Sept. 10, 1968 P. ERISMANN 3,400,671

STACKING ARRANGEMENT FOR PALLETS

Filed May 24, 1967 2 Sheets-Sheet 1

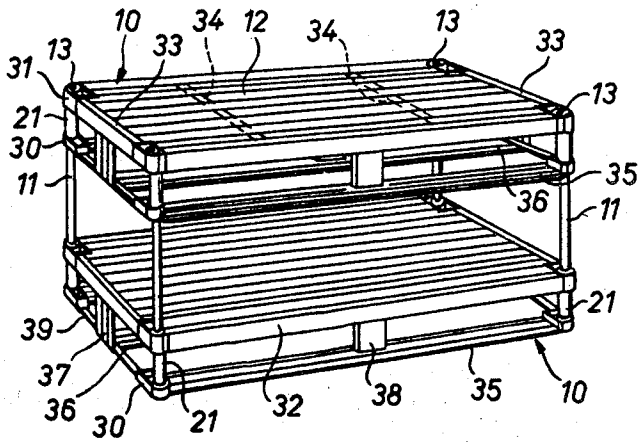
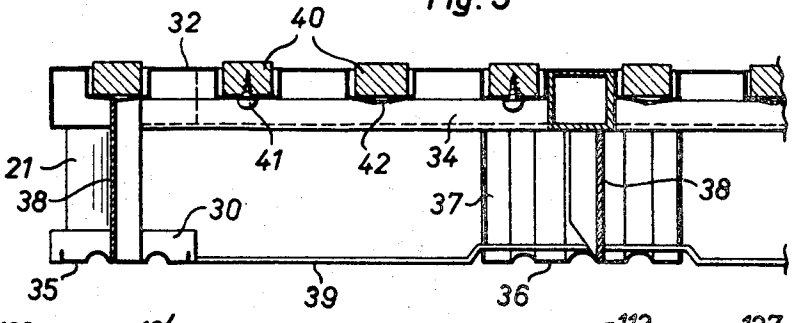


Fig. 1

Fig. 5



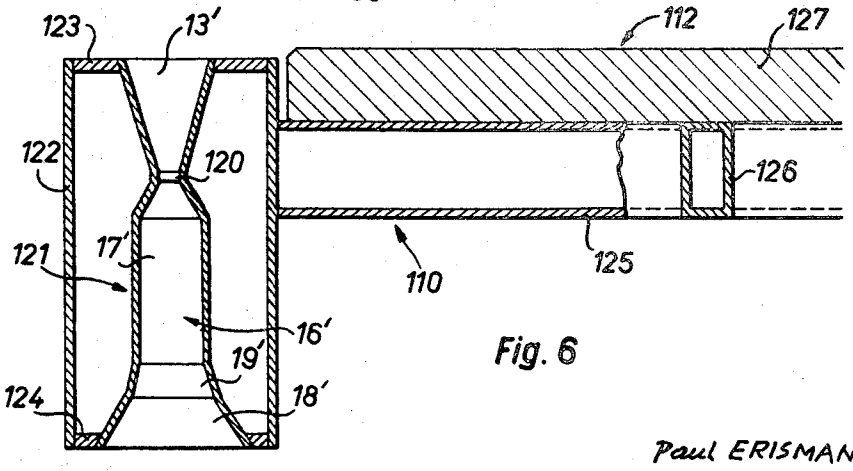


Fig. 6

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STACKING ARRANGEMENT FOR PALLETS

