

April 2, 1963

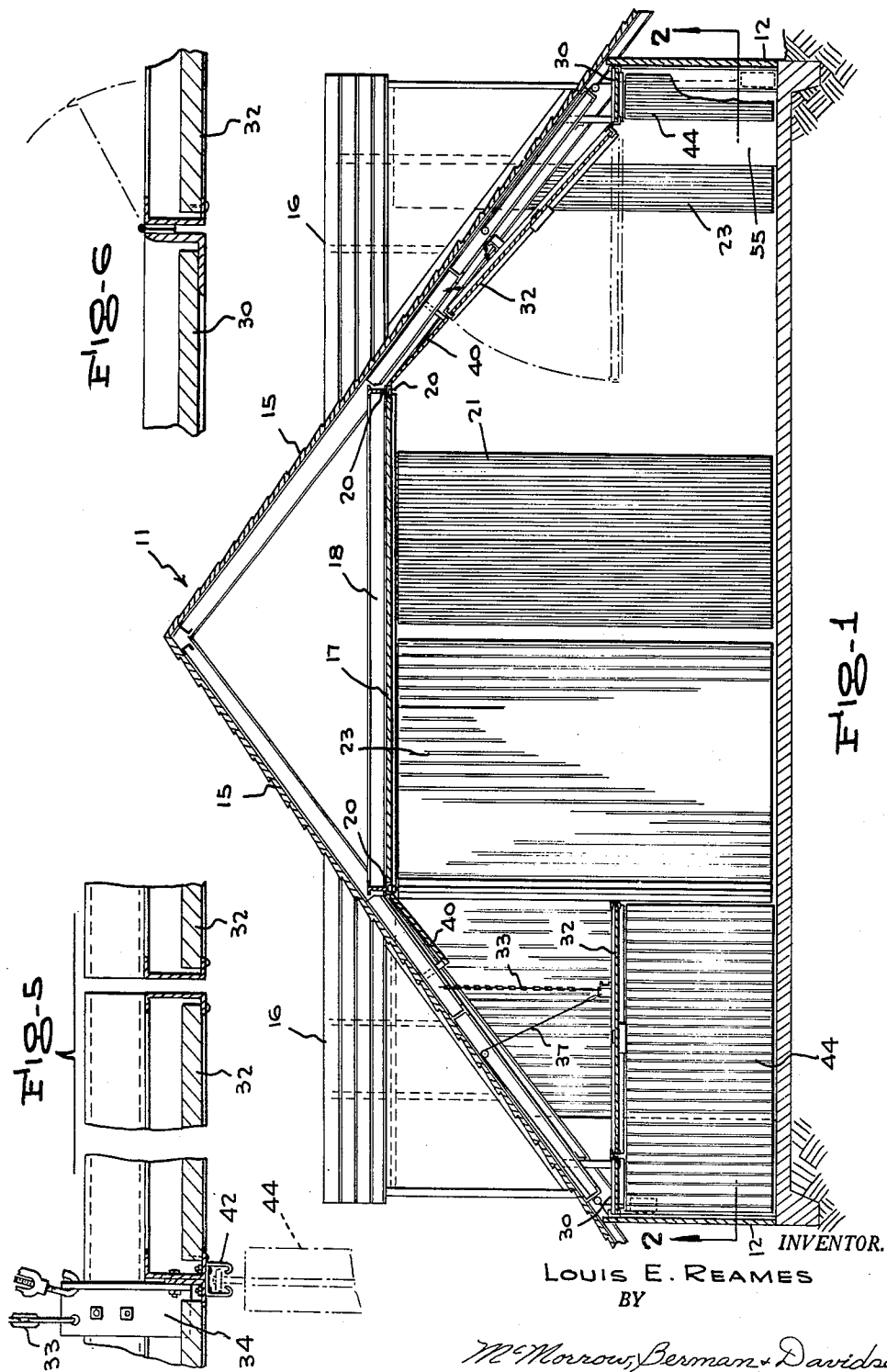
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EDUCATIONAL ACTIVITIES BUILDING CONSTRUCTION

