PATENT SPECIFICATION

607,733

Application Date: Feb. 8, 1946. No. 3967/46.
" " July 15, 1946. No. 21108/46.

One Complete Specification left (under Section 16 of the Patents and Designs Acts, 1907 to 1946): Oct. 18, 1946.

Specification Accepted: Sept. 3, 1948.

Index at acceptance:—Class 18, A6(b: r), A8(k: p), Ax.

PROVISIONAL SPECIFICATION
No. 3967 A.D. 1946.

Improvements in Crates for Bottles and the like

We, CRAWLEY AIRCRAFT AND PRECISION TOOL COMPANY LIMITED, a British Company, and CYRIL ARTHUR CLOUGH and HENRY JAMES HUBBARD, both British Subjects, all of Precision Works, London Road, Crawley, Sussex, do hereby declare the nature of this invention to be as follows:—

This invention relates to metal crates for containing bottles, jars, cans and the like, and its object is to provide a metal crate wherewith strength to resist crushing or other distortion in any direction is provided with economical utilisation of material.

To the above end, in the crate according to the invention, a cellular bottle or the like-receiving grid, built-up of longitudinally extending metal strips formed with divergent channel profiled transverse corrugations with the crests of adjoining strips abutting and intersecured, interconnects, between an upper and a lower peripheral frame, posts interconnecting such peripheral frames. By this arrangement the bottle-receiving grid provides a cellular bracing structure between the posts of the crate, which will transmit and disperse any laterally exerted crushing stress.

Preferably the divergent channel corrugations of the metal strips forming the grid are of semi-hexagonal profile, as such provides abutting strips with flat meeting crests of ample length for longitudinally well separated spot weldings, but also results in a hexagonal cellular grid through which lateral stresses are dispersed by the obliquely directed straight sides of each hexagonal cell. Alternatively, the corrugations may be semi-circular or of a shape intermediate between semi-hexagonal and semi-circular.

In a representative example of a crate according to the invention, the hexagonally cellular grid is formed of eight corrugated strips extending longitudinally side by side. Of these strips the pair one on each side of the longitudinal axis of the crate are alike, being entirely semi-hexagonally corrugated throughout their length, with one end of each slightly extended to lap the unextended end of the terminal semi-hexagonally corrugated end of the other.

Two intermediate semi-hexagonally corrugated strips on both sides of the longitudinal axis of the crate are formed at both ends with an outwardly convex semi-cylindrical termination, that at one end of each being of sufficiently smaller radius to nest in the larger semi-cylindrical termination of the other. These intermeshing semi-cylindrical terminations of each pair of intermediate strips also fit in the concavities of semi-cylindrical end posts of the crate.

The two outermost semi-hexagonally corrugated strips terminate in longitudinally extending ends which are welded to the laterally abutting straight crests of the adjoining more inwardly situated strips. The crests of the last corrugations of each of the outermost strips are each formed with a semi-cylindrical outwardly convex bulge which fits in the concavity of the corresponding semi-cylindrical side post of the crate.

The frames at the top and bottom of the crate are each composed of a metal tube, bent to a rectangular outline with rounded corners, and rendered endless by the two ends being welded together.

Beneath each transverse row of cells of the crate, a bar extends transversely across the bottom rectangular tubular frame, to support the bottles in the grid. Each bottle-supporting transverse bar is a flat bar stiffened by a central downwardly directed flute pressed out thereof intermediate its ends, which are curved to seat on and be welded to the tubular bottom frame.

[Price 1/-] Shillings.

The semi-cylindrical posts, of which there are eight two at each end and two at each side of the crate, are each diverted at each end to fit respectively inside the upper tubular frame and outside the lower tubular frame, to both of which they are secured by rivets and welding. The cellular grid is secured by rivets or welding or by both rivets and welding to the posts at an intermediate height.

Each post at its lower end has a semi-cylindrical liner welded therein and presenting two outwardly directed lugs which fit inwardly over the tubular bottom frame, whilst the post itself is diverted outwardly thereof as stated above.

