry beneath said platform, said supporting members comprising rigid paperboard tubes affixed beneath said platform with the axes of the bores of said tubes disposed normal to the plane of said platform, the walls of said tubes being solid and the bore of each tube being of a width at least as great as the thickness of the wall of the tube and separate caps extending across the bottom faces of the tubes.

NORMAN L. CAHNERS.




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