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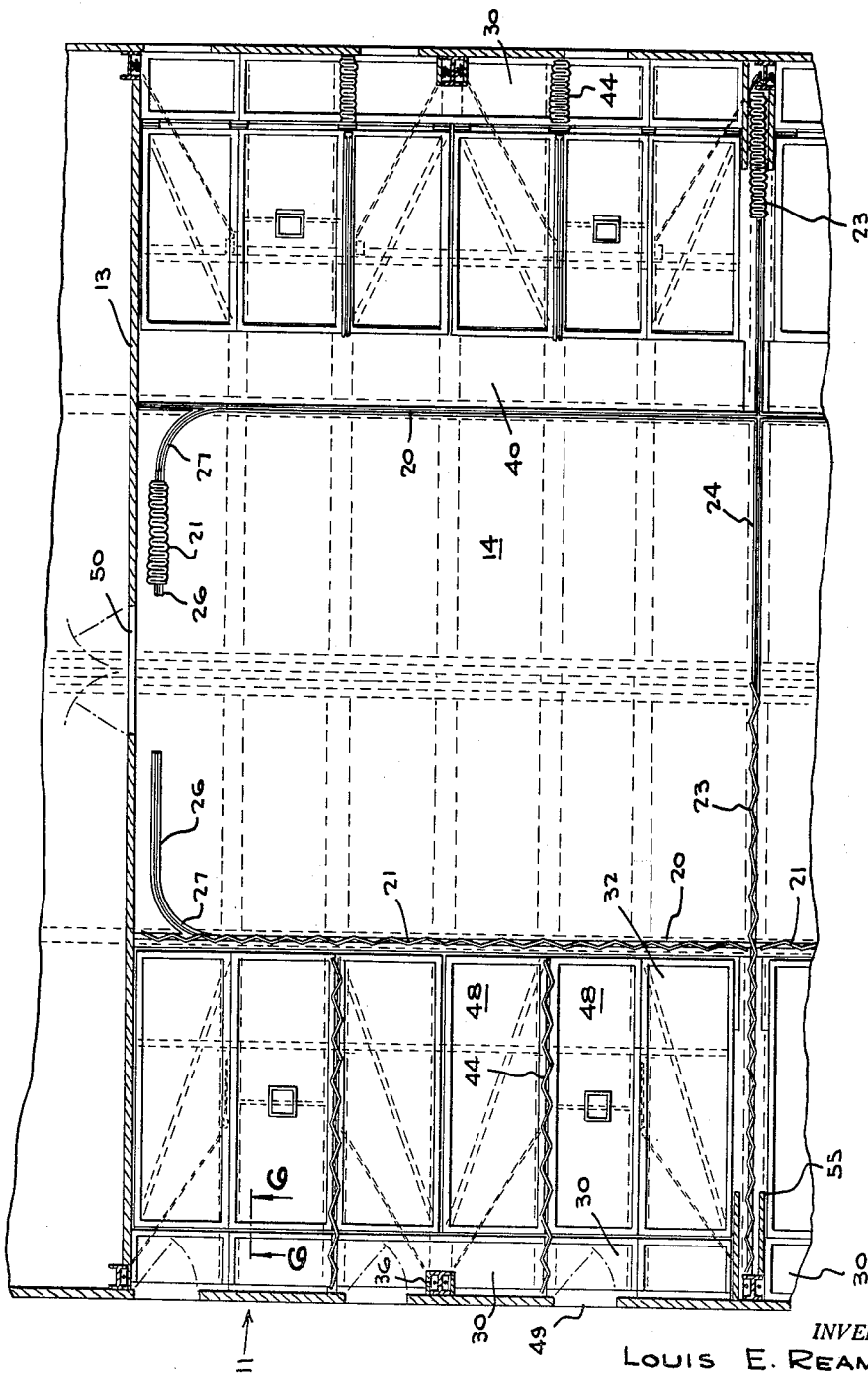