At the level of the cellular grid on each side of the crate, a metal binding and strengthening strap extends from one end post outside the two side posts to the corresponding post at the other end of the crate. These two straps can be embossed with or otherwise bear the name of the owner of the crate, and are secured to the post by the rivets conjointly with the grid component strips. The rivets may be tubular.

Dated this 8th day of February, 1946.

PHILLIPS & LEIGH,
Agents for the Applicants.

PROVISIONAL SPECIFICATION
No. 21108 A.D. 1946.

Improvements in Crates for Bottles and the like

We, CRAWLEY AIRCRAFT AND PRECISION TOOL COMPANY LIMITED, a British Company, and CYRIL ARTHUR CLOUGH and HENRY JAMES HUBBARD, both British Subjects, all of Precision Works, London Road, Crawley, Sussex, do hereby declare the nature of this invention to be as follows:—

This invention relates to metal crates for containing bottles, jars, cans and the like, having a cellular bottle or the like-receiving grid, built-up of longitudinally extending metal strips formed with semi-hexagonally profiled transverse corrugations with the flat crest of adjoining strips abutting and intersecured, interconnecting, between an upper and a lower peripheral frame, posts interconnecting such peripheral frames, as described in the provisional specification of our application for patent No. 3967/46.

The present invention provides an improved method of interconnecting the abutting flat crests of the hexagonally corrugated strips composing the cellular grid, and also a form of lower peripheral frame which facilitates internesting of and strengthens the crates.

The abutting flat crests of the hexagonally corrugated grid component strips are, according to the invention, intersecured by stamping a hole in each of two abutting flat crests, the hole in one being of larger diameter than the hole in the other, the smaller diameter hole being bordered by a tubular burr which extends through and is clinched around the border of the larger diameter hole

The holes are for instance circular.

To avoid the clinched-over end of the tubular burr projecting and thereby being liable to scratch labels on bottles, the margins of the strip metal surrounding both holes are shallowly dished and the clinched-over tubular burr of the smaller diameter hole is located in and masked by the shallow annular recess, due to such dishing of the margins of the holes.

The lower peripheral frame of the crate, is, according to the invention, formed of a bar of approximately Z-cross section, with the upper flange directed laterally outwards and the lower flange directed laterally inwards, with the web vertical.

The web thus provides a vertical spigot surface which is so located as to nest readily within the tubular upper peripheral frame of another like crate.

The lower inner flange of the Z-bar provides a flat bearing to rest on a surface.

The peripheral frames are rectangular with rounded corners, and to facilitate bending to such shape, the inner and lower flange of the component Z-bar is cut away at the corners.

The base of the crate is formed of a grid composed of shallow wide inverted transverse channel bars welded on to the upper flange of the Z-bar, with one or more inwardly flanged shallow wide inverted longitudinal channel bars welded to the inwardly directed surface of the web of the Z-bar.

Dated this 15th day of July, 1946.

PHILLIPS & LEIGH,
Agents for the Applicants.

COMPLETE SPECIFICATION

Improvements in Crates for Bottles and the like

We, CRAWLEY AIRCRAFT AND PRECISION TOOL COMPANY LIMITED, a British Company, and CYRIL ARTHUR CLOUGH and HENRY JAMES HUBBARD, both British Subjects, all of Precision Works, London Road, Crawley, Sussex, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to metal crates for containing bottles, jars, cans and the like, and its object is to provide a metal crate wherewith strength to resist crushing or other distortion in any direction is provided with economical utilisation of material.

The metal crate according to the invention, has a cellular bottle or the like-receiving grid, built-up of longitudinally extending metal strips formed with divergent channel profiled transverse corrugations with crests of corrugations of adjoining strips abutting and intersecured, directly interconnecting, between an upper and a lower peripheral frame, posts interconnecting such peripheral frames. By this arrangement the bottle-receiving grid provides a cellular bracing structure between the posts of the crate, which will transmit and disperse any laterally exerted crushing stress.

In practice the divergent corrugations of the metal strips forming the grid are of semi-hexagonal profile, as such provides mutually abutting strips with flat meeting crests of ample length for ample longitudinally extensive interconnection, and also results in a hexagonally cellular grid through which lateral stresses are dispersed by the obliquely directed straight sides of each hexagonal cell. Alternatively, the corrugations may be of semi-circular profile or of a profile intermediate between semi-hexagonal and semi-circular.

