Jan. 18, 1955 R. KENDALL ET AL 2,699,746

CARGO SHIP HOLD CONSTRUCTION

Filed April 11, 1950 4 Sheets-Sheet 1

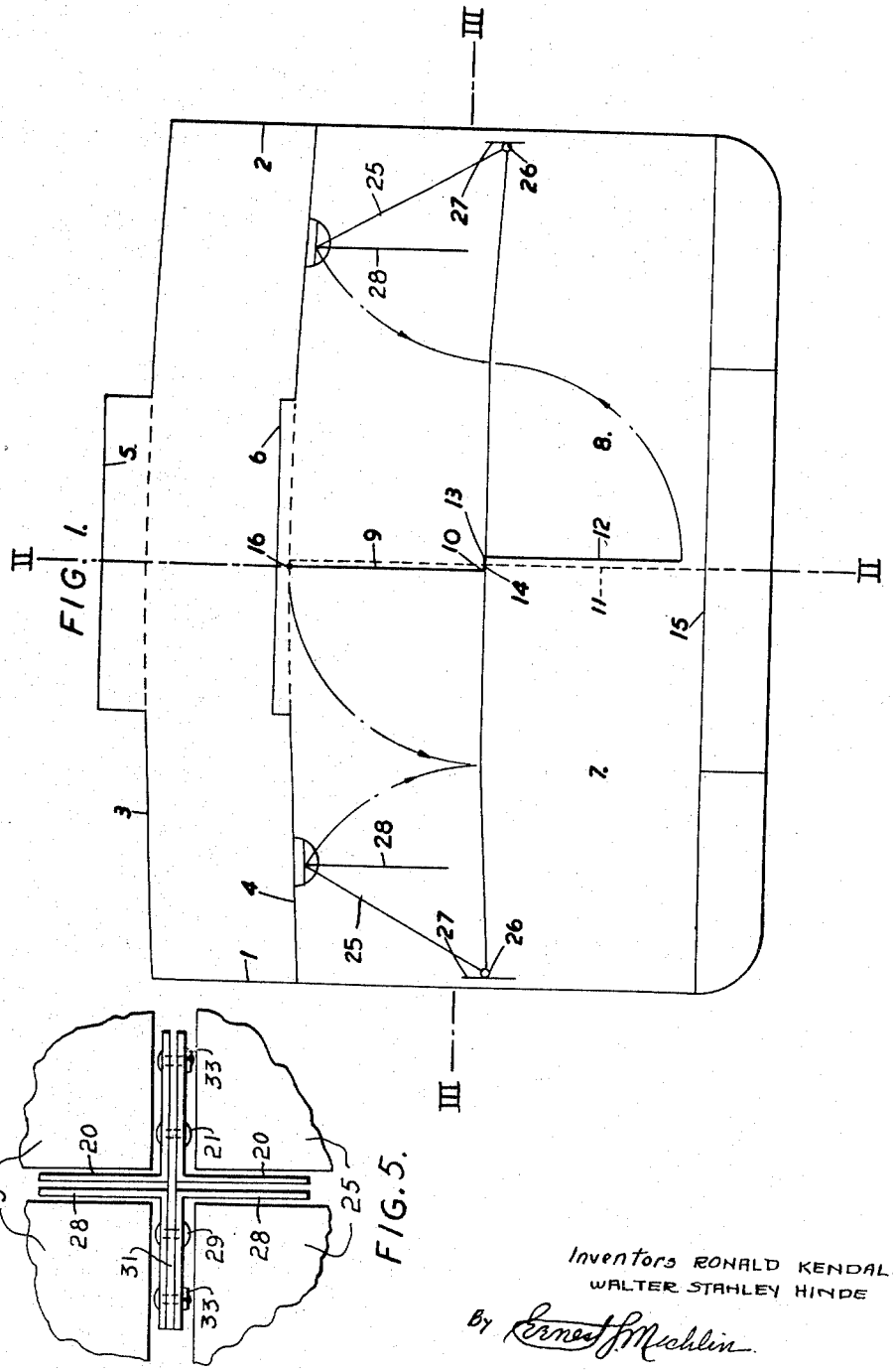


FIG. 1.

FIG. 5.