Fig. 2

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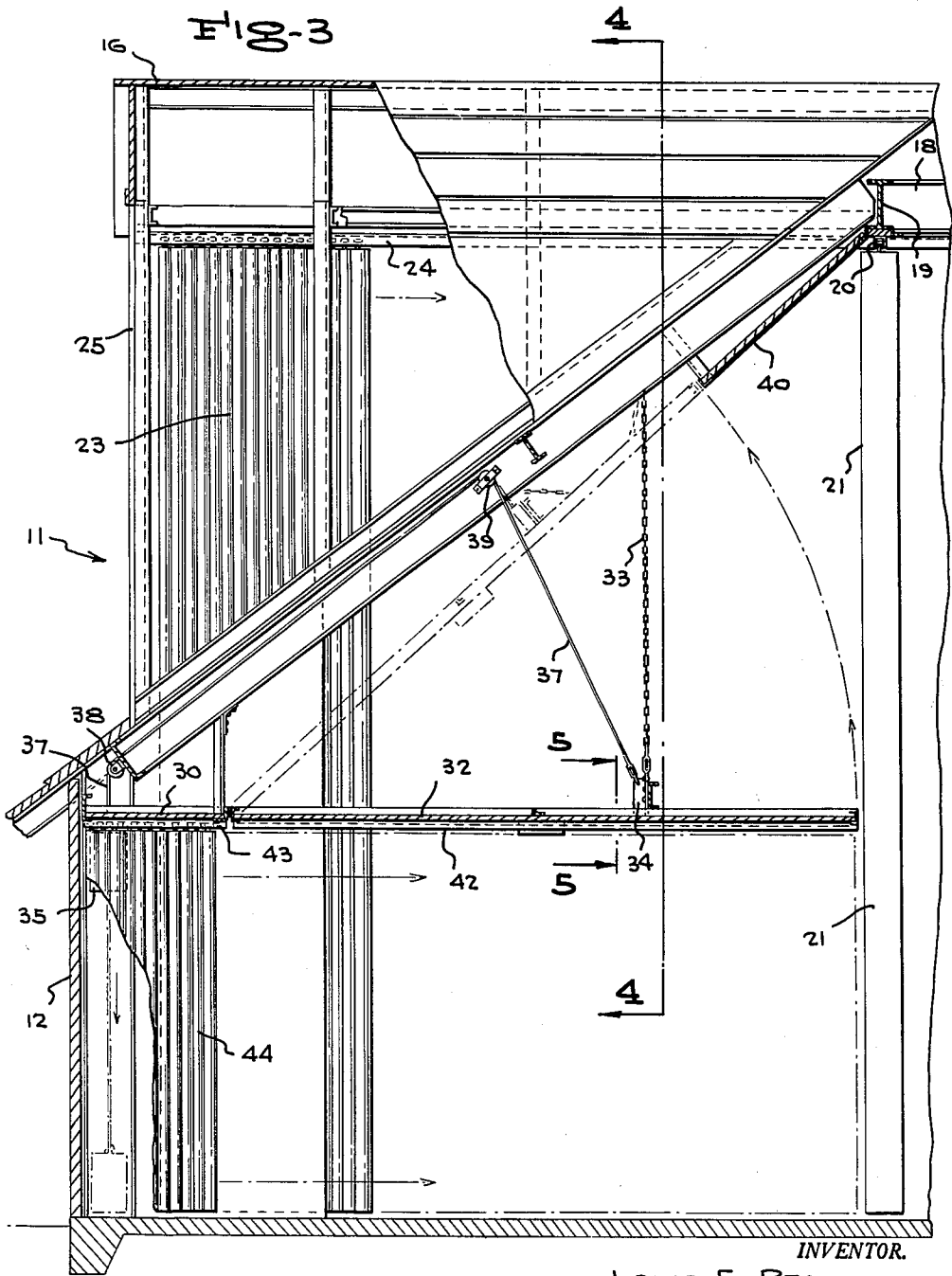
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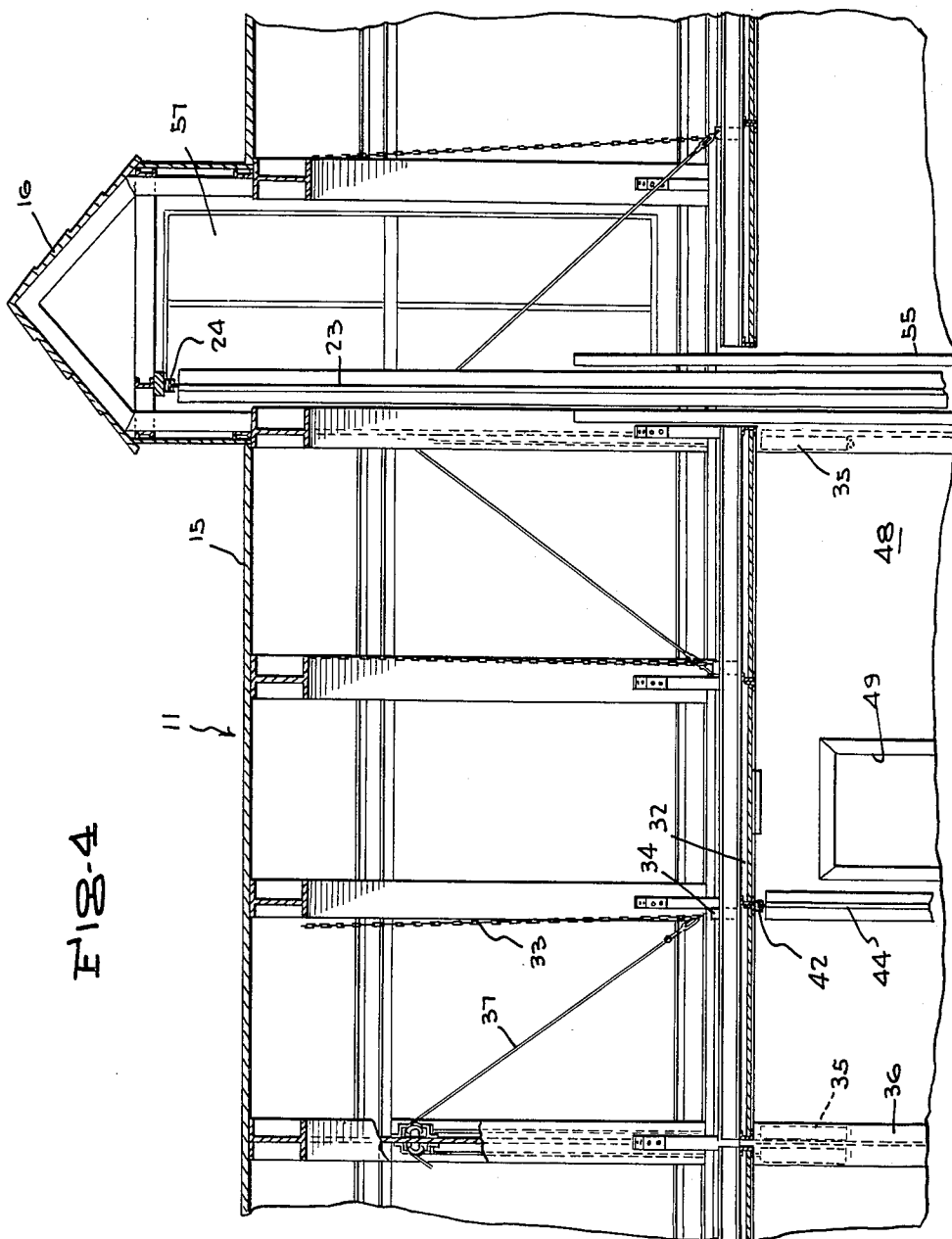
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4 Sheets-Sheet 4