The above described bracing by the cellular grid of the posts interconnecting upper and lower peripheral frames of a metal crate, should be distinguished from a previously proposed construction of metal crate, wherein a cellular bottle-receiving grid, formed of semi-hexagonally corrugated metal strips rivetted together at abutting crests of the corrugations, is rivetted to each of an upper and a lower peripheral frame member, rivetted to and interconnected by vertical members, all composed of flat metal bars.

In the present crate, the upper peripheral frame is, for instance, composed of a metal tube, bent to a rectangular outline with rounded corners, and rendered endless by the two ends being welded together.

The lower peripheral frame is similarly composed of a metal bar bent to a rectangular outline with rounded corners and rendered endless by the two ends being welded together. This lower frame bar is, for instance, a bar of approximately **Z**-cross section, with the upper flange directed laterally outwards and the lower flange directed laterally inwards with the web vertical. The web thus provides a vertical spigot surface which is so located as to nest readily within the tubular upper peripheral frame of another like crate. The lower inner flange of the **Z**-bar provides a flat bearing to rest on a surface.

To facilitate bending, the inner and lower flange of the **Z**-bar may be cut away at the corners.

The base of the crate is, for instance, formed of a grid composed of shallow wide inverted transverse channel bars welded to the upper flange of the **Z**-bar, with one or more inwardly flanged shallow wide inverted longitudinal channel bars welded to the inwardly directed surface of the web of the **Z**-bar.

The posts are, for instance, semi-cylindrical with the concave face of each secured to and fitting around a semi-cylindrical outwardly convex bulge on the respective hexagonal cell of the bottle-receiving and crate-bracing grid.

The strips composing the bottle-receiving grid may be inter-welded, mutually abutting flat crests being of ample length for longitudinally well separated spot weldings. However, for facilitating manufacture, the abutting flat crests of the hexagonally corrugated grid component strips may be intersecured by stamping a hole in each of two abutting flat crests, the hole in one being of larger diameter than the hole in the other, the smaller diameter hole being bordered by a tubular burr which extends through and is clinched around the border of the larger diameter hole.

A representative example of a crate according to the invention is illustrated on the accompanying drawings, in which:—

Fig. 1 is a side elevation partly broken away and in section, of the crate.

Fig. 2 is a plan partly broken away and in section of the crate.

Fig. 3 is a section on the line 3—3 of Figs. 1 and 2.

Fig. 4 is a plan, and

Fig. 5 is a side elevation of a portion of the bottle-receiving grid, and

Fig. 6 is a section on the line 6—6 of Fig. 4, and on a larger scale, showing a method of intersecuring the component strips of the grid.

The bottle crate shown in the drawings comprises, an upper peripheral frame *a* of rectangular outline with rounded corners and a lower peripheral frame *b* of similar outline, interconnected by eight posts *c*, two at each longitudinal side and two at each transverse end of the crate.

The posts *c* are interconnected at about their mid-height by a hexagonally cellular bottle-receiving grid composed of eight metal strips d^1, d^2, d^3 formed with divergent channel corrugations of semi-hexagonal profile. These strips d^1, d^2, d^3 extend longitudinally of the crate and the flat crests of adjoining strips abut and are intersecured, for instance by welding or as subsequently described.

A pair of the strips d^1 extend along the mid-width of the crate. On each side of the pair of strips d^1 is a pair of strips d^2 formed at each end with a bulge *e* where the ends of the component strips d^2 are welded together. This bulge *e* is fitted in the concave face of and secured by a rivet *f* to the respective end post *c*, which is semi-cylindrical.

The two outermost semi-hexagonally corrugated metal strips d^3 are at the crests of each of their outer corrugations formed with a bulge *g*, which is fitted in the concave face of and secured by a rivet *h* to the respective side post *c*.

The crest of the intermediate corrugation of each of the outer strips d^3 is formed with a rectangular protrusion *i* of channel cross section, to the base of which is secured, by a rivet *j*, at its mid-length a metal binding and strengthening strap *k* which extends from one end post *c* outside the two side posts *c* to the corresponding post *c* at the other end of the crate, and is secured to these posts *c* by the respective rivets *f* and *h*. These two straps *k* can be embossed with or otherwise bear the name of the owner of the crate.