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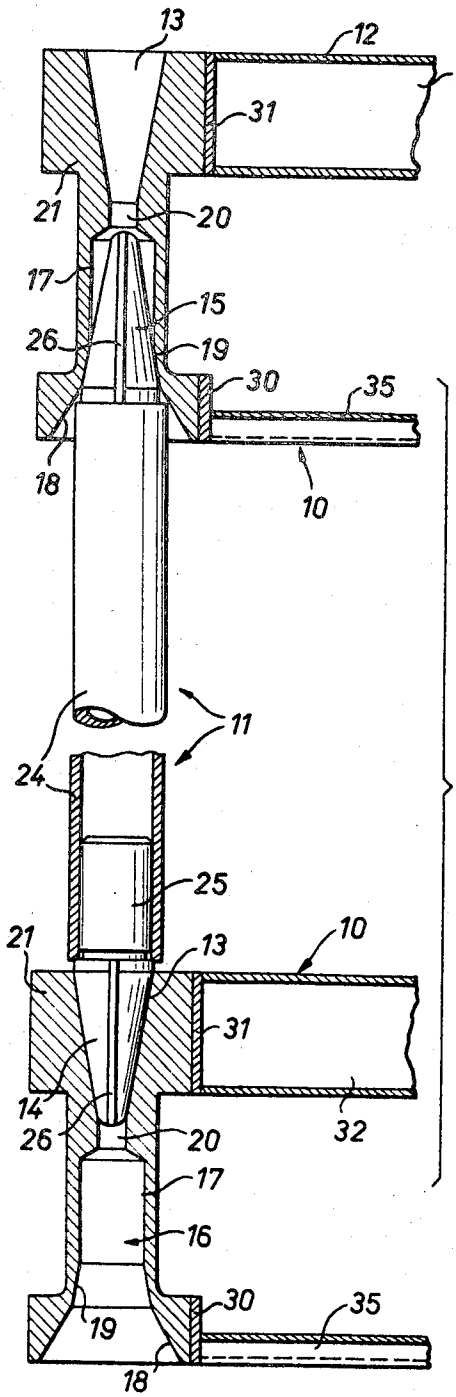


Fig. 2

Fig. 3

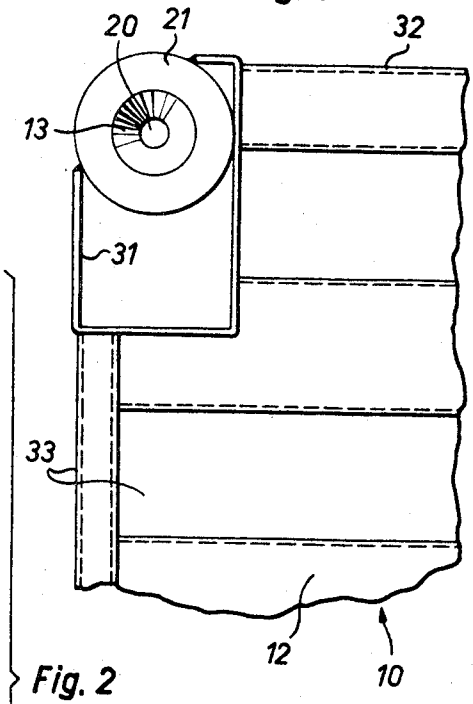
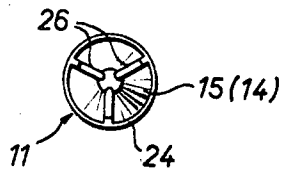


Fig. 4



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STACKING ARRANGEMENT FOR PALLETS

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7 Claims. (Cl. 108—53)

ABSTRACT OF THE DISCLOSURE

A stacking arrangement for pallets in the form of right angled platforms with corner parts. Support members are arranged detachably in such corner parts to allow the stacking of a plurality of pallets above one another. Each of the corner parts of a platform is provided with a conical recess at the top and at the bottom which cooperate with corresponding conical plug like components provided upon the support members. The platforms are provided when made of corrugated sheet metal with grooves in which wooden lathes are positioned having their top sides slightly higher than the top side of the corrugated sheet metal.

The present invention relates to a stacking arrangement including pallets, for transporting or storing piece goods and having support members arranged detachably in the cornerpieces of the right-angled platform of the pallets, which members permit at least a second pallet to be stacked at a distance above the first.

Stacking arrangements of this type are already known and have the advantage that they render possible the transporting or storing of piece goods on the pallets arranged above each other at a distance and that the pallets are again usable when required in the same way as normal transport pallets. Hitherto known types of these stacking arrangements were, however, unsatisfactory in many respects. This mainly concerns the support members and the type of connection with the pallets.

The basic object of the present invention is to produce a particularly simple form of support member and means for detachably connecting it with the pallets, and to render possible a faultless and stable stacking on top of one another of a considerable number of pallets at a distance from each other, so that the stacking device is safely usable even, for example, on moving railway wagons or lorries.