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EDUCATIONAL ACTIVITIES BUILDING CONSTRUCTION

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8 Claims. (Cl. 20—1)

This invention relates to building construction, and more particularly to a structural arrangement for a multi-purpose building wherein it is desirable to at times utilize a large portion of or substantially the entire floor area of a building in a single enclosure, and at other times to subdivide the floor area of the building into a plurality of individual enclosures separated from each other.

A main object of the invention is to provide a novel and improved structural arrangement for a multi-purpose building, for example, for a school building, provided with means for subdividing a large floor area of the building into a plurality of distinct and separate individual enclosures, the means being foldable so that said large floor area of the building may be at other times utilized as a single unit, said means being relatively simple in construction, being easy to manipulate, and being relatively low in cost.

A further object of the invention is to provide an improved structural arrangement for a multi-purpose building, for example, for a school building, said arrangement including movable partition means and ceiling panel means which may be arranged to normally define a plurality of separate and independent cubicles or enclosures for use as classrooms, or the like, and which may be at times folded up or moved to stored positions, whereby to define a single relatively large room or enclosure in the building which may be used for student assembly purposes, for athletic activities, or the like.

A still further object of the invention is to provide an improved structural arrangement for a multi-purpose building, such as a school building, said structural arrangement including means to provide foldable partitions and ceiling elements defining a plurality of separate and individual cubicles or classrooms, the wall means and ceiling means defining said cubicles or classrooms being foldable or movable to stored positions so that a large floor area of the building may be at times utilized as a single, relatively large room or enclosure for purposes of student assembly, or the like, the foldable and movable partition and ceiling elements being easy to manipulate and involving relatively simple and inexpensive components and being neat in appearance as well as durable in construction.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

FIGURE 1 is a transverse vertical cross sectional view taken through an improved multi-purpose building constructed in accordance with the present invention.

FIGURE 2 is a horizontal cross sectional view taken substantially on the line 2—2 of FIGURE 1.

FIGURE 3 is an enlarged fragmentary transverse vertical cross sectional view taken through one side portion of the building of FIGURES 1 and 2 with parts broken away to show details of interior construction.

