United States Patent

[11] **3,566,194**

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[21] Appl. No. **854,687**
[22] Filed **Sept. 2, 1969**
[45] Patented **Feb. 23, 1971**
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[54] **SHALLOW DEPTH LOAD CENTER**
10 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **317/119,** 317/117, 317/118, 317/120
[51] **Int. Cl.** **H02b 1/04**
[50] **Field of Search** 317/115, 117, 118, 119, 120

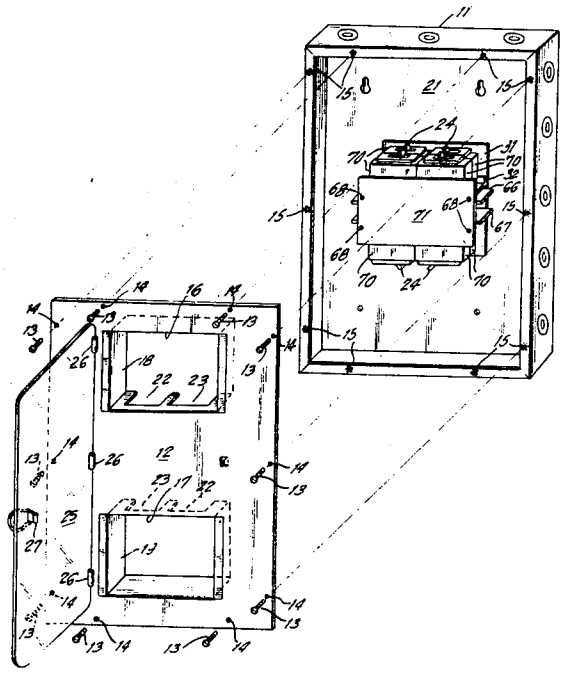
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ABSTRACT: A load center is constructed with line busing disposed entirely between the circuit breakers, without adding depth to the load center enclosure, and positioned to be engaged by circuit breakers that are locked into position by pivoting thereof in planes parallel to the rear wall of the enclosure.



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SHEET 1 OF 5

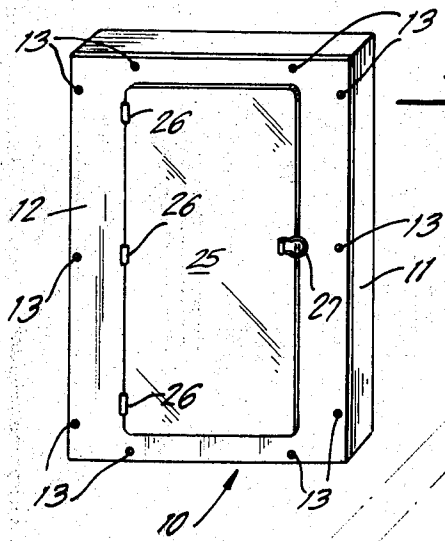


FIG. 1.

FIG. 2.

