

(57) **Abrégé(suite)/Abstract(continued):**

latch having a rotatable shaft (40), a head (46) connected to a bottom end of the shaft, and a plate (42) connected to a top end of the shaft. A spring (44) biases the plate toward the bottom surface of the sub-container. A lever (48) is attached to the shaft between the head portion and the spring. The shaft and head portion are rotatable between an unlocked position and a locked position via the lever. One or more guide members (30, 32) may be mounted on the base to help align the sub-containers.

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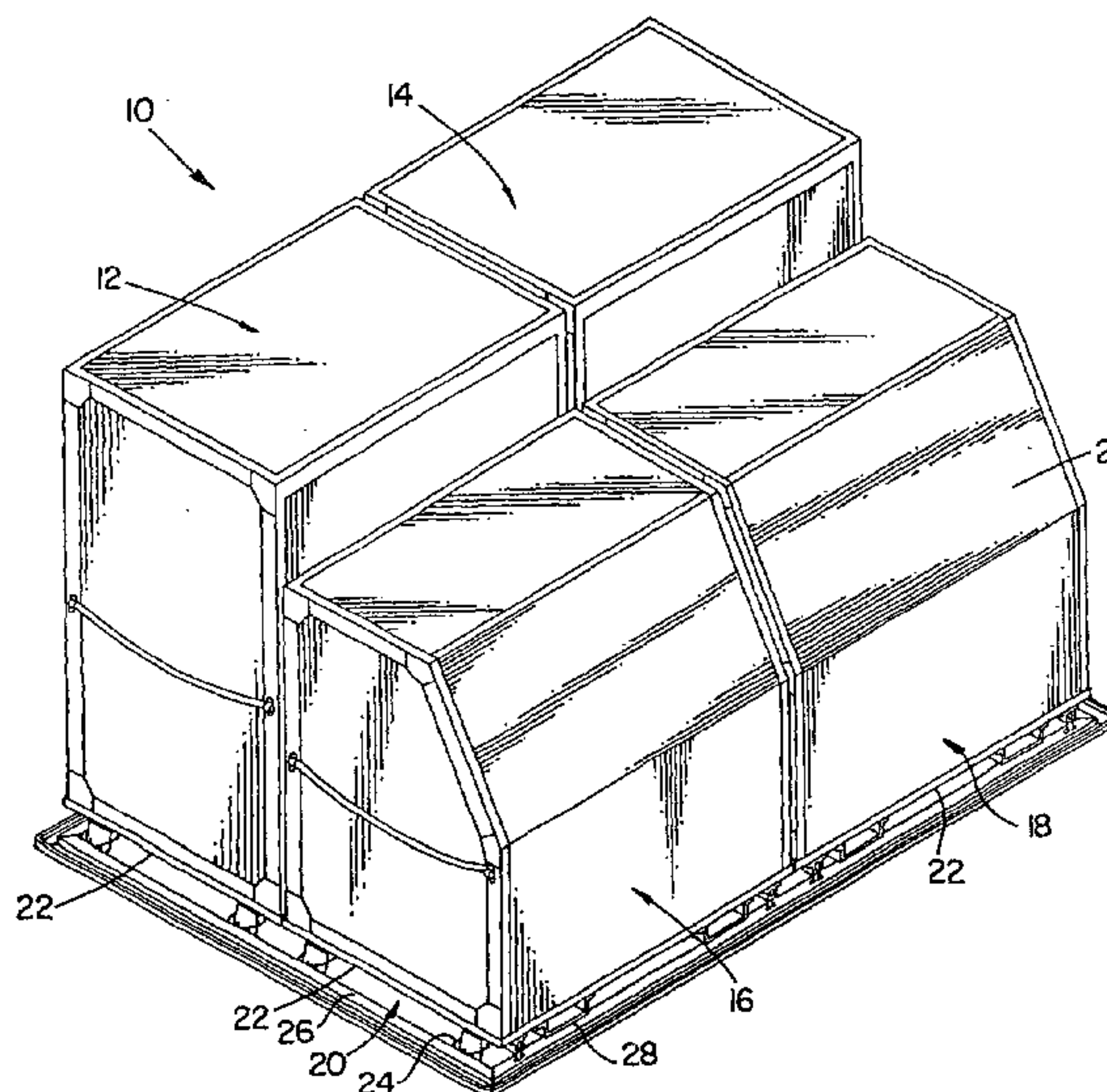
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(54) Title: AIR TRANSPORT MODULAR CONTAINER SYSTEM



