July 1, 1969 W. W. BROCKWAY 3,452,492

SCHOOL BUILDING WITH EXCHANGEABLE ANNEX UNIT

Filed May 8, 1967 Sheet 1 of 2

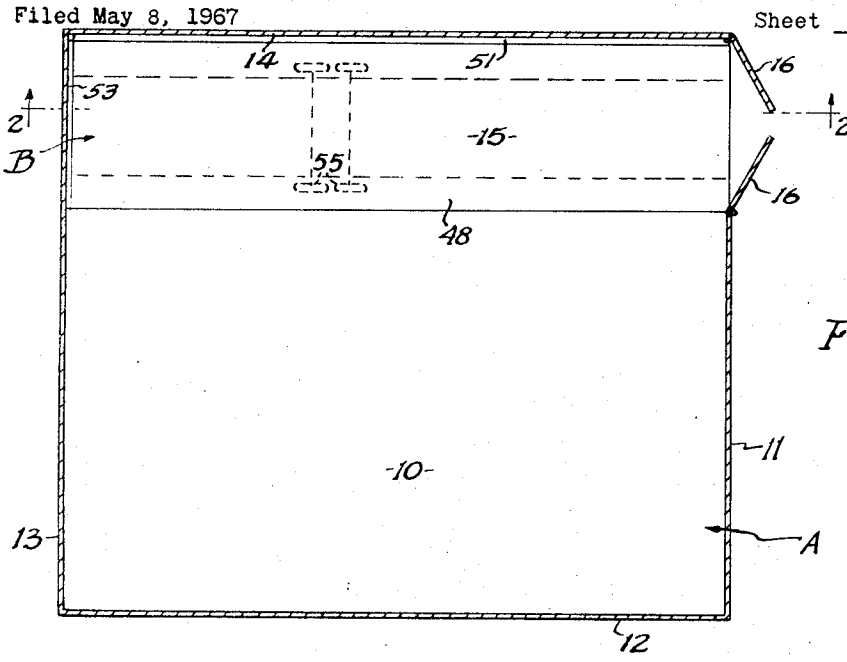


FIG. 1

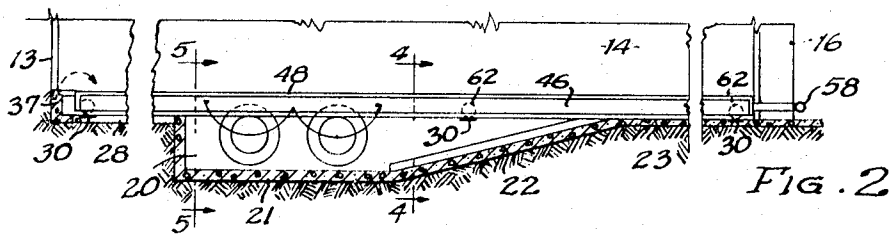


FIG. 2

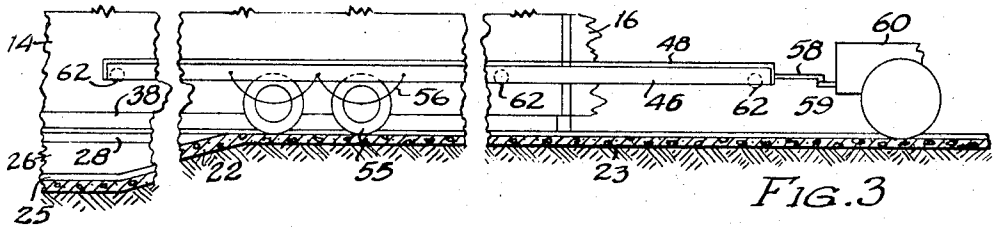


FIG. 3

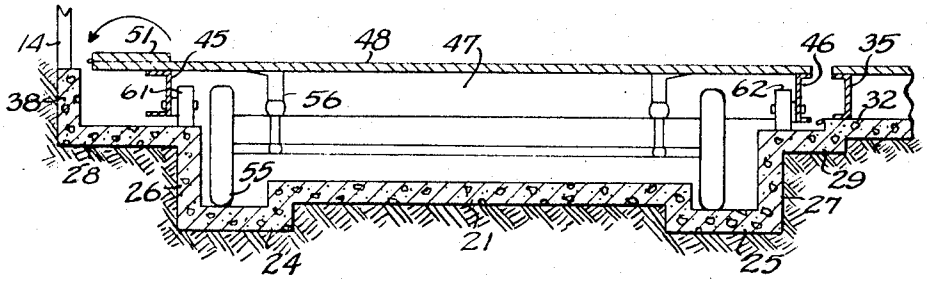


FIG. 4

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Fig. 8

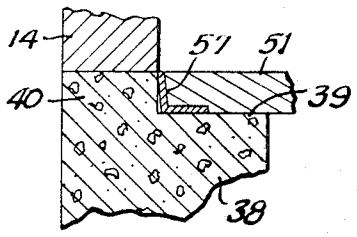
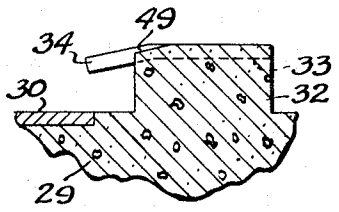


Fig. 7



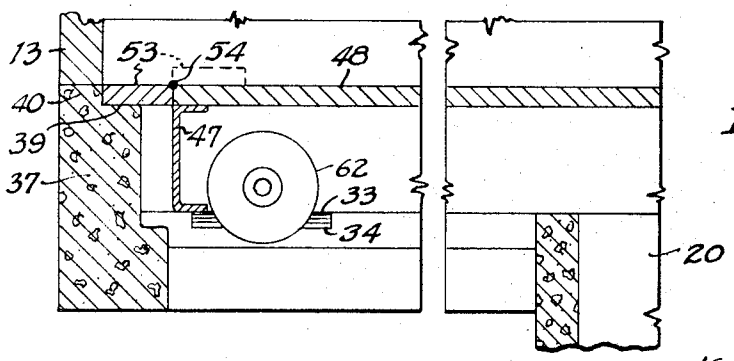
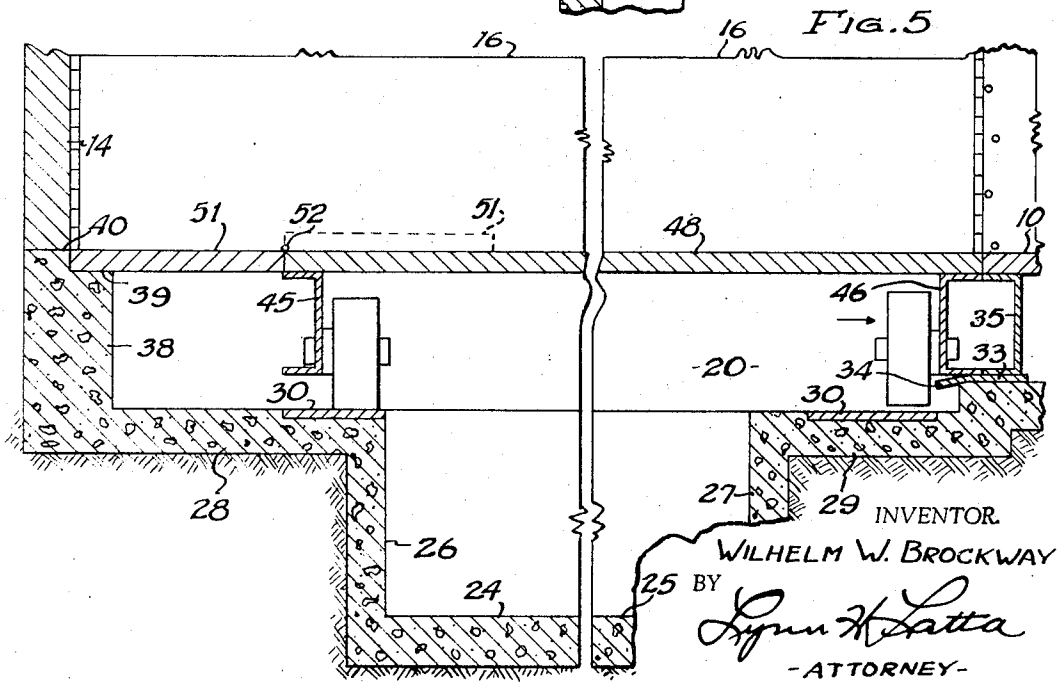


Fig. 6

Fig. 5



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SCHOOL BUILDING WITH EXCHANGEABLE ANNEX UNIT

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Int. Cl. E04b 1/343
U.S. Cl. 52—64 4 Claims

ABSTRACT OF THE DISCLOSURE

A classroom having a mobile annex unit coupled to a permanent building unit, the mobile annex unit having transportation wheels for moving it from one permanent building unit to another permanent building unit. The mobile unit and permanent building unit have cooperable means for shifting the mobile unit into coupled relation to the permanent building unit such that the wheels are relieved of the weight of the mobile unit.