Inventors RONALD KENDALL
WALTER STANLEY HINDE

By Ernest J. Muehlin
Attorney

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CARGO SHIP HOLD CONSTRUCTION

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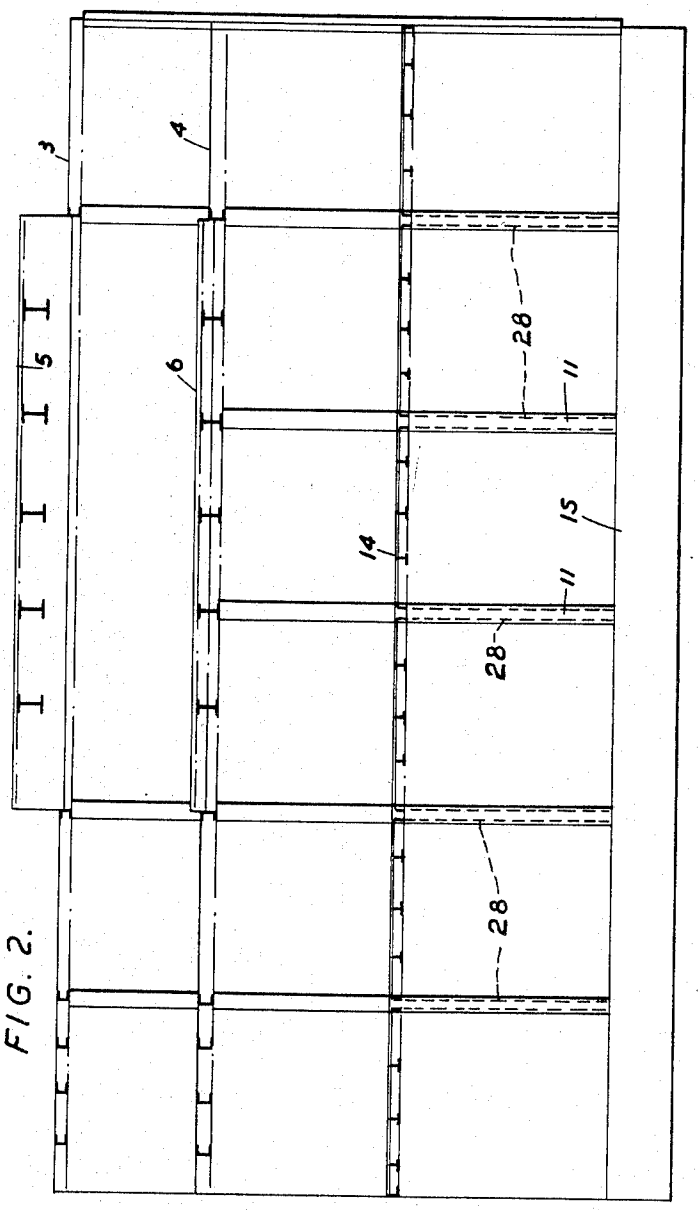


FIG. 2.

