July 22, 1930. W. W. MacGRUDER 1,771,304

KALAMEIN DOOR

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Fig. 1

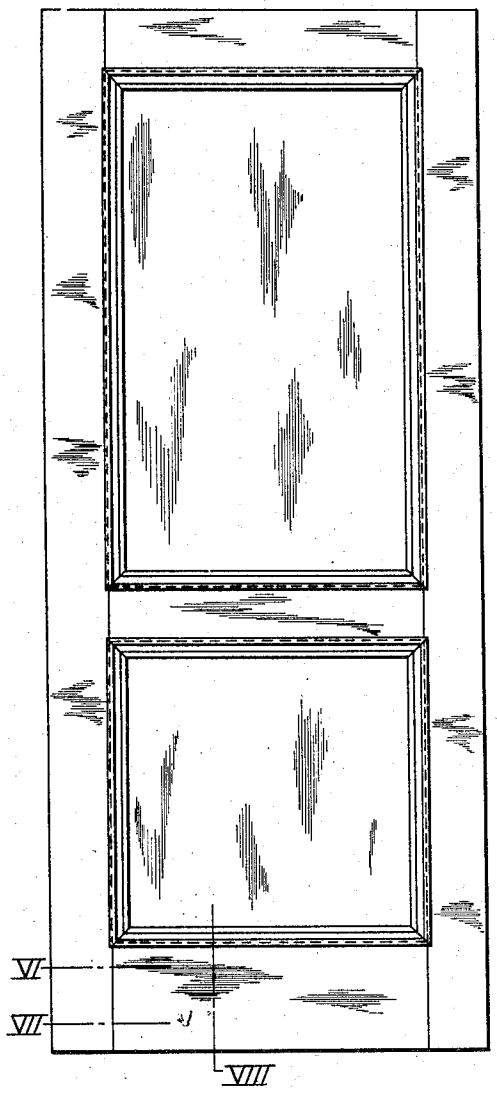


Fig. 2

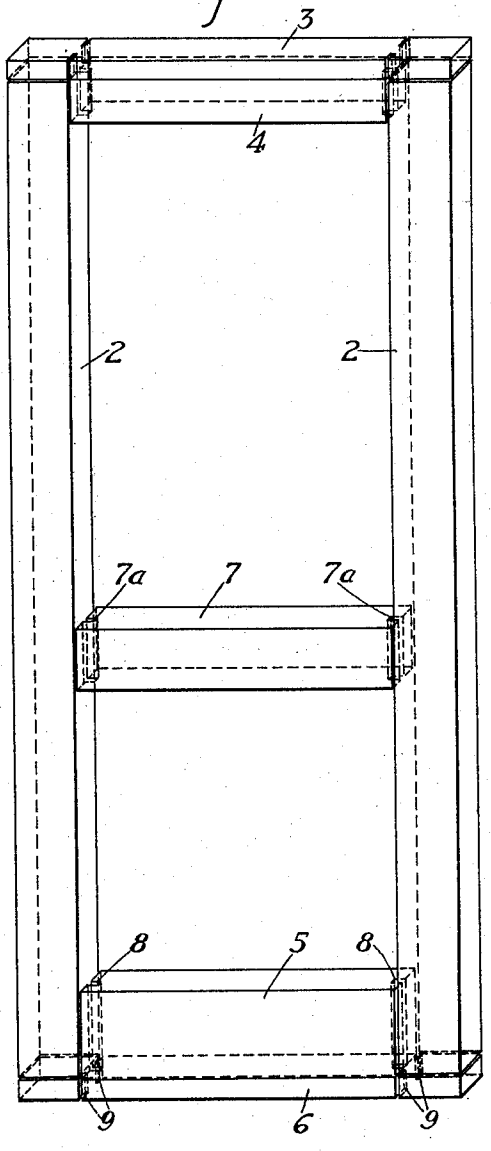


Fig. 3



INVENTOR

William W. MacGruder

by his attorneys

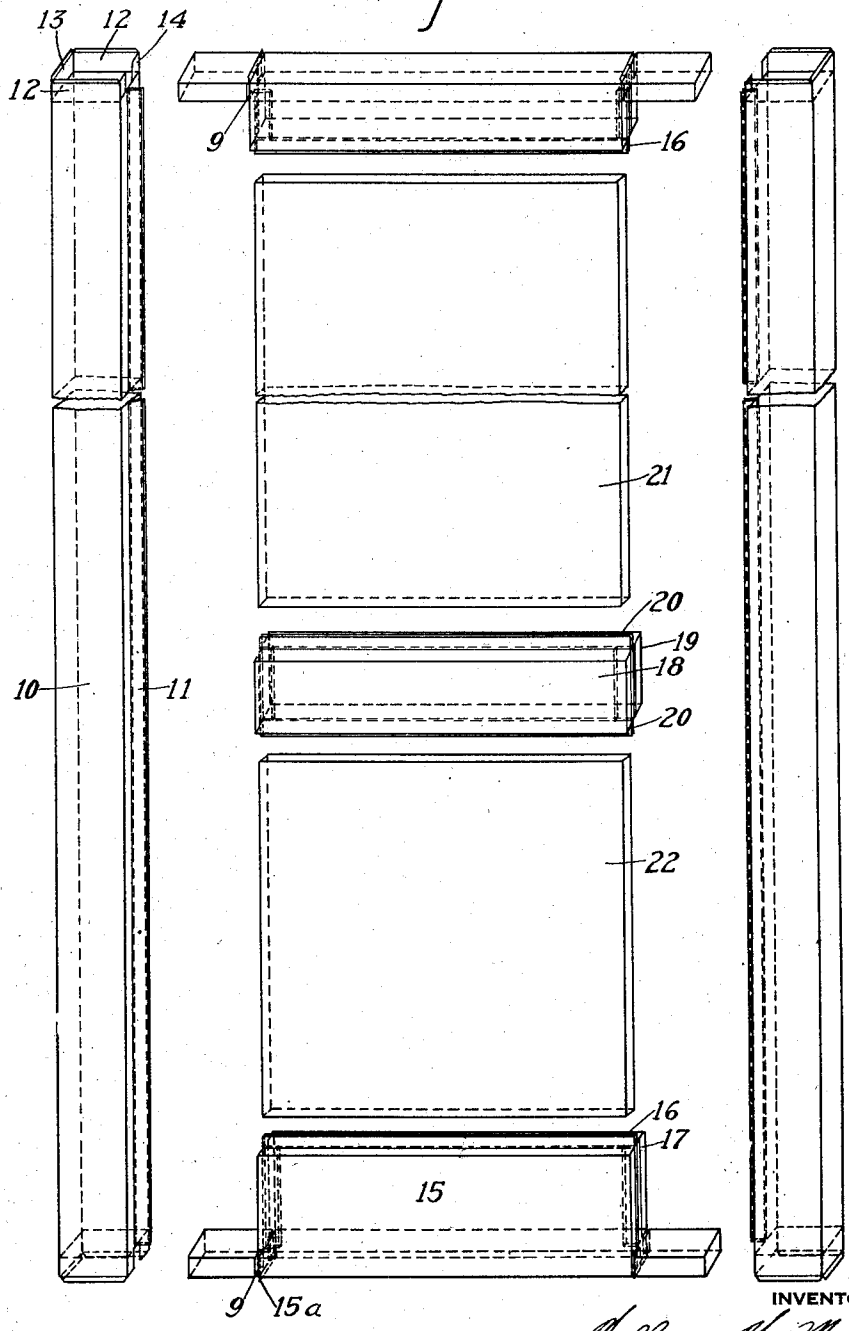
Byron, Stebbins & Lamslee

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Fig. 4



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Fig. 5

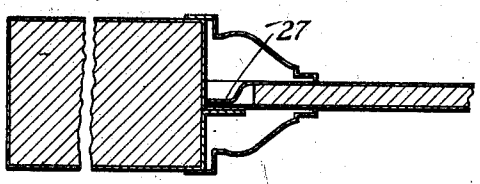


Fig. 6

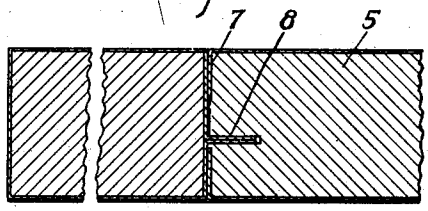


Fig. 7

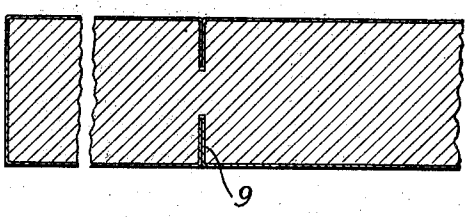


Fig. 8

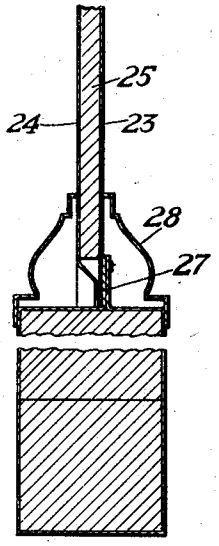


Fig. 9

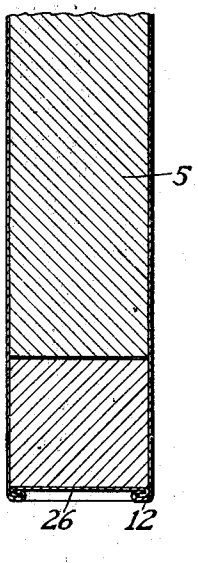
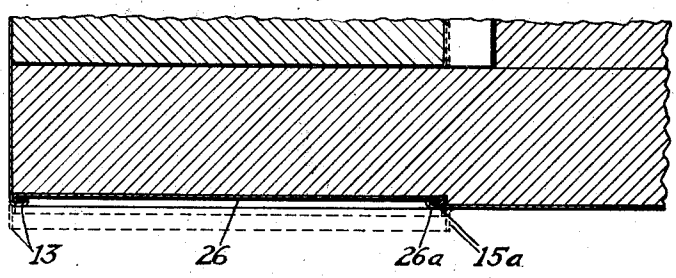


Fig. 10



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Patented July 22, 1930 1,771,304

UNITED STATES PATENT OFFICE

WILLIAM W. MacGRUDER, OF GREENSBURG, PENNSYLVANIA, ASSIGNOR TO W. F. OVERLY & SONS, OF GREENSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

KALAMEIN DOOR

Application filed January 11, 1928. Serial No. 245,956.

This invention is for an improvement in metal sheathed wooden doors known in the trade as kalamein doors.

Kalamein doors are widely used where protection against fire is desired, and in order to meet the requirement imposed by insurance companies, their construction must be such that the door will stand up after the wooden core has been burned out.