BACKGROUND OF THE INVENTION

Temporary school buildings which can be moved onto foundations on school grounds have been employed in recent years in order to meet a demand for added classroom space that cannot easily be filled by permanent buildings, due to lack of funds for building permanent structures. Shortage of schoolroom facilities has become so acute that it is becoming increasingly difficult to fill the need even with temporary classrooms.

SUMMARY OF THE INVENTION

This invention provides a composite building structure providing a normal student activity area, with student seating and teaching facilities, etc. in a permanent section of the structure, and providing special facilites, such as laboratory equipment, in a mobile section which can be bodily removed after a period of use thereof, and can then be exchanged for another mobile section having different facilities therein.

An object of the invention is to provide, for a school system having a number of schools, a combination building structure including a permanent building unit and a mobile annex unit having specialized instruction equipment which can be moved from one permanent building unit to another so as to avoid the necessity for duplicating the specialized equipment for each school location.

Another object is to provide for annexing to a basic school building unit a series of exchangeable specialized instruction units such as chemistry laboratory, physics laboratory, manual training shop, etc., for successive periods of use, so as to avoid the necessity for maintaining an entire series of such units as permanent portions of a single school establishment.

DESCRIPTION

These and other objects will become apparent in the following specifications and appended drawings, wherein:

FIG. 1 is a plan view of a combination permanent and mobile unit embodying the invention;

FIG. 2 is a fragmentary vertical longitudinal sectional view of the mobile unit in its installed position, taken on the line 2—2 of FIG. 1;

FIG. 3 is a vertical longitudinal sectional view of the mobile unit, in an intermediate position of transit into or out of the permanent building structure;

FIG. 4 is a cross-sectional view of the partially installed mobile unit, taken at the position of line 4—4 of FIG. 2;

FIG. 5 is a detail vertical cross-sectional view of the annex unit installation, taken on line 5—5 of FIG. 2;

FIG. 6 is a fragmentary detail vertical longitudinal sectional view of the forward portion of the annex unit installation;

FIG. 7 is a fragmentary cross-sectional view of the ledge support for one side of the annex unit; and

FIG. 8 is a detail sectional view of a modified form of the hinged side floor panel.

Referring now to the drawings in detail, and in particular to FIG. 1, I have shown therein, as an example of one form in which the invention may be embodied, a school building including a permanent building unit A and a mobile annex unit B along one side thereof. Permanent unit A includes a fixed floor **10** providing a normal or common student activity area which can be divided into classrooms, study hall, library, office, etc., a plurality of walls **11**, **12**, **13** and **14**; and suitable doors, windows, roof, etc., which are not shown since they form no part of this invention. Wall **13** is extended beyond floor **10**, and wall **14** is spaced from the adjacent side margin of floor **10**, to define a rectangular annex area **15**, alongside wall **14**, to receive the annex unit B.

Annex unit B is in the form of a platform which carries specialized teaching equipment such as a laboratory, office, demonstration table, test equipment, etc., and which may be arranged for maximum educational advantage.

When unit B is being transported it may be covered by a tarpaulin or other suitable cover to protect the equipment which it carries. Area **15** may be joined to the student activity area **10** by a level floor joint for unobstructed communication between units A and B. Wall **11** terminates at the inner side of annex area **15**, to provide an entryway of sufficient width to receive the annex unit B. Such entry way is normally closed by a movable wall panel or panels or hinged door **16**. Area **15** extends the full length of the permanent building unit A as shown, or may extend a portion of the length of the building from entry doors **16** to the rear end of the building.