The posts *c* are welded at the top to the underside of the upper peripheral frame *a* which is formed by a metal tube, bent to the rectangular outline with rounded corners and rendered endless by the two ends being welded together.

At their lower ends the posts *c* are welded to the upper laterally outwardly directed flange of a **Z**-section bar composing the lower peripheral frame *b*. The lower flange of this **Z**-bar is inwardly directed, whereas the web is vertical. Like the tube of the upper peripheral frame *a*, the **Z**-bar *b* is bent to a rectangular outline with rounded corners and the bar is rendered endless by the two ends thereof being welded together.

Transversely extending shallow wide inverted channel bars *l* are welded to the upper flange of the **Z**-bar *b* to form a bottle-supporting base grid of the crate. These channel bars *l* are supported at their midlength by an inwardly flanged shallow wide inverted longitudinal channel bar *m* welded at its ends to the inwardly directed surface of the web of the **Z**-bar *b*.

Instead of welding the strips d^1, d^2, d^3 together they can be secured together by integral clinched eyelets as shown in Figs. 4—6. A hole *n* is stamped in the flat crest of the semi-hexagonal corrugation of one strip d^1. A smaller hole bordered by a tubular burr *o* is stamped in the abutting crests of the next strip d^1. The tubular burr *o* is entered into and extends through and is clinched around the border of the larger diameter hole *n* in the strip d^1. The holes are circular.

To avoid the clinched-over end of the tubular burr *o* projecting and thereby being liable to scratch labels on bottles, the margins of the strip metal d^1 surrounding each hole *n* and each hole bordered by a tubular burr *o*, are shallowly dished and each clinched-over tubular burr *o* is located in and masked by the shallow annular recess due to such dishing of the margins of the holes, as shown in cross section in Fig. 6.

In addition to providing bottle-receiving cells, the cellular grid formed by the semi-hexagonally corrugated metal strips d^1, d^2, d^3 stiffly braces the posts *c* and thereby the peripheral frames *a*, *b* of the crate.

The hexagonal configuration of the cells of the grid distributes and disperses lateral stresses exerted on the grid.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A metal crate having a cellular bottle or the like-receiving grid, built-up of longitudinally extending metal strips formed with divergent channel

Fig. 1 is a side elevation partly broken away and in section, of the crate.

Fig. 2 is a plan partly broken away and in section of the crate.

Fig. 3 is a section on the line 3—3 of Figs. 1 and 2.

Fig. 4 is a plan, and

Fig. 5 is a side elevation of a portion of the bottle-receiving grid, and

Fig. 6 is a section on the line 6—6 of Fig. 4, and on a larger scale, showing a method of intersecuring the component strips of the grid.

The bottle crate shown in the drawings comprises, an upper peripheral frame *a* of rectangular outline with rounded corners and a lower peripheral frame *b* of similar outline, interconnected by eight posts *c*, two at each longitudinal side and two at each transverse end of the crate.

The posts *c* are interconnected at about their mid-height by a hexagonally cellular bottle-receiving grid composed of eight metal strips d^1, d^2, d^3 formed with divergent channel corrugations of semi-hexagonal profile. These strips d^1, d^2, d^3 extend longitudinally of the crate and the flat crests of adjoining strips abut and are intersecured, for instance by welding or as subsequently described.

A pair of the strips d^1 extend along the mid-width of the crate. On each side of the pair of strips d^1 is a pair of strips d^2 formed at each end with a bulge *e* where the ends of the component strips d^2 are welded together. This bulge *e* is fitted in the concave face of and secured by a rivet *f* to the respective end post *c*, which is semi-cylindrical.

The two outermost semi-hexagonally corrugated metal strips d^3 are at the crests of each of their outer corrugations formed with a bulge *g*, which is fitted in the concave face of and secured by a rivet *h* to the respective side post *c*.