Inventors RONALD KENDALL
WALTER STANLEY HINDE

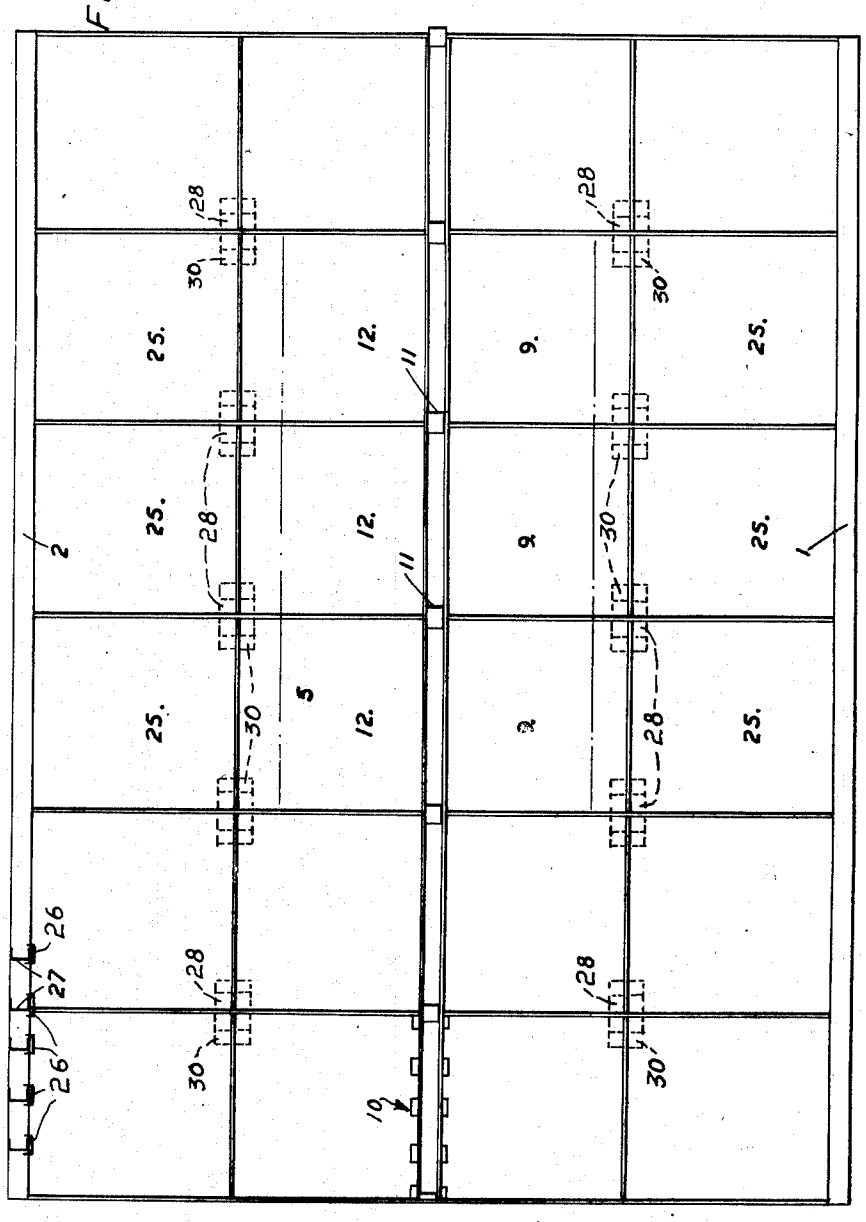
By Ernest J. Mechlin
Attorney

Jan. 18, 1955 R. KENDALL ET AL 2,699,746

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FIG. 3



Inventors RONALD KENDALL
WALTER STANLEY HINDE

By Ernest J. Mechlin
Attorney

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CARGO SHIP HOLD CONSTRUCTION

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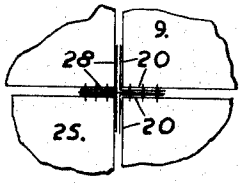
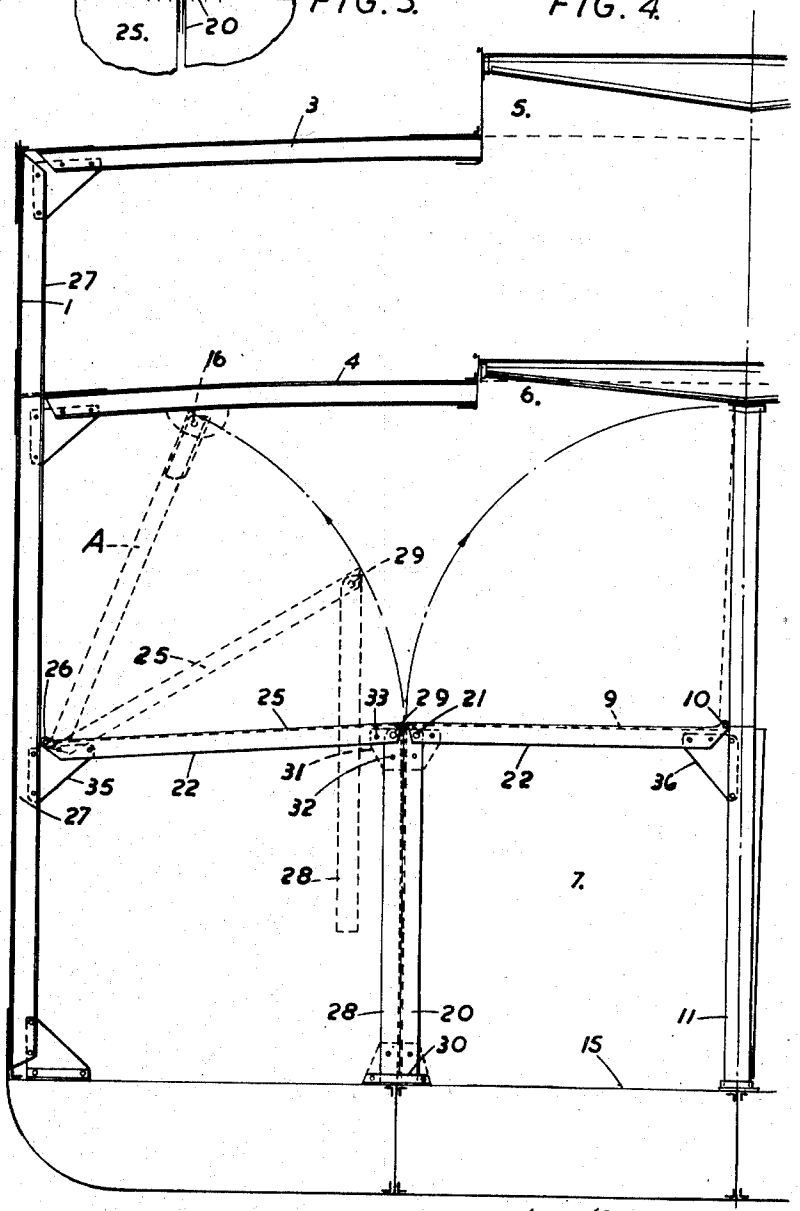