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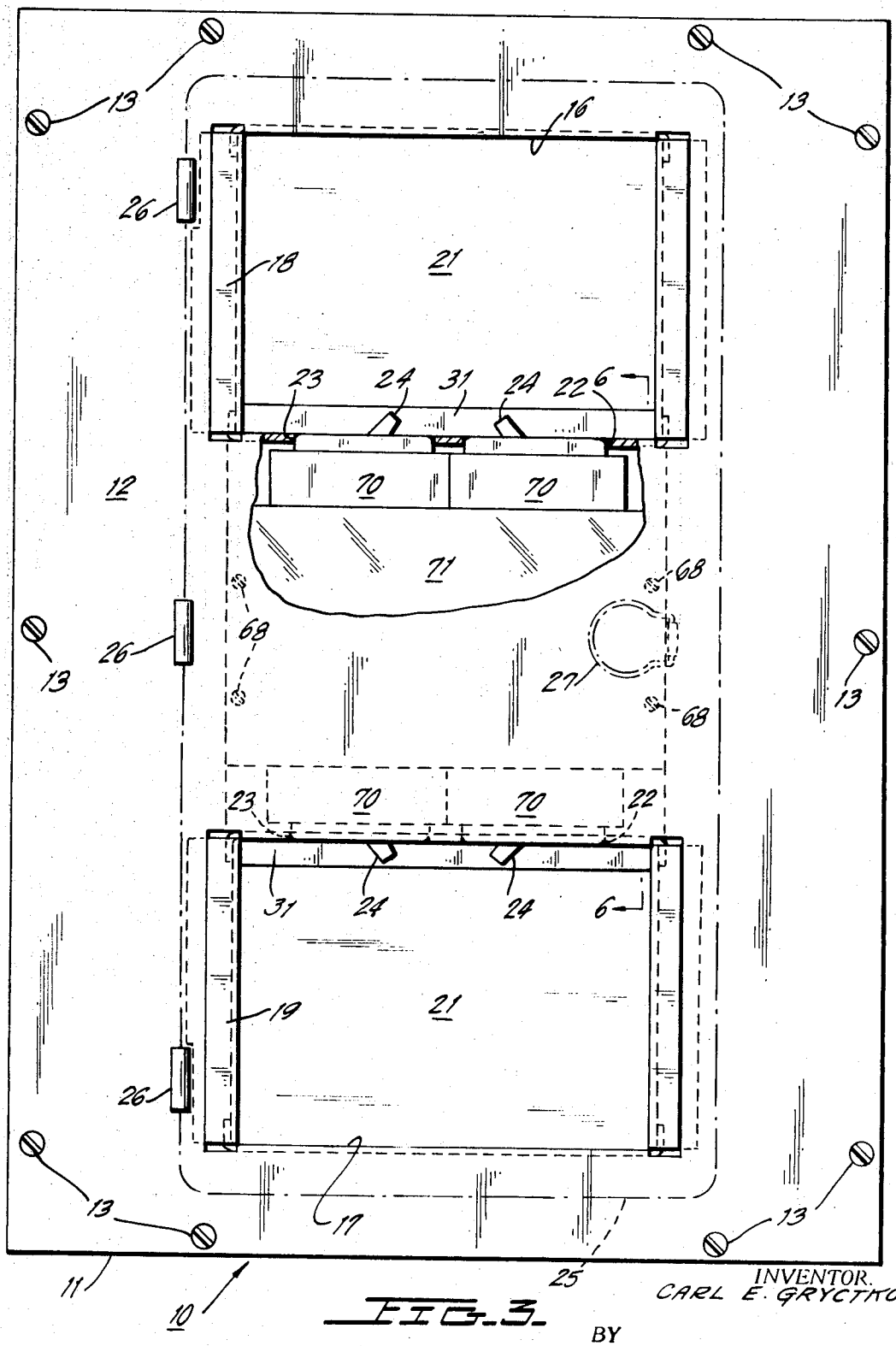