According to the invention there is provided a stacking arrangement with pallets for transporting or storing piece goods and with support members arranged detachably in the corner parts of the right angled platforms of the pallets, which allow the stacking of at least a second pallet at a distance above the first, characterized in that each of the corner parts of the platform of the pallets has a recess opening upwards conically and each of the support members is provided with a corresponding conical plug-like component at least at its lower end, for insertion into one of the said conical recesses.

In accordance with a particularly advantageous embodiment the support members are rod-like and the undersides of the pallets are also provided with recesses to take the upper end of the support members.

In this case the rod-like support members can advantageously have a conical peg-like component at both ends, each of the recesses at the underside of the pallets forming a conical seat for one of the said peg-like components, where the conicity of all peg-like components and conical surfaces is advantageously the same and is between 8° and 15°.

Specific embodiments of the invention will now be described by way of example with reference to the accompanying drawings, in which:

FIGURE 1 shows in perspective a stacking arrangement consisting of two pallets arranged one above the other with support members inserted in between;

FIGURE 2 shows on a larger scale a part of the arrangment partly in vertical longitudinal section and partly in elevation, where, for the sake of simplicity, only one corner piece of the pallet and only one of the support members are represented;

FIGURE 3 shows a plan view on a corner piece of a single pallet;

FIGURE 4 shows a plan view of a single support member;

FIGURE 5 shows a cross-section through one of the pallets;

FIGURE 6 shows a vertical section similar to FIGURE 2 through a corner piece of an alternative embodiment of a pallet.

The stacking arrangement shown in FIGURES 1 and 2 consists of two pallets **10** and four rod-like support members **11** each of which is arranged in one corner of the pallet. The pallets **10** are completely interlocking and have the same outer dimensions as the standardized transporting pallets of numerous railway undertakings now used in large quantities. Consequently, the pallets have a rectangular platform **12** which is intended to take piece-goods for transporting or storing. In each cornerpiece of this platform **12** there is a recess **13** opening conically upwards which forms a seat for a corresponding conical plug-like component **14** (FIGURE 2) at the far end of a support member. At the upper end of each support member **11**, there is also arranged a conical plug-like member **15** which is advantageously exactly the same as the first-mentioned plug-like member **14**.

Coaxially with each conical recess **13**, at the underside of the pallet **10**, another recess **16** (FIGURE 2) is arranged and each recess **16** has a cylindrical part **17**, an opening part **18** widened like a funnel and a conical seat **19** arranged in between. The conicity of the recesses **13**, the plug-like components **14** and **15** and the conical seat **19** is the same and is from 8° to 15°. Between the recesses **13** and **16**, arranged one above the other, a connecting hole **20** is provided which renders possible the removal of water or dirt from the upper recess **13** through the lower recess **16**.

The recesses **13**, **16** and **20** lying coaxially with each other are arranged in a common metal component **21** which, for example, can be made by turning or casting. Four similar metal components **21** form the corner pillars of each pallet **10**. In the present embodiment the pallet **10** is made completely of metal. The construction of the pallets is described in more detail below.

The rod-like support members **11** are, as shown in FIGURE 2, each formed from a tube **24** and two plugs **25** bearing the conical parts **14** or **15** are inserted one in each end of the tube. The length of the tubes **24** are the same length as the required free distance between the pallets **10** when they are stacked one upon the other. It is advantageous to provide each of the plug-like compoents **14** and **15** with one or more longitudinal grooves **26**. Any dirt present in the conical recesses **13** can fall into these grooves **26** if the plug-like components **14** or **15** are inserted with simultaneous rotation.

In accordance with FIGURES 2, 3 and 5 the metal components **21** are each surrounded below and above by an adjacent, approximately rectangular frame **30** or **31** which is welded to the corresponding metal component **21**. The already mentioned platform **12** of each pallet **10** is formed by a corrugated sheet metal **32** and has grooves running parallel to each other, which have a substantially rectangular cross-sectional profile.

At each of its opposite edges, the sheet metal **32** is

reinforced by a profiled fillet **33** which runs at right angles to the longitudinal direction of the sheet **32** and is welded to the latter. Furthermore, there are at the underside of the sheet **32** several cross-pieces **34** arranged at a distance from each other which are attached to the sheet **32** by welding. Both the sheet **32** and the profiled fillet **33** are welded to the upper frame **31** of the metal component **21**.

