Oct. 14, 1952 B. T. GILL ET AL 2,613,834

KNOCKDOWN CRATE

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FIG.1.

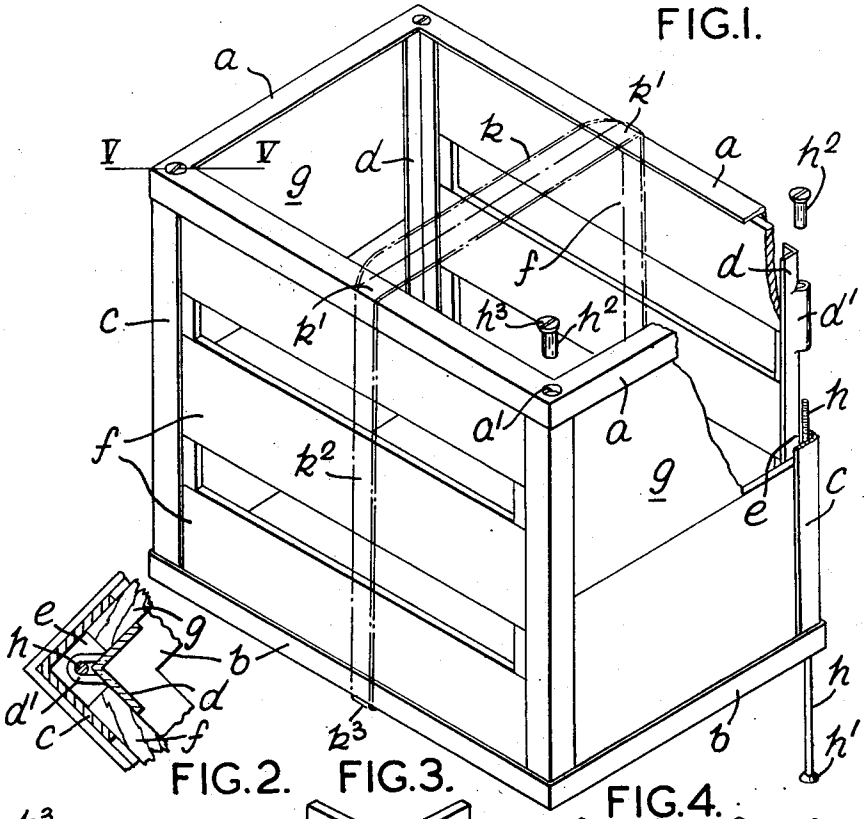


FIG.2.

FIG.3.

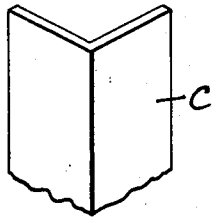


FIG.4.

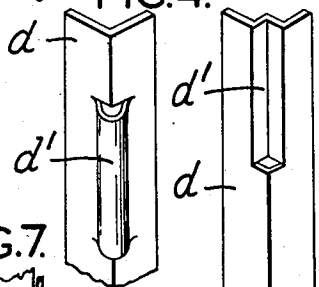


FIG.5.

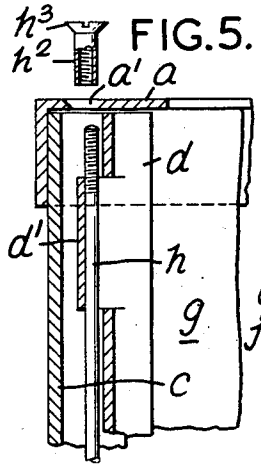


FIG.8.

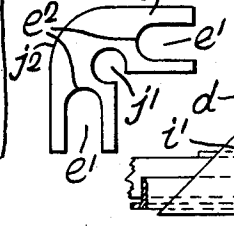


FIG.7.

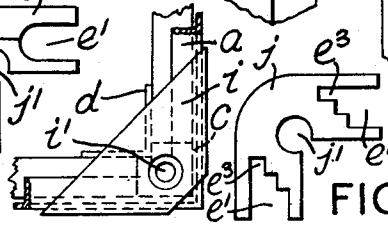


FIG.6.

FIG.9.

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KNOCKDOWN CRATE

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2 Claims. (Cl. 217—12)

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This invention relates to improvements in crates, cases and like containers for the storage and transport of bottles or other goods. More particularly it relates to containers of composite construction, in which top and bottom frames and connecting standards or uprights, made for example of metal, are provided with detachable slats or panels forming the sides and ends of the containers, these slats or panels being made of wood or other suitable material.