FIG. 3

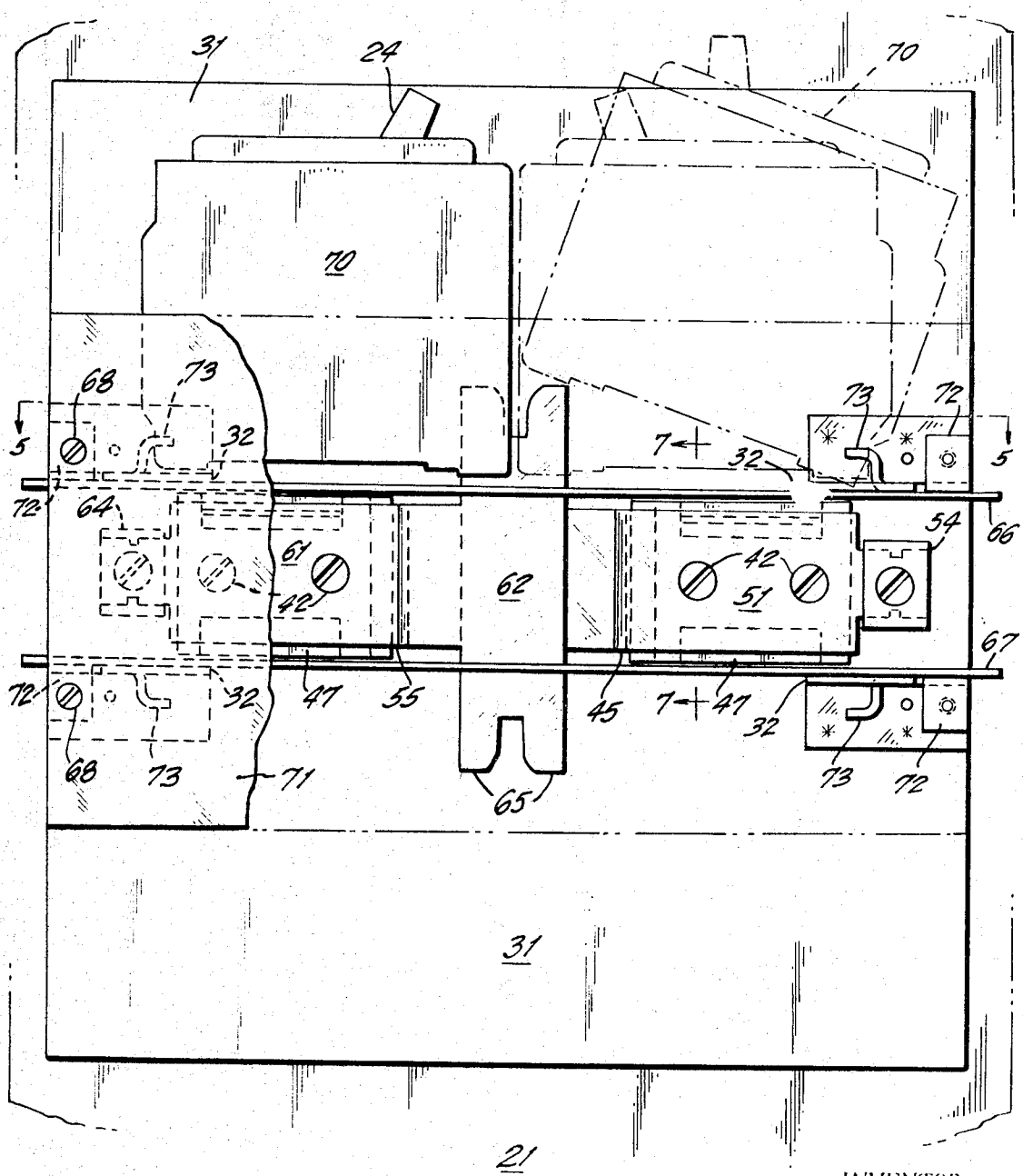
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FIG. 4



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FIG. 5.