FIGURE 4 is a fragmentary vertical cross sectional view taken substantially on the line 4—4 of FIGURE 3.

FIGURE 5 is an enlarged cross sectional detail view taken substantially on the line 5—5 of FIGURE 3.

FIGURE 6 is an enlarged cross sectional detail view taken substantially on the line 6—6 of FIGURE 2.

Referring to the drawings, 11 generally designates a multi-purpose building constructed in accordance with the present invention, the building being intended for use,

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for example, as an educational institution. The building 11 is provided with side walls 12, 12, suitable transverse front and rear walls, not shown, and may include transverse partition walls 13 spaced apart to define a relatively large enclosure 14 therebetween. The building is provided with a suitable roof, for example, with a roof having the sloping portions 15, 15 which extend over the relatively large main enclosure 14, as well as the remaining portions of the building. The roof may be provided with aligned opposite dormers 16, 16 adjacent the intermediate portion of the main enclosure 14 for a purpose presently to be described.

Designated at 17 is a fixed ceiling segment which is secured to the framing of the building 11 and which extends over the inner portion of the main enclosure 14, namely, over the inner portion of the building floor area, as shown in FIGURE 1. As shown in FIGURE 1, the ceiling panel 17 is secured to framing elements 18 which are in turn secured at their ends to the roof framing, whereby the ceiling panel 17 is fixedly secured to the roof framing. As shown in FIGURE 3, the members 18 are secured to longitudinal beams 19, which are in turn secured to the roof framework. Secured to the bottom flanges of the beams 19 and extending parallel to the side walls 12 are respective channeled supporting tracks 20, 20, and movably supported on and depending from said channeled tracks 20 are respective folding partition walls 21, 21, of any suitable material, which are of sufficient length so that when they are unfolded, they extend for a substantial length of the main enclosure 14 and define longitudinal partition walls separating the center portion of the main enclosure 14 from the spaces between the partition walls 21 and the side walls 12. As shown in FIGURE 2, the longitudinal partition elements 21 may comprise pairs of segments disposed on opposite sides of a transverse central plane along which is provided respective foldable transverse partition wall segments 23, 23 supported on transversely extending channeled tracks 24 which extend into the dormers 16, 16, so that the transversely extending foldable partition members 23, 23 may be at times folded up and may be stored in the dormers adjacent the end walls 25 thereof, as shown, for example, at the right side of FIGURE 2, and as shown in FIGURE 3.

As shown in FIGURE 2, the longitudinal tracks 21, 21 are arranged so that they communicate at their end portions with respective transversely extending storage tracks 26, 26, said storage tracks having arcuate entry portions 27 which connect with the tracks 21 adjacent the ends of the tracks. Thus, the foldable longitudinal partition wall segments 21 may be guided into the arcuate portions 27 and thence into the transversely extending main portions of the storage tracks 26, and may be stored in folded condition adjacent the transversely extending walls 13, as shown at the right side of FIGURE 2. To unfold the longitudinal wall segments 21, it is merely necessary to guide the segments onto the main longitudinally extending track portions 20, and then to stretch the foldable partitions so that they extend for the full distance between the main transverse partition elements 23 and the end walls 13.

Relatively narrow fixed horizontal longitudinally extending ceiling sections 30, 30 are secured to the side wall framing adjacent the respective side walls 12 adjacent their intersections with the roof, the relatively narrow fixed ceiling sections 30 extending substantially for the entire length of the portions of the main enclosure 14 defined on opposite sides of the transverse vertical plane containing the transverse main foldable partition members 23. Hinged to the inner edge portions of the relatively narrow longitudinally extending horizontal ceiling sections 30 are a plurality of movable ceiling sections 32 which are normally supported in horizontal posi-

tions by means of connecting chains 33 attached at their top portions to the roof framing and attached at their lower ends to upstanding brackets 34 secured on the ceiling sections 32 in the manner illustrated in FIGURE 3. The hinged ceiling panel members 32 are spaced relatively close to each other so that when they are in horizontal positions they substantially define a continuous ceiling overlying the side portions of the main enclosure 14. As shown in FIGURE 3, the hinged ceiling members 32 are of sufficient length so that when they are in horizontal positions they extend closely adjacent to the longitudinal partition wall members 21.