According to the present invention, the improved crate, case or like container comprises rectangular top and bottom frames which are connected together at the corners by vertical tie-members or equivalent means associated with corner uprights each of which provides two vertical guide-channels disposed at right angles to each other for receiving detachable slats or panels constituting the ends and sides of the crate or the like.

In such construction each of the uprights may comprise separate outer and inner angle members held in spaced relationship so as to form between them the two vertical guide-channels. The vertical tie-members may comprise bolts or screw-threaded rods fitted at one or both ends with countersunk nuts or screw-nipples and engaging with countersunk holes at the corners of the top and bottom frames, these holes being drilled, for example, in the horizontal flanges of the angles forming these frames. The tie-rods may pass vertically between the component members of the respective standards or uprights, these component members being clamped on tightening the nuts, but in some cases the tie-rods may be arranged to pass through lugs or sockets attached to or pressed out from the inner angle members of the uprights.

We may also provide means for gripping the extremities of the slats or panels in their guide-channels so as to prevent rattle or looseness due for example to shrinkage of the wood or other material of which they are composed.

In the accompanying drawings, various embodiments of the invention are illustrated by way of non-limitative examples; in these drawings,

Fig. 1 is a perspective view of a crate for containing bottles, one corner being partly broken away to show the construction.

Fig. 2 shows, on a larger scale, a sectional plan of one corner of the crate.

Figs. 3 and 4 represent respectively the outer and the inner angle-members which together form the upright at one corner of the crate.

Fig. 5 is a sectional view, upon the vertical plane V—V of Fig. 1, showing the engagement of the tie-member with the top frame and upright at one corner, prior to the tightening of the tie-member.

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Fig. 6 represents a modified form of the inner angle-member of a corner upright.

Fig. 7 is a plan view, also on a larger scale, showing one corner of the top frame according to a further modification.

Figs. 8 and 9 represent two alternative forms of corner uprights, suitable for construction in light alloy by an extrusion method.

Referring to Figs. 1 to 4, the crate comprises a rectangular top frame *a*, made for example of metal angle-strips welded or otherwise secured together, a similar bottom frame *b*, and uprights at the four corners, each of these uprights comprising an outer angle-member *c* and an inner angle member *d*; the outer angle-members *c* engage in the corners of the top and bottom frames, being of such length as to support the top frame at the required height, but the inner angle-members *d* are of slightly shorter length. The angle-members *c*, *d* are spaced apart so as to form between them vertical guide-channels *e*, into which the detachable side-slats *f* and end-panels *g* are dropped; vertical tie-rods *h* connect the top and bottom frames *a*, *b* together, the tie-rods being formed with countersunk heads h^1 at their lower ends and screw-threaded at their upper ends to receive sleeve-nuts h^2 also formed with countersunk heads h^3.

The inner angle-members *d* are arranged to engage with the tie-rods *h*, for example by means of lugs or sockets d^1 punched out from the material, as shown in Fig. 4, two or more of these sockets being provided at different levels; the top and bottom frames *a*, *b* are also arranged to engage the tie-rods or their sleeve-nuts, by means of holes formed therein, as shown at a^1 in Fig. 1, each of these holes being countersunk to match the heads h^1, h^3 of the tie-rods and nuts. The holes are so located in relation to the corners of the frames *a*, *b*, that when the crate is being assembled the centres of the holes are slightly offset in relation to the tie-rods *h*, as shown in Fig. 5; when the nuts h^2 are tightened, however, the entry of their heads into the countersunk holes a^1, and the corresponding entry of the heads h^1 into the countersunk holes in the bottom frame *b*, will tend to draw the inner angle-members *d* outwards, thereby narrowing the guide channels *e* and clamping the extremities of the slats and panels *f*, *g* tightly against the outer angle-members *c*, at the same time that

the frames are drawn tightly against the outer members. The parts of the composite container will thus be held rigidly together when assembled, the extremities of the slats and panels being gripped in their guide-channels so as to prevent rattle or looseness due for example to shrinkage of the wood or other material of which they are composed.

The lugs or sockets d^1 need not be formed externally of the inner angle-members d but may be formed by punching the material inwardly from the angle, for example as shown in Fig. 6; alternatively, the sockets may be dispensed with, the tie-rods then fitting loosely into the re-entrants of the angle-members d until the tension is applied.