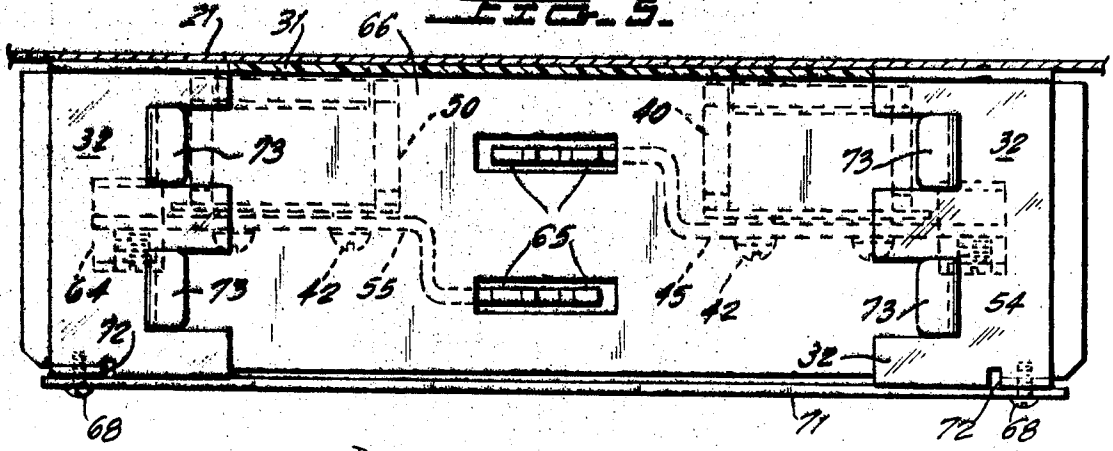
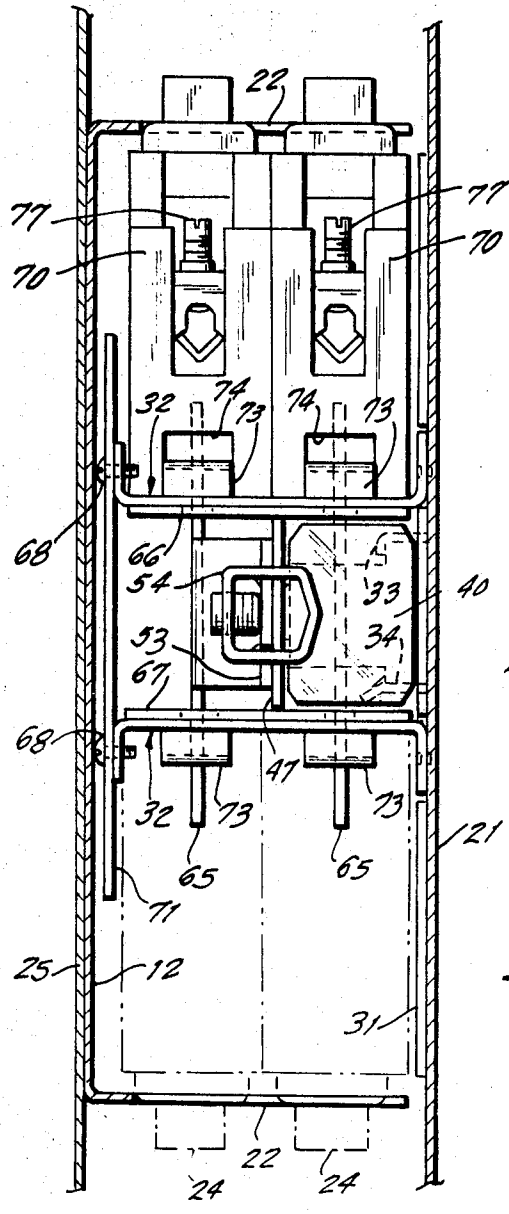


FIG. 6.