The hinged ceiling members 32 are counterbalanced by respective pairs of counter weights 35, 35 provided for each hinged ceiling segment, the counter weights 35 being slidably housed in vertical hollow tubular housings 36 forming part of the wall framing of the building and being located adjacent to the side walls 12, the counter weights 35 being connected to the hinged ceiling segments 32 by flexible cables 37 engaged over pairs of pulleys 38 and 39 provided on the roof framing and being fastened to the upstanding brackets 34 of the respective hinged ceiling segments 32.

As will be readily apparent, the counter weights 35 may be of sufficient mass to substantially balance the weight of the ceiling segments 32, so that in order to elevate said ceiling segments to their raised positions, shown in dotted view in FIGURE 3, relatively little upward force is required to be exerted on the ceiling segments 32. Alternatively, any other suitable elevating means may be employed, for example, motor driven elevating means or any suitable manually operated elevating means.

Secured to the central portion of the roof structure of the building are sloping fixed ceiling panels 40 which are located so that the movable panels 32, when in fully elevated positions, will be flush with said fixed ceiling panels 40, whereby to provide a substantially continuous ceiling for the main enclosure 14 when all of the hinged panels 32 are in their fully elevated positions.

Secured to the under sides of the hinged ceiling sections 32 are transversely extending channeled tracks 42, and secured to the under sides of the longitudinally extending relatively narrow fixed ceiling sections 30 are transversely extending tracks 43 registrable with the tracks 42 when the ceiling sections 32 are in their horizontal positions, as shown in FIGURE 3. Movably supported in and depending from the transversely extending tracks 42, 43 are respective additional folding partition walls 44 which are of sufficient length, when unfolded, to define transverse partition walls extending substantially to the longitudinal partition walls 21, as shown in FIGURE 2. As shown in FIGURE 3, the foldable transverse partition walls 44 are foldable to a sufficiently small length to be completely supported by the track members 43 secured to the narrow ceiling sections 30, whereby the foldable transverse partition walls 44 may be removed completely from the channeled supporting tracks 42, whereby to allow the hinged ceiling sections 32 to be elevated.

When the longitudinal partitions 21, the main transverse partitions 23 and the additional transverse partitions 44 are in their fully extended positions, the central portion of the main enclosure 14 is divided into two relatively large rooms, defined within the longitudinal partition walls 21 and on opposite sides of the transverse partition wall elements 23, and a plurality of cubicles, or additional smaller enclosures 48 are defined between the longitudinal partition wall elements 21 and the side walls 12, and between the transversely extending partition walls 44. The individual enclosures 48 each may be employed as a separate classroom or activity room, the side walls 12 being provided with doorways 49 to give access to the individual enclosures 48 from outside the building. Access to the relatively large central rooms is provided

through central doorways 50 provided in the transverse fixed end walls 13 of the main enclosure 14.

As previously mentioned, when it is desired to utilize the entire floor area of the main enclosure 14 as a single room, for purposes of student assembly, athletic contests, or the like, all of the foldable partitions 21, 23 and 44 are folded up and moved to their stored positions, for example, as shown at the right side of FIGURE 2, making substantially the entire floor area of the main enclosure 14 available for use as a continuous open area. Under these conditions, the hinged ceiling segments 32 are raised to their dotted view positions, shown in FIGURE 3, so that they are disposed substantially flush with the fixed sloping ceiling segments 40, being held in elevated positions by their associated counter weights 35 or by suitable holding means provided in other types of elevating mechanisms which may be employed.

As will be readily apparent, the foldable partition arrangement and partition storage arrangement above described may be employed in a building which is either substantially rectangular in shape, or which has a sloping roof, as illustrated specifically in the drawings. The folding partition elements 21, 23 and 44 may be made of any suitable material, and may be of conventional internal structure. Similarly, the channeled supporting tracks for the folding partition walls may be designed in accordance with the specific nature of the foldable partitions. The transversely extending track elements 42 and 43 may be suitably located to provide enclosures 48 of the desired size. The supporting tracks for the folding partitions may be either surface mounted or recessed. The ceiling panels 32 may be made of any suitable material providing the desired acoustical characteristics and appearance.

As shown in FIGURE 2, the side portions of the building may be provided underneath the dormers 16 with housings or recesses 55 to receive the major portions of the folded transverse partition wall elements 23. The dormers 16 may be of any suitable size, and the supporting track 24 may be located in any suitable portion of the dormers, for example, may be located substantially adjacent the side margins of dormer windows 57 provided at the ends of the dormers so as to impose minimum obstruction to light from said windows.