The lower frames **30** of the metal components **21** are joined by straps **35** in pairs, which straps consist of metal sheet with corrugated cross-sectional profile (FIGURES 1, 2 and 5). A third strap **36** of similar type runs parallel to the straps **35** and in the middle between the same. The metal strap **36** has upwardly directed end parts **37** which are welded to the profiled fillet. Between the underside of the metal plate **32** and the upper side of the straps **35** and **36** are arranged and welded several intermediary supports **38**. Finally, two metal strips **39** run parallel to the profiled fillet **33** each between a pair of the lower frames **30** of the metal pieces **21** and are welded to these frames **30**.

In order to avoid unrequired sliding of the goods which are lying on the platform **12** it is advantageous to place in each of the grooves of the metal sheet **32** a wooden lathe **40** as is shown in FIGURE 5. These wooden lathes **40** are fastened by screws **41** which pierce from below through suitable holes in the base of the grooves in the sheet **32**. The height of the wooden lathes **40** is greater than the height of the grooves so that the upper side of the wooden lathes lies somewhat higher than the upper side of the parts of the metal sheet **32** lying between the grooves. Advantageously the base of the groove is not even but slightly V-shaped or like a gutter and is provided at its deepest point with several drainage holes **42** spaced at a distance from one another for draining water from the upper surface of the platform. In this way the wooden lathes **40** are prevented from lying in water for a long time and being damaged by rotting.

The use and working of the described stacking arrangement is as follows:

One rod-like support member **11** is inserted by means of its lower conical plug-like component **14** into each of the recesses **13** at the upper side of the lowest pallet **10**. A good seating of the plug-like component **14** in the recess **13** is brought about by a screw-like rotation of each support member **11** by which the support members **11** are joined to the lower pallet firmly but detachably. After this the second pallet **10** is lifted by means of a suitable lifting appliance, for example, a fork-lift truck, and then lowered over the first pallet in such a way that the plug-like component **15**, at the upper end of the support member **11**, fits into the funnel-shaped mouth part **18** of the recesses **16** on the underside of the second pallet. By the combined effect of the funnel-shaped mouth part **18** with the conical plug-like component **15** the latter are automatically and accurately centered with reference to recesses **16** if the second pallet is lowered. Finally, the second pallet rests on the plug-like component **15** of the support member **11** by means of the conical seat **19**. The described positioning of the second pallet does not require any great skill in the person operating the lifting appliance and can easily also be carried out if the pallet **10** is loaded with piece goods.

Again rod-like support members **11** can be placed into the conical recesses **13** of the second, i.e., the now top pallet if required, on which support members a third pallet can be placed and so on. In this way a considerable number of pallets **10** can be arranged on top of each other at distances and form a shelf from the stacking arrangement.

The pallet **10** arranged one on top of the other can be lifted easily with a lifting device, for example, a fork lift stacker again individually or in groups. In this way the lifted pallet **10** practically always releases itself automatically from the lower bordering support member **11** since the friction connection between the upper plug-like component **15** and the conical seat **19** is considerably smaller than the frictional contact between the lower plug-like component **17** and the conical surfaces of the recesses **13**. If required, however, the whole pallet stack can be lifted by lifting the lowest pallet by means of a fork lift stacker or the like and transported to another place, for example, to be loaded or unloaded from a vehicle.

The alternative embodiment of a part **110** shown in FIGURE 6 is of simple construction which is satisfactory for many uses. Instead of the metal components **21** of the first example of embodiment there are, in accordance with FIGURE 6, tubes **121** of metal, each of which is provided with a recess **13'** opening conically upwards and a recess **16'** opening downwards. The lower recess **16'** has, as in the first example, a cylindrical part **17'**, a funnel-like opening mouthpiece **18'** and a conical seat **19'** arranged in between. The conicity of the recess **13'** and of the conical seat **19'** is the same and fits the conicity of the pipe-like component **14** and **15** of the support members **11** (not shown in FIGURE 6). Between the recesses **13'** and **16'** is a connecting hole **120**. Each of the tubes **121** is enclosed by a prismatic rectangular sleeve **122** in which end plates **123** and **124** are welded. The latter each have a central opening whose periphery closes at the mouth of the recess **13'** or **16'** and is welded with the corresponding end of the tube **121**. Four of the described sleeves **122** with inserted tubes **121** are arranged and fastened in the corner piece parts of a rectangular shaped metal frame which consists of rectangular tubes **125** of which only one can be seen in FIGURE 6. In these metal frames are incorporated several cross-pieces **126** arranged at a distance from each other which, together with the metal frames form a grating. On the latter is supported and fastened a wooden platform **127** whose transverse side forms the platform **112** of the pallets.