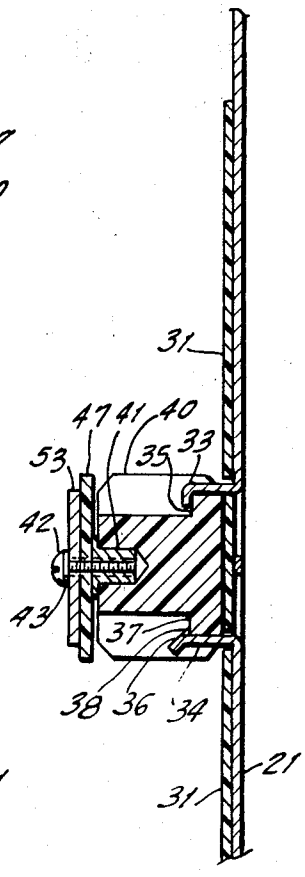
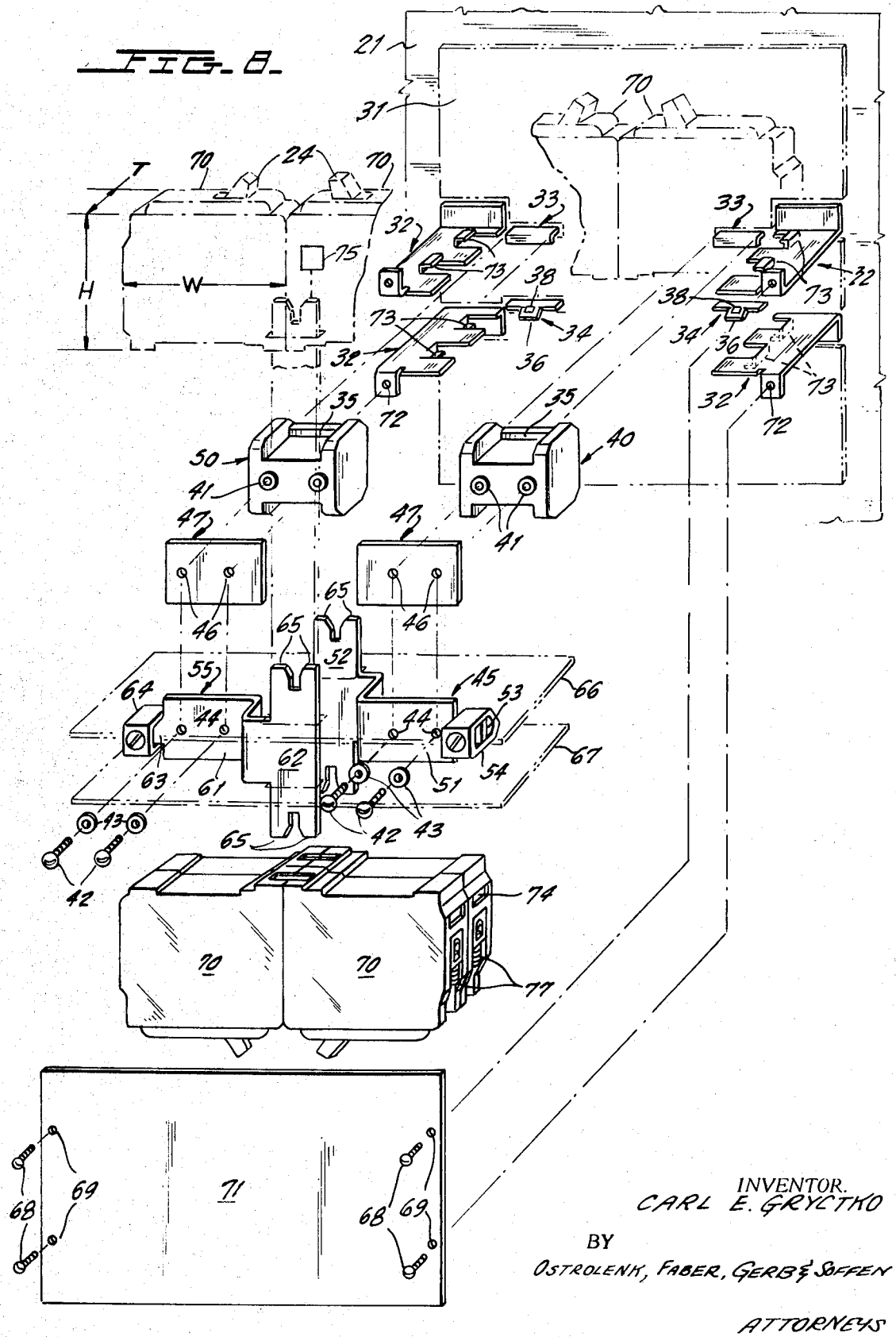


FIG. 7.

FIG. 8



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SHALLOW DEPTH LOAD CENTER

This invention relates to load centers in general, and more particularly relates to an especially shallow depth load center.

In trailers, mobile homes, and houses constructed with 2 × 3 studs, the space between wall layers is very narrow, thereby highlighting the need for shallow depth load centers. With this in mind, the instant invention provides a load center construction in which the depth of the panelboard enclosure is controlled by the thickness, rather than the length or width, of the circuit breakers, and the busing is positioned so that it does not add to the enclosure depth.

Accordingly, a primary object of the instant invention is to provide an especially shallow load center.

Another object is to provide a load center construction in which the enclosure depth is controlled by the thicknesses of the circuit breaker.

Still another object is to provide a load center in which line busing does not add to the enclosure depth.

A further object is to provide a shallow depth load center in which line busing consists of two identical straps, each having a stab portions frictionally engageable by four circuit breakers.

These objects as well as other objects of this invention will become readily apparent after reading the following description of the accompanying drawing in which:

FIG. 1 is a perspective of a shallow depth load center constructed in accordance with teachings of the instant invention.

FIG. 2 is an exploded perspective of the load center of FIG. 1, with its cover and front plate separated from the enclosure.

FIG. 3 is a front elevation of the load center with the cover removed.