As above mentioned, the counter weights 35 are of sufficient mass to substantially counterbalance the hinged ceiling members 32. This enables the ceiling members 32 to be easily elevated to their dotted view positions of FIGURE 3, and when thus elevated, the ceiling members will remain in their raised positions because of the friction of the associated supporting members, mainly, the friction in the pulleys 38 and 39. Because of such friction, the hinged ceiling members 32 likewise remain in horizontal positions when they are lowered, namely, when they are lowered to the full view positions thereof illustrated in FIGURE 3.

While a specific embodiment of an improved structural arrangement for a multi-purpose building has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. In a building having side and transverse walls and a roof, defining a main enclosure, first track means secured to said roof at its under side and being spaced from and extending parallel to a side wall, a folding partition wall movably supported on and depending from said first track means and being of sufficient length when unfolded to define a longitudinal partition wall in said main enclosure, a relatively narrow horizontal ceiling section secured to said side wall adjacent its intersection with the roof and extending longitudinally in the main

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enclosure, an additional ceiling section hinged to the inner edge portion of said narrow ceiling section and being movable upwardly to a position adjacent said roof, means to support said additional ceiling section in a horizontal position substantially flush with said narrow ceiling section, registering respective transversely extending further track means secured to said narrow ceiling section and said additional ceiling section, and an additional folding partition wall movably supported on and depending from said further track means and being of sufficient length when unfolded to define a transverse partition wall in said main enclosure.

2. In a building having side and transverse walls and a roof defining a main enclosure, first track means secured to said roof at its under side and being spaced from and extending parallel to a side wall, a folding partition wall movably supported on and depending from said first track means and being of sufficient length when unfolded to define a longitudinal partition wall in said main enclosure, a relatively narrow horizontal ceiling section secured to said side wall adjacent its intersection with the roof and extending longitudinally in the main enclosure, an additional ceiling section hinged to the inner edge portion of said narrow ceiling section and being movable upwardly to a position adjacent said roof, means to support said additional ceiling section in a horizontal position substantially flush with said narrow ceiling section, registering respective transversely extending further track means secured to said narrow ceiling section and said additional ceiling section, and an additional folding partition wall movably supported on and depending from said further track means and being of sufficient length when unfolded to define a transverse partition wall in said main enclosure, said additional folding partition wall being foldable to a sufficiently small length to be totally supported by the portion of said further track means secured to said narrow ceiling section, whereby to allow said additional ceiling section to be elevated.

3. In a building having side and transverse walls and a roof defining a main enclosure, first track means secured to said roof at its under side and being spaced from and extending parallel to a side wall, a folding partition wall movably supported on and depending from said first track means and being of sufficient length when unfolded to define a longitudinal partition wall in said main enclosure, a relatively narrow horizontal ceiling section secured to said side wall adjacent its intersection with the roof and extending longitudinally in the main enclosure, a plurality of additional ceiling sections hinged to the inner edge portion of said narrow ceiling section and being movable upwardly to positions adjacent the roof, means to support said additional ceiling sections in coplanar horizontal positions substantially flush with said narrow ceiling section, a plurality of spaced sets of registering transversely extending further track means secured to said narrow ceiling section and said additional ceiling sections, and respective additional folding partition walls movably supported on and depending from said sets of further track means and being of sufficient length when unfolded to define transverse partition walls in said main enclosure.

4. In a building having side and transverse walls and a roof defining a main enclosure, first track means secured to said roof at its under side and being spaced from and extending parallel to a side wall, a folding partition wall movably supported on and depending from said first track means and being of sufficient length when unfolded to define a longitudinal partition wall in said main enclosure, a relatively narrow horizontal ceiling section secured to said side wall adjacent its intersection with the roof and extending longitudinally in the main enclosure, an additional ceiling section hinged to the inner edge portion of said narrow ceiling section and being movable upwardly to a position adjacent said roof, means to support said additional ceiling section in a horizontal position substantially flush with said narrow ceiling section, regis-

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tering respective transversely extending further track means secured to said narrow ceiling section and said additional ceiling section, and an additional folding partition wall movably supported on and depending from said further track means and being of sufficient length when unfolded to define a transverse partition wall in said main enclosure, said additional ceiling section being of sufficient length when in horizontal position to extend adjacent said longitudinal partition wall, said additional folding partition wall being foldable to a sufficiently small length to be totally supported by the portion of said further track means secured to said narrow ceiling section, whereby to allow said additional ceiling section to be elevated.