Area **15** has a permanent foundation and an elongated rectangular pit **20**, FIG. 2, having at its rear end a bottom **21** defined by a horizontal concrete slab, having an intermediate ramp **22** defined by an inclined slab, and having a ground-level apron **23** defined by a horizontal slab below but near the floor level of the building. The lining slabs **21**, **22** and **23** of the pit, FIG. 4, are provided with depressed tracks **24** (adjacent side wall **14**) and **25** (adjacent the side margin of floor **10**) which tracks are of channel form and are merged with vertical side walls **26** and **27** of the pit. Extending laterally outwardly from side walls **26**, **27** are lateral track shoulders **28**, **29**, which extend the full length of the annex area **15** in a single level plane. Shoulders **28**, **29** are provided with recessed metal roller slide plates **30**, FIG. 5, which are spaced along the length of the shoulders. Alongside the shoulder **29**, and formed integrally therewith, is a supporting ledge **32** which extends the full length of the annex area **15**. Ledge **32** extends along the outer side of shoulder **29**, whereby the longitudinal side frame member **46** of annex unit B may be shifted laterally onto the ledge **32** in the final stage of bodily movement of the annex unit B into installed position. A plurality of leveling plates **33**, spaced along the length of ledge **32**, are mounted therein, flush with the upper surface thereof. Each leveling plate **33** has a laterally projecting, downwardly inclined slide **34**.

Floor **10** of the permanent building unit A projects over supporting ledge **32**, FIG. 5, and is marginally supported by a floor joist **35** extending the length of ledge **32** and supported thereon. The pit structure described above may be constructed as an integral part of a conventional foundation for the permanent unit A and remains a permanent part thereof. Along the outer and back sides of pit **20–23** (FIG. 2) the permanent foundation includes sup-

porting walls 37, 38 (FIGS. 5 and 6) which are provided in their upper surfaces with recessed support shoulders 39 which are disposed inwardly of upwardly projecting lips 40 on which the vertical building walls 13 and 14 are erected.

Mobile annex unit B has an undercarriage comprising a pair of laterally-spaced, longitudinally extending chassis beams 45 and 46 (FIG. 5) connected by longitudinally spaced transverse floor joists 47, to provide a frame which is covered with a fixed floor panel 48. When the annex unit B has been wheeled into place in ramp area 15 in the initial position shown in FIG. 4, it can be moved onto the supporting ledge 32 by shifting it laterally, using suitable power-operated apparatus, the chassis beam 46 engaging and sliding upwardly on slides 34 and coming to rest on the upper surface of ledge 32 and the flush portions of leveling plates 33 which actually may project slightly above the surface of ledge 32 along the margin thereof adjacent slides 34, so that the edge of beam 46 will ride smoothly over this margin of ledge 32, without catching against it. To this end, this margin of ledge 32 may be levelled as at 49 in FIG. 7. Beam 46 is of the same height as permanent floor joist 35 and is moved into side-by-side contact therewith in the fully installed position shown in full lines in FIG. 6. The two beams may be complementary e.g., of channel section and in opposed relation, with their horizontal flanges abutting, as shown. Floor 48 of the annex and permanent floor 10 have their adjacent margins so related to beams 46 and 35 (e.g., in registration with the margins thereof) as to be brought into tight abutting contact when annex unit B is moved into fully installed position.

Floor 48 has its outer marginal portion secured on top of beam 45 (FIG. 5). Since the latter is spaced inwardly a substantial distance from outer building wall 14 and its foundation wall 38 (necessarily in order to apply to the beam 45 the lateral push necessary to slide it upwardly on slides 34) a hinged floor section 51 (FIG. 8) is provided, to close the gap between the outer margin of fixed floor section 48 and wall 14. Floor section 51 is hinged at 52 (FIG. 5) to the outer margin of fixed floor section 48. It is adapted to be swung from a folded position shown in phantom in FIG. 5, to the full-line position in which its outer margin snugly closes adjacent the inner side of foundation lip 40 and its adjacent marginal portion rests upon shoulder 39. As shown in FIG. 8, the outer margin of hinged floor section 51 may be slightly bevelled (e.g., by means of a reinforcing strip 57 of slightly obtuse di-hedral angle section) or the opposed side face of lip 40 may be inclined slightly from the vertical, so as to provide a wedging action in which the margin of hinged floor section 51 can be tightly wedged against lip 40 by forcing the floor section 51 downwardly against shoulder 39. This feature may be employed to lock the annex unit B tightly in its installed position, to prevent any lateral shifting of the annex unit after installation, such as might develop a crack between the adjoining margins of floors 10 and 48, and to hold the annex section securely against any longitudinal shifting in annex area 15.