FIG. 5.

FIG. 4.



Inventors RONALD KENDALL
WALTER STANLEY HINDE

By Ernest J. Mechlin

Attorney

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CARGO SHIP HOLD CONSTRUCTION

Ronald Kendall and Walter Stanley Hinde, Brasted Chart, England, assignors of one-third to James Burness & Sons Limited, London, England, a British company; Lloyds Bank Limited and Richard Trevis Scriven Hinde, executors of said Walter Stanley Hinde, deceased

Application April 11, 1950, Serial No. 155,146

3 Claims. (Cl. 114—72)

This invention relates to ships with more especial reference to cargo ships and has for its object to provide an improved construction and arrangement of ship capable of carrying bulk dry cargoes such as grain or, with equal ease, parcel cargoes such as motor vehicles and packaged and crated goods requiring to be stowed in between decks and holds of comparatively small depth.

Cargo ships engaged in the carriage of grain in bulk are required by international regulations to have a centre line division in an otherwise clear hold.

Broadly stated, an improved construction of cargo ship according to the invention has a plurality of movable structures arranged in line to provide a longitudinal vertical centre line division or bulkhead to prevent movement of cargo in one operative position and in the other operative position to form an additional deck for parcel cargo.

In the practice of the invention, which is equally applicable to the conversion of existing cargo-carrying ships or to new constructions, the movable structures are normally rectangular and are conveniently arranged along the longitudinal centre line of the ship. In the position they occupy for bulk cargo the movable structures occupy a substantially vertical position so as not to interfere with the passage of cargo from the hatches into the bottom of the holds and to serve as longitudinal central bulkheads or a centre line division which may extend throughout the ship and which prevents shifting of the cargo en route.

When moved to their other operative position in which they are horizontal, the structures may extend as decks to the side walls of the ship but more usually, complementary sets of movable structures are arranged along the inside walls of the ship, and when parcel cargoes are to be carried, both sets, which are pivotally mounted at their upper or lower edges, are swung downwardly or upwardly as the case may be to form decks, their free edges being supported by horizontal girders carried by vertical pillars appropriately located in the holds between the centre and sides of the ship.

The girders may be detachable but are preferably integral with the deck-forming structures and pivotally mount the pillars so that the latter can be stowed against the structures when these are swung to the bulk cargo position. All these components may advantageously be of light metal, such as aluminum or aluminum alloy so as to facilitate their movement and to enable the ship rapidly to be converted from bulk cargo service to parcel freight service by lowering or raising the movable structures to the position forming an additional deck manually or through the medium of the normal cargo working machinery.

Only the upper parts of the cargo holds may be provided with the substantially vertical movable structures or partitions according to the present invention so that when lowered or raised to their alternative position only one additional parcel cargo deck is furnished, or several rows of swinging deck forming partitions may be superposed one above the other in one or each hold to provide as many additional intermediate decks for parcel cargo freight as required.

Further it will be appreciated that where the hold is of relatively short length the movable structures or partitions may be arranged transversely. In such cases the complementary deck forming structures will, of course, be attached to the fore and aft lateral walls of the holds.