The crest of the intermediate corrugation of each of the outer strips d^3 is formed with a rectangular protrusion *i* of channel cross section, to the base of which is secured, by a rivet *j*, at its mid-length a metal binding and strengthening strap *k* which extends from one end post *c* outside the two side posts *c* to the corresponding post *c* at the other end of the crate, and is secured to these posts *c* by the respective rivets *f* and *h*. These two straps *k* can be embossed with or otherwise bear the name of the owner of the crate.

The posts *c* are welded at the top to the underside of the upper peripheral frame *a* which is formed by a metal tube, bent to the rectangular outline with rounded corners and rendered endless by the two ends being welded together.

At their lower ends the posts *c* are welded to the upper laterally outwardly directed flange of a **Z**-section bar composing the lower peripheral frame *b*. The lower flange of this **Z**-bar is inwardly directed, whereas the web is vertical. Like the tube of the upper peripheral frame *a*, the **Z**-bar *b* is bent to a rectangular outline with rounded corners and the bar is rendered endless by the two ends thereof being welded together.

Transversely extending shallow wide inverted channel bars *l* are welded to the upper flange of the **Z**-bar *b* to form a bottle-supporting base grid of the crate. These channel bars *l* are supported at their midlength by an inwardly flanged shallow wide inverted longitudinal channel bar *m* welded at its ends to the inwardly directed surface of the web of the **Z**-bar *b*.

Instead of welding the strips d^1, d^2, d^3 together they can be secured together by integral clinched eyelets as shown in Figs. 4—6. A hole *n* is stamped in the flat crest of the semi-hexagonal corrugation of one strip d^1. A smaller hole bordered by a tubular burr *o* is stamped in the abutting crests of the next strip d^1. The tubular burr *o* is entered into and extends through and is clinched around the border of the larger diameter hole *n* in the strip d^1. The holes are circular.

To avoid the clinched-over end of the tubular burr *o* projecting and thereby being liable to scratch labels on bottles, the margins of the strip metal d^1 surrounding each hole *n* and each hole bordered by a tubular burr *o*, are shallowly dished and each clinched-over tubular burr *o* is located in and masked by the shallow annular recess due to such dishing of the margins of the holes, as shown in cross section in Fig. 6.

In addition to providing bottle-receiving cells, the cellular grid formed by the semi-hexagonally corrugated metal strips d^1, d^2, d^3 stiffly braces the posts *c* and thereby the peripheral frames *a*, *b* of the crate.

The hexagonal configuration of the cells of the grid distributes and disperses lateral stresses exerted on the grid.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A metal crate having a cellular bottle or the like-receiving grid, built-up of longitudinally extending metal strips formed with divergent channel

* C L M S *

profiled transverse corrugations with crests of corrugations of adjoining strips abutting and intersecured, directly interconnecting, between an upper and a lower peripheral frame, posts interconnecting said peripheral frames.

2. A metal crate as claimed in claim 1, in which the corrugations of the metal strips are of semi-hexagonal profile.

3. A metal crate as claimed in claim 1 or 2, in which the upper peripheral frame is composed of a metal tube bent to a rectangular outline with rounded corners and rendered endless by its ends being welded together.

4. A metal crate as claimed in claim 1, 2 or 3, in which the lower peripheral frame is composed of a bar of Z-cross section bent to a rectangular outline with rounded corners and rendered endless by its ends being welded together, with an outwardly directed upper flange and an inwardly directed lower flange and vertical web.

5. A metal crate as claimed in claim 4, having a base grid formed of shallow transverse inverted channel bars welded on the upper flange of the lower peripheral frame and supported on an inwardly flanged shallow longitudinal inverted channel bar welded to the web of said frame.

6. A metal crate as claimed in any of the foregoing claims, in which the posts are semi-cylindrical and fit around bulges on the strips and are embraced by external metal straps.

7. A metal crate as claimed in any of the foregoing claims, in which the abutting crests of the strips are interconnected by a tubular burr on one extending through and clinched around the border of a hole in the other.

8. The improved metal crate as shown in the accompanying drawings.

Dated this 18th day of October, 1946.

PHILLIPS & LEIGH,
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Agents for the Applicants.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1948.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies, price 1s. 0d. each (inland) 1s. 1d. (abroad) may be obtained.

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