FIG. 4 is an enlarged front elevation, with portions cut away, illustrating the mounting of circuit breakers in the load center.

FIG. 5 is a cross section taken through line 5–5 of FIG. 4, looking in the direction of arrows 5–5.

FIG. 6 is a cross section taken through lines 6–6 of FIG. 3, looking in the direction of arrows 6–6.

FIG. 7 is a fragmentary cross section taken through line 7–7 of FIG. 4, looking in the direction of arrows 7–7.

FIG. 8 is an exploded perspective showing the main elements of the load center of FIG. 1.

Now referring to the FIGS. load center **10** of FIG. 1 includes a panelboard comprising shallow, rectangular enclosure **11** having removable front cover **12** secured in place by a plurality of sheet metal screws **13**. The latter extend through clearance holes **14** in front wall **12** and are received by threaded apertures **15** along the in-turned marginal edge of enclosure **11**.

Wall **12** is provided with rectangular cutouts **16**, **17** and rectangular partitions **18**, **19** extending rearwardly from the boundary edges defining cutouts **16**, **17** respectively. Partitions **18**, **19** extend to enclosure rear wall **21**, with one wall of each of the partitions **18**, **19** being provided with double notches **22**, **23** to provide clearance for the operation of circuit breaker operating handles **24**. The walls with notches **22**, **23** and the other walls of partitions **18**, **19** are struck from wall **12** during formation of cutouts **16**, **17** and the remaining walls of partitions **18**, **19** are secured by welds. Openable cover **25** is pivotally mounted to front wall **12** by hinges **26**, with spring catch **27** mounted on the rear surface of cover **25** extending through aperture **28** in front wall **12** to maintain cover **25** in close position wherein it closes the recesses defined by rectangular partitions **18**, **19**.

The panelboard interior comprises insulating sheet **31** positioned adjacent to the front surface of enclosure rear wall **21**. Sheet **31** is appropriately notched to provide clearances for two circuit breaker mounting brackets **32** and two pairs of insulator block retainer elements **33**, **34**. Brackets **32** and elements **33**, **34** extend forwardly from enclosure rear wall **21**, being welded thereto.

As best seen in FIG. 7, element **33** is of generally L-shaped cross section, with the free end thereof hooking over ledge **35** of insulator block **40**. The free edge of element **34** flares away from element **33**, to provide a camming surface **36** which facilitates pivoting of insulator **40** about element **33** to a point where shoulder **37** falls beneath retaining ear **38** struck from element **34**. When shoulder **37** moves to the rear of gear **38**, element **34** springs back toward element **33** locking insulator **40** in its operative position abutting insulating sheet **31**. In a similar manner, the other pair of elements **33**, **34** secure the other insulator block **50** in its operative position.

A pair of threaded inserts **41** at the front surface of block **40** receive screws **42** after they have passed through lock washers **43**, clearance apertures **44** in conducting straps **45**, and clearance apertures **46** in insulating sheet **47**, the latter lying adjacent to the front surface of block **40**. Similarly, another pair of screws **42** and lock washers **43** secure conducting strap **55** and another insulating sheet **47** to block **50**.

It is noted that conducting straps **45** and **55** are identical. In particular, strap **55** includes main portion **61** having offset portion **62** at one end thereof and ear **63** at the other end thereof. Wire grip **64** is mounted to ear **63**. Similarly, strap **45** includes main portion **51**, offset portion **52** at one end thereof and ear **53** with wire grip **54** mounted thereto at the other end of main portion **51**.

Offset portions **52**, **62** extend beyond both edges of the respective main portions **51**, **61**. These transverse extensions of offset portions **52**, **62** each terminate in a pair of stabs **65**, **65**, with each stab **65** being adapted for frictional engagement by the line terminal of a so-called plug-in type circuit breaker **70**, eight of which form part of load center **10**. The stab projections extending in one direction pass through slots in insulating sheets **66**, while the other stab projections extend through slots in another insulating sheet **67**. Insulating sheets **66** and **67** are positioned adjacent to opposite edges of main strap portions **51**, **61**, and are retained in operative positions by brackets **32**. Four screws **68** extend through clearance aperture **69**, in insulating sheet **71**, and are received by threaded apertures in ears **72** at the forward end of each bracket **32**, to secure insulating sheet **71** in operative position adjacent to the inner surface of front wall **12**.