(57) **Abstract:** An air cargo container assembly (10) for rapid air shipment of emergency and other supplies, without netting, includes sub-containers (12, 14) attachable to a base plate (20) via locking mechanisms (29) on the sub-containers. The locking mechanisms pass through openings (34) in the base and engage a downward-facing surface of the base. Each locking mechanism includes a latch having a rotatable shaft (40), a head (46) connected to a bottom end of the shaft, and a plate (42) connected to a top end of the shaft. A spring (44) biases the plate toward the bottom surface of the sub-container. A lever (48) is attached to the shaft between the head portion and the spring. The shaft and head portion are rotatable between an unlocked position and a locked position via the lever. One or more guide members (30, 32) may be mounted on the base to help align the sub-containers.

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AIR TRANSPORT MODULAR CONTAINER SYSTEM

BACKGROUND OF THE INVENTION

[0001] Air cargo containers are commonly used to
5 transport various types of cargo. Air cargo containers are
generally loaded with cargo at a remote location,
transported to an airport or airstrip by truck, and are
then loaded into aircraft using specialized equipment. To
improve security against chemical, biological or nuclear
10 terrorism, the various government agencies around the world
have begun to stockpile smaller modular air cargo
containers (known as sub-containers) containing emergency
medical supplies, such as smallpox vaccines. These
emergency air cargo containers or sub-containers may be
15 often stored at air transportation centers, so that they
may be transported quickly to areas where the supplies are
needed.

[0002] As these sub-containers or modular containers are
used to store a large supply of items, when loaded, they
20 may weigh up to 1000 kg or more. Unlike most other air
cargo containers, the sub-containers have caster wheels, or
other suitable wheels, so that the containers may be
readily moved by hand.

[0003] When these types of air cargo containers are shipped, they are generally loaded onto pallets with a forklift, and are then covered with nets to secure the containers to the pallets. The pallets loaded with the
5 containers are then moved into an airplane or truck with a forklift or a conveyor system.

[0004] This system of loading containers onto pallets, securing nets over the containers, and then loading the pallets into an airplane or truck, has several
10 disadvantages. First, the process is time-consuming, particularly the netting portion of the process. Moreover, specialized skill is required to properly load the containers onto pallets with a forklift, and to properly secure the containers to the pallets with nets.
15 Additionally, the caster wheels on the containers rest on the substantially flat pallet surfaces during transport, which may lead to the containers rolling off of the pallets, particularly during rough transport.

[0005] As a result, the shipment of supplies contained
20 within the air cargo containers may be delayed. In the case of emergency medical supplies, the potential delays associated with current transportation processes are unacceptable. Accordingly, a more efficient system of

transporting air cargo containers, and especially for transporting sub-containers containing emergency medical supplies, is urgently needed.

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STATEMENT OF THE INVENTION

[0006] In a first aspect, a modular air cargo container assembly includes sub-containers secured to a base or pallet via locking mechanisms located on the sub-containers. The locking mechanisms preferably pass through openings in the base and engage a bottom surface of the base. Since the sub-containers are secured in place by the locking mechanisms, securing the sub-containers with netting is not needed. Additionally, the sub-containers are much more quickly, reliably, and easily secured to the base, which reduces transport time and complexity.

[0007] In a second aspect, the base or pallet comprises a metal plate, preferably an aluminum plate, having openings through which the locking mechanisms on the sub-containers pass to engage a bottom surface of the base. As the base is similar in size and shape to existing bases, it can be handled by existing airport and/or shipping depot equipment.

[0008] In a third aspect, a locking mechanism on the container comprises a latch having a rotatable shaft. A head is connected to a bottom end of the shaft. A plate is connected to a top end of the shaft. A spring biases the plate toward a latch pin. A lever is attached to the shaft between the head portion and the spring. The shaft and head are rotatable between an unlocked position and a locked position via the lever. The locking mechanism is quickly and easily used to lock a sub-container onto the base, without the need for tools or netting.