The present invention has for its object to provide a door construction wherein all of the wooden parts of the door are encased in sheet metal and wherein the sheet metal casing is firmly held together. A further object of the invention is to provide a door of this kind which is convenient and cheap to assemble and wherein the metal sheathing and the wood can be cut to size and kept in stock separately and assembled as required.

The invention may be readily understood by reference to the accompanying drawings in which—

Figure 1 is a front elevation of a complete door constructed in accordance with my invention;

Figure 2 is a perspective view of the wooden parts of the door frame without the metal applied thereto;

Figure 3 is a transverse section through the door shown in Figure 1;

Figure 4 is an exploded view of the several parts of the door in a position to be fitted together;

Figure 5 is a detail view showing the manner in which the panel is secured to the side frame;

Figure 6 is an enlarged section in the plane of line VI—VI of Figure 1;

Figure 7 is a similar view in the plane of line VII—VII of Figure 1;

Figure 8 is a detail sectional view on a larger scale in the plane of line VIII—VIII of Figure 1;

Figure 9 is a detail vertical section through a corner of the door at the bottom, the view being transverse to the plane of the door; and

Figure 10 is a vertical section through a bottom corner of the door, the section being taken in the plane of the door.

The wooden door frame, which is shown in Figure 2, prior to the application of the metal comprises vertical stiles 2. The vertical stiles are connected at the top by a top rail made of an upper piece 3 and a lower piece 4. They are connected at the bottom by a bottom rail comprised of an upper piece 5 and a lower piece 6. At 7 is a middle rail. In Figure 2, the wooden frame members are shown secured together, although they are actually in practice, not secured together until each piece has been individually encased in metal, as hereinafter described. The upper part 5 of the bottom rail has a vertically extending slot 8 therein at each end thereof. The lower member 6 of the bottom rail has an opposed pair of transverse slots 9 at each end thereof, the slots 9 being formed in opposite sides of the piece 6. The members 3 and 4 of the top rail are slotted just the same way as the corresponding parts 6 and 5 respectively of the bottom rail.

Each vertical stile 2 is encased in a metal sheath 10 which conforms to the shape thereof and which fits tightly thereover. The edges of the sheet metal sheath are brought together along the vertical inner face of the stile, as indicated at 11 in Figure 4, the meeting edges of the sheath being turned outwardly to form a double flange down this face of the strip. The metal sheath has side flaps at the top and bottom thereof designated 12, which project beyond the end of the stile, as best shown in Figure 4, when the sheath is first put on the metal. The sheath also has an end flap 13 projecting upwardly beyond the end of the stile. The flange 11 does not project beyond the end of the stile, but at 14 there are vertically extending flaps or flanges.