A narrow transverse floor section 53 (FIG. 6) is preferably attached to the rear end of fixed floor panel 48 by hinge means 54 and adapted to be swung from a folded position shown in phantom, to a position, shown in full lines, in which it snugly closes a gap that may occur between the rear end of floor panel 48 and foundation wall 37 after annex unit B has been moved to its fully installed position.

For the purpose of moving the annex unit B from one location to another, its chassis frame 45–47 is equipped with an undercarriage comprising transport wheels 55 (FIG. 3) attached thereto by conventional vehicle spring mounts 56; and a trailer hitch 58 is removably attachable to its forward end and adapted to be coupled to a hitch member 59 on a tractor 60 which may be of a type such as is employed for pulling large freight truck trailers or mobile homes. Additionally, the chassis 45–47 is provided with a plurality of casters or rollers 61 and 62 rotatably mounted on its chassis beams 45 and 46 respectively. Each group of rollers may be five in number, spaced equally along the length of the respective beam. The casters project below the lower sides of beams 45, 46 sufficiently to ride upon the pit shoulders 28, 29 with the lower side of beam 46 just slightly below the level of the upper surface of supporting ledge 32 but slightly above the ends of slides 34. Casters 61, 62 are on the inner sides of beams 45, 46 and ledge 32 is on the outer side of beam 46. Thus the beam 46 overhangs the slides 34 in the direction in which the annex unit B is shifted in order to slide it onto the support ledge 32.

OPERATION

Tracks 24, 25 and shoulders 28, 29 are wide enough to allow transport wheels 55 and rollers 61, 62 to be shifted laterally to the extent that beam 46 may be shifted onto support ledge 32 from the position spaced away from the ledge it occupies when unit B is being moved into or out of the annex area 15. The bottom 21 of pit 20 is of such depth that transport wheels 55 will be suspended when located over the bottom (FIG. 2) and the load of annex unit B will be transferred to rollers 61, 62, riding on shoulders 28, 29, as the wheels 55 enter the deepest area of pit 20.

To install annex unit B in a permanent building unit A to which it has been hauled by tractor 60, it is maneuvered into position on the ground level apron 23 with its wheels 55 received in the tracks 24, 25 thereof, on the sides thereof toward the outside (wall 14) so that beam 46 will clear the ledge 32 and slides 34 as the unit B is moved into the building. The unit B is then backed into area 15, down ramp 22, the wheels 55 entering the pit 20 and the rollers 61, 62 coming into rolling contact with shoulders 28, 29 as the wheels 55 near the pit bottom 21. During the final stage of backing the unit B into area 15, the rollers 61, 62 will ride onto shoulders 28, 29, lifting the wheels 55 clear of the pit bottom 21.

When the unit B has reached the correct position with its rear end sufficiently close to foundation wall 37, it is unhitched from the tractor 60, and suitable pushing or pulling means, such as a plurality of hydraulic or screw jacks or winches, are operated to move it onto slides 34 of leveling plates 33 and up the slides onto ledge 32 thus taking the load of the unit B off the rollers 62 and leveling the annex platform 48 with permanent floor 10. In the initial stage of laterial shifting of unit B, rollers 61, 62 will slide along slide plates 30 (which are positioned to register with rollers 61, 62 during the shifting operation). This will faciliate the shifting until the rollers 62 are relieved of the load. Suitable attachments (not shown) may then be made to anchor the annex unit to the permanent unit A.

When a laboratory or other special study course utilizing the annex unit B is completed, it may be removed from permanent unit A by reversing the installation steps, and may then be moved on to another school and replaced by an annex unit (with different study facilities) from another school or from a pool of interchangeable annex units maintained by the school system.

I claim:

1. A composite school building comprising:

a permanent building unit having a floor providing space for common student activities and having along one side thereof an area for an anex unit for specialized study activity;

said area being provided with an undercarriage-receiving pit below the level of said floor, and a ramp descending into said pit;

a mobile annex unit receivable in said area, said annex

unit having a floor and an undercarriage comprising wheels for road transport of said unit as a tractor-drawn trailer, said undercarriage being receivable in said pit so as to lower said annex floor into leveled association with said permanent unit floor;

horizontal shoulders along the respective sides of said pit;

rollers on said undercarriage, engageable with said shoulders as said wheels near the bottom of said pit and adapted to travel on said shoulders so as to lift said wheels to suspended condition above the bottom of said pit;

longitudinal beams at respective sides of said annex unit, said rollers projecting below said beams so as to carry them above said shoulders;

a ledge extending alongside one of said shoulders; and

leveling plates secured in the upper surface of said ledge and having laterially projecting, downwardly inclined ramps up which the respective beam is adapted to ride in response to lateral power shifting of said annex unit so as to seat said respective beam upon said ledge.