[0009] In a fourth aspect, one or more guide members are mounted to a top surface of the base, preferably in a substantially cross-shaped pattern. The guide members automatically position sub-containers on the top surface of the base, so that the locking mechanisms are properly aligned with corresponding openings or fittings on the base.

[0010] In a fifth aspect, in a method of securing containers to a base, locking mechanisms on the containers are engaged to the base. The containers are quickly and easily, yet securely, attached to the base, for shipment by air or ground.

[0011] Other features and advantages of the invention will appear hereinafter. The invention resides as well in sub-combinations of the features described.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Fig. 1 is a perspective view of a preferred modular container assembly.

[0013] Fig. 2 is a partial bottom perspective view of a sub-container used in the modular container assembly of
10 Fig. 1.

[0014] Fig. 3 is a back view of the modular container assembly of Fig. 1.

[0015] Fig. 4 is a side view of the modular container assembly of Fig. 1.

15 [0016] Fig. 5 is a plan view of a base used in the container assembly of Fig. 1.

[0017] Fig. 6 is a partial exploded view of a sub-container detached from a base.

[0018] Figs. 7A and 7B are front-sectional views of a preferred locking latch mechanism in a retracted and an engaged position, respectively.

[0019] Fig. 7C is a side-sectional view of the preferred locking latch mechanism of Figs. 7A and 7B in an engaged position.

DETAILED DESCRIPTION OF THE DRAWINGS

[0020] Fig. 1 illustrates a modular container assembly or system 10 according to a preferred embodiment. The container assembly 10 includes a plurality of sub-containers detachably mounted to a base plate or structure 20, or container support structure. Four sub-containers 12, 14, 16, 18 are shown detachably mounted to a rectangular base 20 in Fig. 1. Two sub-containers 12, 14 having a rectangular cross-section in a lengthwise and a widthwise direction, and two sub-containers 16, 18 having a truncated right trapezoidal cross-section in a lengthwise direction, are shown in Fig. 1 for illustration purposes. Of course, various numbers of sub-containers, having any suitable shape or configuration, may be employed in the container assembly 10. Detachably mounted means having the capability to be attached or secured (e.g., during transport), and also

able to be released (e.g., during actual loading and unloading of the containers onto the base).

[0021] The sub-containers are preferably metal, such as aluminum, or any other material suitable for securely
5 containing and transporting a large volume of items, such as a large quantity of emergency medical supplies. The sub-containers are preferably formed of extruded aluminum sections, with the sections attached to one another via rivets, welds, or other suitable attachments. The base
20 is typically a metal plate 3 to 6 or 4 to 5 mm thick.
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[0022] Each sub-container preferably includes a door 21 or a removable cover for providing access into the sub-container. Items, such as medical supplies, may be loaded into and unloaded out of the sub-container via the door 21.
15 The door 21 is preferably lockable via a lock, latch, or other suitable locking mechanism, so that the door 21 remains closed during transport of the sub-container.

[0023] As shown in Fig. 2, the sub-container 12 preferably includes a plurality of caster wheels 24, or
20 other wheels or rollers, attached to a bottom surface of the base section 22.

[0024] The sub-container 12 may optionally include a pair of forklift guides 28 attached to the bottom surface of the base section 22. The guides 28 receive the forks of a forklift. If provided, the forklift guides 28 allow the sub-container 12 to be readily raised and lowered for storage and/or for delivery at locations where a relatively smooth rolling surface is not available.

[0025] The sub-container 12 further includes one or more locking or securing mechanisms 29 on a bottom surface of the base section 22. In a preferred embodiment, four locking or securing mechanisms 29, one near each corner of the base section 22, are attached to the base section 22, as illustrated in Fig. 2. The locking mechanisms 29 may comprise any devices suitable for securing and releasing a sub-container to and from the base 20.

[0026] The locking mechanisms 29 may be located in front of the caster wheels 24 near the outer edges of the base section 22, as illustrated in Fig. 2, or may be located at any other suitable location on the base section 22. The locking mechanisms 29 are preferably positioned so that they may be aligned with latch engagement openings 34, or latch engagement structures or devices, in the base 20. In one configuration, two of the locking mechanisms 29 may be