This arrangement of flaps or flanges is the same at each end of each stile. The bottom rail is encased by a single piece of sheet metal fitted therearound, this casing being designated 15. The opposite edges of the metal are brought together over the top face of the rail and turned upwardly to form a double flange 16. The ends of the casing 15 are turned over the ends of the member 5, as shown at 17 in Figures 4 and 6. The portions 17 of the metal also project into the slots

9 in the lower member 6, as best shown in Figure 7.

The middle rail 7 is enclosed in two correspondingly shaped pieces of sheet metal 18 and 19 with upturned edges 20 thereon forming double flanges along the top and bottom of the middle rail. The ends of the pieces 18 and 19 are bent over to cover the ends of the middle rail, the vertical slot 7^a in the ends however, being left uncovered.

In assembling the door, the wooden parts are first separately encased in metal. The end rails at the top and bottom of the door are then fitted to the stiles, the inturned flanges 14 at the ends of the stiles being received in the vertical slots 9 in the cross rails. The flange 11 on the stiles enters the slot 8 in the cross rails at the same time the middle rail is secured in place. One of the flanges 11 of one of the stiles enters a groove 7^a at one end of the middle rail 7, and the flange 11 of the other stile enters the corresponding groove 7^a at the other end of the middle rail.

After the end rails have been placed on the stiles as described, a small flanged metal plate 26 is placed over that portion of the wooden rail that rests against the ends of the stile. The edges of the flanges 12 and 13 are rolled over to form an interlocking seam around the three edges of the plate 26. The sheath 15 encasing the top and bottom rail has a flange 15^a at each end thereof, and this flange is rolled over and interlocked with the flange at one end of the plate 26 to form the rolled joint 26^a of Figure 10. The plate 26 not only serves to protect the wooden structure at the ends of the stiles, but also forms a metallic interlock between the end rails and the stiles. This interlock is sufficient to hold the door together even if the wooden core were entirely removed.

After the several parts have been placed together, the panels 21 and 22 can be secured in place. This is done as best shown in Figure 8, by pressing the edges of the plates 23 and 24 together at intervals around the edge of the panel, as shown in Figures 5 and 8 and spotwelding the panel to the upstanding flanges 11, 16 and 20. The spotwelding of the panel further ties the several parts of the door together. After the panels are secured in place, metal molding 28 is placed around the edges of the panels on each side of the door.

The construction of the door is such that each piece can be separately covered with metal and then the several pieces assembled. After the door has been assembled, all of the wooden parts are completely encased in metal, and the frame is rigidly secured together. The door is fastened together and the sheathing secured to the several members in such way that no nails or screws necessary for holding the door together, pass through the metal into the wood. Due to this fact, the door will remain rigid even if the wooden core is burned out. The entire door is assembled with a minimum of parts, and the various parts are so shaped that dies for bending the metal can be easily provided. The entire construction lends itself to cheap, as well as durable manufacture.

While I have particularly shown and described one embodiment of my invention, it will be understood that various detail changes and modifications may be made therein.

I claim:

1. In a kalamein door, top and bottom rails, each of which has a metal sheathing and projecting end portions, vertical stiles, each of which is enclosed in a sheathing, said rails being equal to the distance between the stiles, the projecting portions having a length equal to the width of the stiles, the sheathing for the vertical stiles projecting beyond the ends of the stiles and embracing the projecting ends of the top and bottom rails, said projecting ends of the rails having transverse slots on opposite sides thereof to receive the sheathing of the stiles.

2. In a kalamein door, top and bottom rails, each of said rails having a metallic sheathing thereover and having projecting portions at each end thereof, vertical stiles, each of said stiles having a metallic sheathing encasing the same, the metallic sheathing being longer than the stiles and projecting beyond each end of the stiles, the projecting part of the sheathing for the stiles at each corner embracing one of said projecting portions of a top or bottom rail, the sheathing of the stile and the sheathing for the top or bottom rail being connected together across the outside of the top and the bottom of the door and being in contact along the end faces of the rails and the inside faces of the stiles.

3. In a kalamein door, top and bottom rails, each of which is enclosed in a metal sheathing which is folded transversely over the end faces thereof to substantially cover the end faces, each rail having a projecting portion at each end thereof, a pair of vertical stiles, a sheathing enclosing each stile and projecting beyond the end of the stile at each end thereof, said projecting portions of the rails lying against the adjacent end of a stile, said projecting portions of the rails being transversely slotted to receive a portion of the stile sheathing and into which the sheathing which is folded over the end faces of the rails projects.

4. In a kalamein door, top and bottom rails, each of which is enclosed in a metal sheathing, each rail having a projecting portion at each end thereof, a pair of vertical stiles, a sheathing enclosing each stile and projecting beyond the end of the stile at each end thereof, said projecting portions of the rails lying

against the adjacent end of a stile, said projecting portions of the rails being transversely slotted to receive a portion of the stile sheathing, and a plate placed over each of said projecting portions and connected with the sheathing for the stile and with the sheathing for the rail.