Each of the brackets **32** is of similar construction, the essential difference being that one type is a mirror image of the other type. Each bracket **32** is provided with two circuit breaker mounting hooks **73**, **73** which fit into cooperating mounting recesses **74** at the load end of circuit breakers **70**, and provide pivots about which circuit breakers **70** are rocked into operative position with their line terminals **75** frictionally engaged with stabs **65**. Terminal **75** is at the end of breaker **70** opposite recess **74** and at the bottom thereof. As is well known to the art, circuit breaker load terminal **77** is positioned at the load end of breaker **70**, above mounting recess **74**.

It is noted that breaker **70** is of a type used for residence and light industrial applications, with the thickness T thereof being considerably less than the width W and overall height H, the latter including the housing height as well as room required to operate handle **24**.

Thus, it is seen that the depth of enclosure **11** is controlled by the thickness of two circuit breakers stacked side by side. Naturally, if only a single line or layer of circuit breakers is to be utilized, then the depth of the panelboard enclosure is reduced by the thickness of a line of circuit breakers. It is noted that the circuit breakers illustrated in the drawings and hereinbefore described are constructed to be 1 inch thick. However, compatible breakers in twin form may be utilized to provide two, rather than one, pole unit per inch of thickness.

It is also noted that in the following claims the uses of "top" and "bottom" with reference to the circuit breaker are merely relative terms, and may change depending upon the orientation or absolute position of the circuit breaker as it is mounted in the load center.

Although there have been described preferred embodiments of this novel invention, many variations and modifica-

tions will now be apparent to those skilled in the art. Therefore, this invention is to be limited not by the specific disclosure herein, but only by the appending claims.

I claim:

1. A loadcenter comprising a plurality of circuit breakers and a panelboard mounting said circuit breakers; each of said circuit breakers including a relatively flat rectangular case with line and load terminals at opposite ends thereof and a contact operating handle projecting through an aperture in a narrow top wall of said case which extends between sidewalls of the case that are many times larger in area than the area of the top wall; said panelboard including a shallow rectangular housing comprising a rear wall and a front wall closely spaced with respect to said rear wall; line busing means mounted within said housing and insulated therefrom; mounting means within said housing; said mounting means operatively positioning said plurality of circuit breakers within said housing with said sidewalls disposed in planes extending generally parallel to said rear wall; said operating handles disposed behind said front wall and said line terminals electrically connected to said line busing means; said front wall having opening means through which said operating handles are engageable for manual operation of said circuit breakers.

2. A loadcenter as set forth in claim 1, in which a first and a second of said circuit breakers are positioned with their bottom walls in confronting relationship and the handles thereof projecting in opposite directions.

3. A loadcenter as set forth in claim 1, in which a first and a second of said circuit breakers are positioned with the line terminal end walls thereof in confronting relationship.

4. A loadcenter as set forth in claim 1, in which the mounting means includes hook portions about which the circuit breakers are pivoted in planes parallel to said rear wall into their operative positions.

5. A loadcenter as set forth in claim 4, in which the busing means includes generally planar portions constituting stabs; said line terminals of said circuit breakers being frictionally engaged with said stabs; said planar portions positioned parallel to said rear wall.

6. A loadcenter as set forth in claim 5, in which said busing includes first and second identical conducting straps, each having a main portion and an offset portion at the end of said main portion; said offset portions constituting said stabs.

7. A loadcenter as set forth in claim 6, in which said main portions are aligned with each other and disposed in a common plane, said offset portions disposed parallel to said plane on opposite sides thereof.

8. A loadcenter as set forth in claim 7, in which said offset portions are in alignment, a wire grip means mounted to each of said main portions at its other end.

9. A loadcenter as set forth in claim 7, in which each of said offset portions provides a sufficient number of said stabs for frictional engagement by line terminals of four circuit breakers.

10. A loadcenter as set forth in claim 9, in which said offset portions are in alignment and said plane is parallel to said rear wall.