2. A composite school building comprising:

a permanent building unit having a floor providing space for common student activities and having along one side thereof an area for an annex unit for specialized study activity;

said area being provided with an undercarriage-receiving pit below the level of said floor, and a ramp descending into said pit;

a mobile annex unit receivable in said area, said annex unit having a floor and an undercarriage comprising wheels for road transport of said unit as a tractor-drawn trailer, said undercarriage being receivable in said pit so as to lower said annex floor into leveled association with said permanent unit floor;

said annex unit floor including a fixed section and a longitudinal section hinged to the outer side of said fixed section and adapted to be folded over said fixed section when said mobile unit is to be moved;

said annex unit having respective longitudinal chassis beams along the respective sides of said fixed floor section, beneath and supporting the same;

said rollers being mounted to and projecting below said beams;

said pit having longitudinal shoulders along its respective sides, positioned for travel of said rollers thereon while said wheels are received in said pit;

a ledge extending alongside the inner shoulder, positioned to provide supporting engagement with the under side of the inner chassis beam; and

a longitudinal foundation wall spaced outwardly from the outer shoulder substantially the width of said hinged floor section, whereby said annex unit, after being rolled onto said ledges, may be shifted laterally to place said inner chassis beam above and in supported engagement with said ledge;

said hinged floor section then being swingable over and upon said foundation wall to cover the space between the outer side of said fixed floor section and said foundation wall.

3. A composite school building comprising:

a permanent building unit having a floor providing space for common student activities and having along one side thereof an area for an annex unit for specialized study activity;

said area being provided with an undercarriage-receiving pit below the level of said floor, and a ramp descending into said pit;

a mobile annex unit receivable in said area, said annex

unit having a floor and an undercarriage comprising wheels for road transport of said unit as a tractor-drawn trailer, said undercarriage being receivable in said pit so as to lower said annex floor into leveled association with said permanent unit floor;

said annex unit floor including a fixed section and a longitudinal section hinged to the outer side of said fixed section and adapted to be folded over said fixed section when said mobile unit is to be moved; said hinged section having a bevelled outer edge and said pit having an outer wall provided with a shoulder against which said bevelled edge is engageable with a wedging action such as to lock said mobile unit to said permanent building unit.

4. A composite school building comprising:

a permanent building unit having a floor providing space for common student activities and having along one side thereof an area for an annex unit for specialized study activity;

said area being provided with an undercarriage-receiving pit below the level of said floor, and a ramp descending into said pit;

a mobile annex unit receivable in said area, said annex unit having a floor and an undercarriage comprising wheels for road transport of said unit as a tractor-drawn trailer, said undercarriage being receivable in said pit so as to lower said annex floor into leveled association with said permanent unit floor;

annex unit floor including a fixed section and a longitudinal section hinged to the outer side of said fixed section and adapted to be folded over said fixed section when said mobile unit is to be moved;

said annex unit having respective longitudinal chassis beams along the respective sides of said fixed floor section, beneath and supporting the same;

said rollers being mounted to and projecting below said beams;

said pit having longitudinal shoulders along its respective sides, positioned for travel of said rollers thereon while said wheels are received in said pit;

fixed outer and inner longitudinal foundation walls extending along said shoulders and spaced laterally therefrom, the spacing of the outer foundation wall from its respective shoulder being substantially equal to the width of said hinged floor section; and

a fixed longitudinal floor joist extending along the inner foundation wall, positioned to abut the inner chassis beam;

said hinged floor section being swingable over and upon the outer foundation wall and having its free lateral margin abuttingly engageable therewith so as to lock the annex unit between said outer foundation wall and said floor joist.

References Cited

UNITED STATES PATENTS

2,247,340	6/1941	Webster	52—79
2,840,866	7/1958	Paulsen	52—79 X
2,852,814	9/1958	Bignardi	52—143 X
3,016,583	1/1962	Grunt et al.	52—234 X
3,212,105	10/1965	Baker et al.	52—64 X

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U.S. Cl. X.R.

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