In the case of relatively light containers, where the angle-section bars used for the top and bottom frames have flanges too narrow for drilling to provide the countersunk holes for the tie-rods' heads or nuts, these flanges may be fitted with triangular gusset plates at the corners, these gusset plates being welded or otherwise secured in place and drilled to provide the holes for the tie-rods. Fig. 7 illustrates this modification, the top frame a being provided with a gusset plate i extending across the corner, welded to the angle-strips of the frame and drilled with a countersunk hole i^1 for the tie-rod nut.

The metal angles or other sections employed for the frames and uprights may be made from steel strips or light alloy, drawn or rolled to the desired section; if light alloy angles are used for the frames, their horizontal flanges may be overlapped at the corners, these parts being then drilled to produce the countersunk holes for the tie-rods. The angles used for the uprights, and particularly for the inner members, may be notched or slit at intervals to produce tongues or other projections which force themselves into the slats and panels as the gripping action takes place.

When using light alloy for the uprights, the outer and inner angle-members may be made integral by extruding the material; Fig. 8 illustrates such an upright, the member j having the general section of an angle-bar, with each of the perpendicular flanges forked along its edge to form the respective guide-channel e^1, and with the inside corner or re-entrant angle slotted longitudinally to form a vertical passage j^1 for the tie-rod. This passage may be of part-circular section, for example representing about 300° of a circle of a diameter to allow the desired clearance for the tie-rod. The outside corner j^2 of the angle-bar may be square or rounded to a convenient radius for fitting into the corners of the top and bottom frames.

Each of the forks on the edges of the flanges may afford a gap or guide-channel e^1 of parallel width, equal to the thickness of the slats or panels to be engaged therein, with its inner end e^2 rounded to a semi-circle or other shape so as to stiffen the sides or arms of the fork. Alternatively, as shown in Fig. 9, the gaps e^1 may be stepped in width to accommodate slats or panels of different thicknesses, the greatest width being adjacent to the extremities of the fork arms and the least width being at e^3 between the outer arm and the first step of the series; this narrow portion e^3 of the gap will penetrate further from the extreme edge than the wider portions, so that sufficient material for strength will subsist between the vertical passage j^1 and the adjacent stepped portions of the gap.

The containers may be provided with carrying handles and with lids; for example, as shown in Fig. 1, a carrying handle k of angle or channel section may extend transversely across the top frame a, the extremities k^1 of the handle being welded to that frame and connected to two metal straps k^2 passing down the opposite sides of the container, their lower ends k^3 being cranked inwards to engage with the bottom frame b. The containers will also be provided with slats or other filling pieces, resting upon the flanges of the bottom frame b, to support the goods therein, and they may be furnished with the usual nested partitions or separators when employed for the storage and transport of bottles.

The improved containers are readily nested for transport before assembly, the top and bottom frames a, b being packed flat upon one another, and the uprights c, d being bundled together in sets for stowage, while the slats and panels f, g may also be stowed in the same package or provided at the point of assembly from local sources of supply.

We claim:

1. In a crate, upper and lower rigid endless rectangular quadrilateral opposed metal frames, the upper frame being a single unit frame of inverted angle section bar and the lower frame being a single unit frame of right-angle section bar, both of said frames having the horizontal limbs of their angle sections directed inwardly to define the planes of the top and bottom of the crate, angle section vertical corner members nested at their ends in the corners of the two frames and abutting against said horizontal limbs, vertical wall panels having their vertical bars with flat sides spaced inwardly from said corner members and presenting to said corner members two sides parallel with the inner faces of said corner members and thereby forming vertical pockets or channels extended the full vertical distance of said corner members and said bars to receive the vertical side edges of the vertical wall panels, said horizontal limbs having holes at the corner parts of the frames, screw threaded anchorage members passed vertically through said holes to retain said angle section corner members and said frames assembled, and guides integral with said vertical bars to receive said anchorage members to retain said vertical bars in position.

2. A crate according to claim 1 wherein said inwardly spaced vertical bars are rectangular angle section bars and said guides for said screw threaded anchorage members are relatively deformed parts of said vertical bars.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,220,621	Friedel	Mar. 27, 1917
1,673,324	Gardner	June 12, 1928
1,828,088	Robinson	Oct. 20, 1931
1,857,350	Brock	May 10, 1932
1,932,772	Eschenbach	Oct. 31, 1933
2,034,440	Maurer	Mar. 17, 1936
2,230,650	Maurer	Feb. 4, 1941
2,412,418	Obermaier	Dec. 10, 1946
2,456,929	Dee	Dec. 21, 1948