5. In a kalamein door, top and bottom rails, each of said rails having a metallic sheathing bent thereabout with the edges of the sheathing brought together to form a flange along the inside of the rail, each rail having a projecting end portion at each end thereof, said sheathing being folded over the end faces of the rail but leaving the projecting end portions exposed, a vertical stile at each side of the door, each vertical stile having a metallic sheathing thereabout whose edges are brought together to form a flange along the inner face of each stile, the end faces of the rails being grooved to receive the flanges of the stiles, the sheathing for each stile projecting beyond the end of the stile at each end thereof and embracing the adjacent projecting portion of a top or bottom rail.

6. In a kalamein door, top and bottom rails, each of said rails having a metallic sheathing bent thereabout with the edges of the sheathing brought together to form a flange along the inside of the rail, each rail having a projecting end portion at each end thereof, a vertical stile at each side of the door, each vertical stile having a metallic sheathing thereabout whose edges are brought together to form a flange along the inner face of each stile, the sheathing for each stile projecting beyond the end of the stile at each end thereof and embracing the adjacent projecting portion of a top or bottom rail, each of said rails having a vertical groove in an end face thereof adapted to receive the flange of the stile sheathing.

7. In a kalamein door, top and bottom rails, each of said rails having a metallic sheathing bent thereabout with the edges of the sheathing brought together to form a flange along the inside of the rail, each rail having a projecting end portion at each end thereof, a vertical stile at each side of the door, each vertical stile having a metallic sheathing thereabout whose edges are brought together to form a flange along the inner face of each stile, the sheathing for each stile projecting beyond the end of the stile at each end thereof and embracing the adjacent projecting portion of a top or bottom rail, each of said rails having a vertical groove in an end face thereof adapted to receive the flange of the stile sheathing, said door also having a middle rail having a slot at each end thereof into which a flange of the stile sheathing is entered, said middle rail being enclosed in metallic sheathing formed of two pieces, the meeting edges of which form flanges along the top and bottom edges of the rail.

8. In a kalamein door, top and bottom rails, each of said rails having a metallic sheathing bent thereabout with the edges of the sheathing brought together to form a flange along the inside of the rail, each rail having a projecting end portion at each end thereof, a vertical stile at each side of the door, each vertical stile having a metallic sheathing thereabout whose edges are brought together to form a flange along the inner face of each stile, the sheathing for each stile projecting beyond the end of the stile at each end thereof and embracing the adjacent projecting portion of a top or bottom rail, each of said rails having a vertical groove in an end face thereof adapted to receive the flange of the stile sheathing, said door also having a middle rail having a slot at each end thereof into which a flange of the stile sheathing is entered, said middle rail being enclosed in metallic sheathing formed of two pieces, the meeting edges of which form flanges along the top and bottom edges of the rail, and panels in the door spotwelded to the respective flanges of the several members.

9. A kalamein door having vertical stiles at each side thereof and a rail at each end thereof, each rail being enclosed in a metal sheathing and having a projecting portion at each end thereof, the projecting portion lying against an end of a stile, each stile having a metal sheathing thereabout projecting beyond the ends thereof, the metal sheathing of the style embracing the projecting portion of the rail, a metal plate overlying the projecting portion of each rail, said plate being connected with the projecting portion of the sheathing for the stile and being connected with the sheathing for the rail.

10. In a kalamein door, an end rail comprising a short portion and a long portion, a metal sheathing encasing the rail and leaving end sections of the long portion uncovered, said sheathing being bent around the ends of the short portion and being bent into transverse vertical slots in the long portion, the edges of the sheathing being brought together over the inner edge of the rail and forming a vertical flange therealong.

11. In a kalamein door, an end rail comprising a short portion and a long portion, a metal sheathing encasing the rail and leaving end sections of the long portion uncovered, said sheathing being bent around the ends of the short portion and being bent into transverse vertical slots in the long portion, the edges of the sheathing being brought together over the inner edge of the rail and forming a vertical flange therealong, the ends of the short portion of the rail having vertical slots therein.

12. The method of forming a kalamein door formed of several pieces comprising stiles and rails, which consists in placing a sheathing over the individual pieces, thereafter assembling the several pieces, and then forming rigid joints between the sheathing of the several pieces of sufficient strength to rigidly hold the door together.

In testimony whereof I have hereunto set my hand.

WILLIAM W. MacGRUDER.