Suitable locking or latching means may be furnished for temporarily securing the movable structures or partitions in their respective positions and those which are hinged along their bottom edges to the ship's sides may be adapted when raised for bulk cargo to be inclined inwardly for the more satisfactory stowage of such cargo to prevent shifting.

The invention will be further described with reference to the accompanying drawings which illustrate diagrammatically part of a cargo-carrying ship constructed according to one embodiment and in which drawings

Fig. 1 is a diagrammatic bows-on cross sectional view taken through one of the ship's holds equipped with the movable structures or partitions to provide an additional intermediate deck when required for carrying parcel cargo.

Fig. 2 is a partial longitudinal central section showing in elevation a portion of the hold and the aligned hatches in the permanent fixed upper and second decks present in the embodiment.

Fig. 3 is a plan view of the hold portion of the ship illustrated in Fig. 2.

Fig. 4 is a transverse half section to a larger scale showing the pivotal mountings of the two sets of movable structures or partitions which form a third deck when the ship is required for parcel cargo work and

Fig. 5 is a detail view showing the relative location of the four supporting pillars at four adjoining free corners of adjacent partitions when in their deck-forming position.

Referring now to the drawings, the ship illustrated has side walls **1** and **2** and fixed upper and second decks marked **3** and **4** respectively in which are vertically aligned central hatches, **5** for the upper deck and **6** for the second deck.

Below the second deck **4** is a space which for bulk cargoes is divided longitudinally by a central bulkhead into two similar compartments, a starboard hold **7** and a port hold **8** alongside each other, such central division being necessary to comply with international regulations and to prevent transverse shifting of bulk cargo en route. Transverse bulkheads at appropriate intervals prevent longitudinal displacement of the bulk cargo.

The bulkheads may be fixtures as in conventional cargo ship construction, but in the embodiment illustrated the central longitudinal bulkhead consists of a plurality of movable structures or panels, an upper row the partitions or panels of which are designated **9** hingedly connected at their lower edges **10** to vertical supporting pillars **11** suitably spaced in line along the centre of the ship, and a lower row of partitions or panels designated **12** hinged at their upper edges **13** to the aforesaid pillars or to a beam **14** extending horizontally along such central pillars **11**.

As will be seen more clearly from Figs. 1 and 4, when the hinged structures, partitions or panels **9** and **12** are in their operative position for carrying bulk cargo, they are disposed in a substantially vertical plane along the longitudinal centre line of the ship and serve to separate the hold as requisite into the two side by side components, i. e., the starboard hold **7** and the port hold **8**, while not interfering to an appreciable extent with the lowering of the bulk cargo such as grain through the superposed hatches **5** and **6** down on to the bottom of the hold represented at **15**. In this position the panels **9** and **12** are releasably held fast by means such as bolts or pins **16**.

In their other operative position to which after withdrawing the pins **16** they may be moved manually or through the normal cargo working machinery about the hinges **10** and **13** respectively, the upper row of panels **9** extend horizontally as a parcel carrying deck to the starboard side of the centre line containing the beam **14** and the lower row of panels **12** extend similarly horizontally from the longitudinal centre line as a parcel carrying deck on the port side of the ship.

The structures or panels **9** and **12** are of general rectangular shape in the embodiment illustrated, and in their deck-forming position their free edges are supported by pillars **20** as shown in Fig. 4, these pillars conveniently being of angle section and being hinged or pivoted in the manner shown at **21** at each free corner of each rectangular panel **9** or **12** as the case may be, the free edges of these rectangular deck-forming panels being reinforced by girders **22** suitably of channel section.

In addition to the movable deck forming panels **9** and **12**, a complementary set of movable structures or panels as shown at **25** in Figs. 1 and 4 are each hinged at their lower edges **26** to the framing **27** of the side wall **1** or **2** of the ship as the case may be, and in their raised positions shown at A in Figs. 1 and 4, such panels do not in any way interfere with the stowage of bulk cargo in either the starboard hold **7** or the port hold **8**. Such panels may be arranged to lie flush against the inside of the wall of the ship under the beams supporting the second deck **4**, although in the embodiment illustrated they are adapted to be inclined inwardly from their bottom hinge supports **26** for the more satisfactory stowage of bulk cargo and to prevent shifting. In this position they are releasably held by means such as bolts or pins **16** engaging the main structure of the ship.