The mode of use of the pallet just described in accordance with FIGURE 6 in connection with rod-like support members **11** is exactly the same as described in the first described embodiment.

In another embodiment (not shown) the pallets can be completely made of wood and only have in the corner parts the metal pieces **21** or tube pieces **121** or similar parts which contain the recesses **13, 16, 20** and **13', 16', 120**.

The main advantages of the described stacking arrangement in accordance with the invention are:

(a) The support members **11** and the means of joining them with pallets **10** or **110** are simple to manufacture;

(b) The safe, stable and rock-free connection of the support members **11** to the pallets **10** or **110** and the connection is easy to make and unmake;

(c) The support members **11** can, if required, be made in the required length quickly or correspondingly long tube pieces **24** are cut out and inserted in the ends of the same plugs **25**;

(d) If the support members **11** are removed from pallets **10** or **110** they can be used exactly in the same way as normal pallets;

(e) The cost of producing the pallets provided with recesses **13** and **16** or **13'** and **16'** is scarcely higher than that of conventional pallets;

(f) Water, dust and dirt have little or no affect on the operational efficiency of pallets **10** or **110** and the support members **11**.

It is thought that the invention and its advantages will be understood from the foregoing description and it is apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing its material advantages, the forms hereinbe-

fore described and illustrated in the drawings being merely preferred embodiments thereof.

I claim:

1. A stacking arrangement with pallets for transporting or storing piece goods, comprising a plurality of pallets in the form of right-angled platforms having an upper and a lower side and corner parts, each one of said corner parts having a pair of openings arranged at the upper and the lower side of each pallet, rod-shaped support members each having identical conical plug-like end portions at its two ends for insertion into one of said openings at the upper side of one of said pallets and into one of said openings at the lower side of another one of said pallets, said pair of openings of each corner part being arranged in coaxial alignment with respect to one another, the openings at the upper side of the pallets each having a conical seat surface of the same conicity and substantially the same axial length as said conical plug-like end portions of the support members, the openings at the lower side of the pallets each having a conical seat surface of the same conicity but a reduced axial length than the conical plug-like end portions of the support members.

2. An arrangement as claimed in claim 1, wherein the openings at the lower side of the pallets each have a cylindrical portion in communication with the smaller diameter end of said conical seat surface and a funnel-like widened mouthpiece extending from the larger diameter end of said conical seat surface, said cylindrical portion, said conical seat surface and said mouthpiece all being in axial alignment.

3. An arrangement as claimed in claim 1 wherein the upper side of each of said platforms is formed of corrugated sheet metal and has grooves running parallel to each other and wooden lathes are located in said grooves whose upper sides are higher than the upper side of said sheet metal.

4. An arrangement as claimed in claim 3, wherein the base of each groove of said corrugated sheet metal is slightly V-shaped to form a gutter and has at the deepest part drainage openings arranged at a distance from one another.

5. An arrangement as claimed in claim 2, wherein each pair of axially aligned openings is interconnected by a passage extending from the smaller diameter end of the seat surface of the upper opening to the cylindrical portion of the lower opening, said passage having a smaller diameter than said cylindrical portion.

6. An arrangement as claimed in claim 1, wherein each of said conical plug-like end portions of the support members and each of the conical seat surfaces of said openings have the same conicity lying in the range from 8° to 15°.

7. An arrangement as claimed in claim 1, wherein each of said conical end portions of the support members has three evenly distributed longitudinal grooves.

References Cited

UNITED STATES PATENTS

2,591,049	4/1952	Butsch	108—53 XR
2,673,700	3/1954	Eberhardt	108—53
2,676,776	4/1954	Townson	108—53
2,678,787	5/1954	Averill	108—53
3,160,120	12/1964	Skubic	108—53
3,180,288	4/1965	McCowan	108—101
3,224,388	12/1965	Skubic	108—53

FOREIGN PATENTS

999,015	7/1965	Great Britain.

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