5. In a building having side and transverse walls and a roof defining a main enclosure, first track means secured to said roof at its under side and being spaced from and extending parallel to a side wall, a folding partition wall movably supported on and depending from said first track means and being of sufficient length when unfolded to define a longitudinal partition wall in said main enclosure, a relatively narrow horizontal ceiling section secured to said side wall adjacent its intersection with the roof and extending longitudinally in the main enclosure, a plurality of additional ceiling sections hinged to the inner edge portion of said narrow ceiling section and being movable upwardly to positions adjacent the roof, means to support said additional ceiling sections in coplanar horizontal position substantially flush with said narrow ceiling section, a plurality of spaced sets of registering transversely extending further track means secured to said narrow ceiling section and said additional ceiling sections, and respective additional folding partition walls movably supported on and depending from said sets of further track means and being of sufficient length when unfolded to define transverse partition walls in said main enclosure, said additional ceiling sections being of sufficient length when in horizontal position to extend adjacent said longitudinal partition wall, said additional ceiling sections being foldable to sufficiently small length to be supported beneath said narrow ceiling section, whereby to allow said additional ceiling sections to be elevated.

6. In a building having side and transverse walls and a roof defining a main enclosure, first track means secured to said roof at its under side and being spaced from and extending parallel to a side wall, a folding partition wall movably supported on and depending from said first track means and being of sufficient length when unfolded to define a longitudinal partition wall in said main enclosure, a relatively narrow horizontal ceiling section secured to said side wall adjacent its intersection with the roof and extending longitudinally in the main enclosure, an additional ceiling section hinged to the inner edge portion of said narrow ceiling section and being movable upwardly to a position adjacent said roof, means to support said additional ceiling section in a horizontal position substantially flush with said narrow ceiling section, registering respective transversely extending further track means secured to said narrow ceiling section and said additional ceiling section, an additional folding partition wall movably supported on and extending from said further track means and being of sufficient length when unfolded to define a transverse partition wall in said main enclosure, a fixed horizontal ceiling section secured to said roof inwardly adjacent said first track means, transversely extending track means secured to said fixed ceiling section, and a further folding partition wall movably supported on and depending from said last-named track means and being of sufficient length when unfolded to define another transverse partition wall in said enclosure.

7. In a building having side and transverse walls and a sloping roof defining a main enclosure, first track means secured to said roof at its under side and being spaced from and extending parallel to a side wall, a folding

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partition wall movably supported on and depending from said first track means and being of sufficient length when unfolded to define a longitudinal partition wall in said main enclosure, a relatively narrow horizontal ceiling section secured to said side wall adjacent its intersection with the roof and extending longitudinally in the main enclosure, an additional ceiling section hinged to the inner edge portion of said narrow ceiling section and being movable upwardly to a position adjacent said roof, means to support said additional ceiling section in a horizontal position substantially flush with said narrow ceiling section, registering respective transversely extending further track means secured to said narrow ceiling section and said additional ceiling section, an additional folding partition wall movably supported on and depending from said further track means and being of sufficient length when unfolded to define a transverse partition wall in said main enclosure, a fixed horizontal ceiling section secured to said roof inwardly adjacent said first track means, transversely extending track means secured to said fixed ceiling section, a further folding partition wall movably supported on and depending from said last-named track means and being of sufficient length when unfolded to define another transverse partition wall in said enclosure, said building being provided with a laterally extending dormer aligned with said last-named track means, and transverse further horizontal track means in said dormer aligned with said last-named track means, said further partition wall being foldable to a sufficiently short length to be totally supported in said dormer by said transverse further horizontal track means.

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8. In a building having side and transverse walls and a roof defining a main enclosure, first track means secured to said roof at its under side and being spaced from and extending parallel to a side wall, a folding partition wall movably supported on and depending from said first track means and being of sufficient length when unfolded to define a longitudinal partition wall in said main enclosure, a relatively narrow horizontal ceiling section secured to said side wall adjacent its intersection with the roof and extending longitudinally in the main enclosure, an additional ceiling section hinged to the inner edge portion of said narrow ceiling section and being movable upwardly to a position adjacent said roof, means to support said additional ceiling section in a horizontal position substantially flush with said narrow ceiling section, registering respective transversely extending further track means secured to said narrow ceiling section and said additional ceiling section, an additional folding partition wall movably supported on and depending from said further track means and being of sufficient length when unfolded to define a transverse partition wall in said main enclosure, counter weight means disposed adjacent said side wall, and means connecting said counter weight means to said additional ceiling section and being arranged to exert an upward pull on said additional ceiling section, said counter weight means being of sufficient mass to substantially counter balance the weight of said additional ceiling section.

No references cited.