As in the case of the deck-forming panels **9** and **12** arranged along the centre line of the ship, the complementary set of panels **25** which are carried at each side, are supported when in their deck-forming position for carrying parcel cargo by pillars represented at **28**, one pillar being pivotally carried as represented at **29** at each free corner of each rectangular panel **25**, and these pillars being also conveniently of the same angle section as the pillars **20**.

The disposition of the temporary deck supporting pillars **20** and **28** at the four abutting corners of adjoining panels is illustrated in Fig. 5 and it will be appreciated that they may be positioned into a common footing **30** bolted to the floor **15** of the hold so that the four adjoining pillars virtually constitute one composite support and mutually reinforce each other.

Advantageously also, they are connected at their upper ends when in the operative deck-forming position by a fishplate or bracket **31** through which pass pins or bolts **32** into the pillars, and pins or bolts **33** into the channel section girders or beams **22** reinforcing the edges of the panels thus securely to tie adjacent panels together and relieve the hinges **21** and **29** from the stress of any freight such as motor vehicles or packaged or crated goods carried by the temporary deck consisting of the panels **9**, **12** and **25**.

Corresponding brackets or fishplates **35** may be mounted on the ship's framing **27** and brackets such as **36** on the central pillars **11** or their longitudinal girders **14**, to support the hinged edges of the movable panels when in their deck-forming position so as to relieve the hinges **10**, **13** and **26** of the deck loads, and at the same time render the intermediate deck structure more rigid.

If desired, the panels **12** may be arranged as is the case with the panels **9** to be swung downwardly to their deck-forming position, in which case a fixed longitudinal bulkhead will be provided along the bottom of the hold.

Further, particularly for holds in the tapering forepart of the ship, instead of the panels being rectangular, they may conform to the contour of the ship's wall.

The panels **9**, **12** and **25** may advantageously be fabricated from sheet aluminium alloy and the pillars and girders may be rolled or extruded sections also of light alloy not only to facilitate handling but also to reduce the unladen weight of the ship.

Lastly, it will be understood that the invention provides the additional advantage of enabling bulk or parcel cargo to be lowered or passed down direct from the hatches to the bottom of the holds and for the movable structures or partitions to be then swung to their deck-forming positions providing an intermediate deck or decks for carrying parcel cargo of any type.

What we claim is:

1. In a cargo ship having a hull including a bottom and side walls and a deck and defining a hold provided with a hatch through the deck, pillars disposed vertically in the hold intermediate the width thereof and spaced from each other longitudinally of the ship and constituting supports for the deck, upper and lower inner panels at opposite sides of said pillars pivoted thereto for vertical swinging movement from a folded position against opposite sides of the pillars in which they form a vertical partition dividing the hold into port and starboard sections to a horizontal position in which they form inner sections of an auxiliary deck, and outer panels pivoted to the side walls for vertical swinging movement from a folded position close to the walls to an extended horizontal position disposing free end edges in meeting relation to free end edges of the extended inner panels and forming outer sections of the auxiliary deck.

2. The structure of claim 1 wherein free end edges of the panels carry props which are pivoted at their ends to the panels for vertical swinging movement from a vertically disposed folded position close to the folded panels to a depending vertical position when the panels are in an extended position and constitute supports having lower ends resting upon the bottom.

3. The structure of claim 1 wherein corners of free end edge portions of adjoining panels meet when extended, and supporting bars of angle metal pivoted to the free inner end edges of the panels for swinging movement from a folded position close to the panels to an extended position in which the bars extend downwardly from the corners of the panels, the depending bars having engagement with intersecting edges of the panels, adjoining depending bars being disposed in face-to-face side-by-side relation to each other and forming props having radially extending flanges, and footings for the props mounted upon the bottom and constituting sockets removably receiving lower ends of the bars and holding companion bars in prop-forming relation to each other.

References Cited in the file of this patent

UNITED STATES PATENTS

32,846	Virdin	July 16, 1861
240,460	Rainey et al.	Apr. 19, 1881
1,066,087	Dingwall	July 1, 1913
1,233,380	McDougall	July 17, 1917
1,259,540	McDougall	Mar. 18, 1918
2,472,185	Apel	June 7, 1949
2,497,412	Larin	Feb. 14, 1950

FOREIGN PATENTS

12,672	Great Britain	of 1890
25,964	Great Britain	of 1905