June 27, 1967 G. J. COOPER 3,327,438

BUILDING CONSTRUCTION

Filed Feb. 24, 1964 4 Sheets-Sheet 1

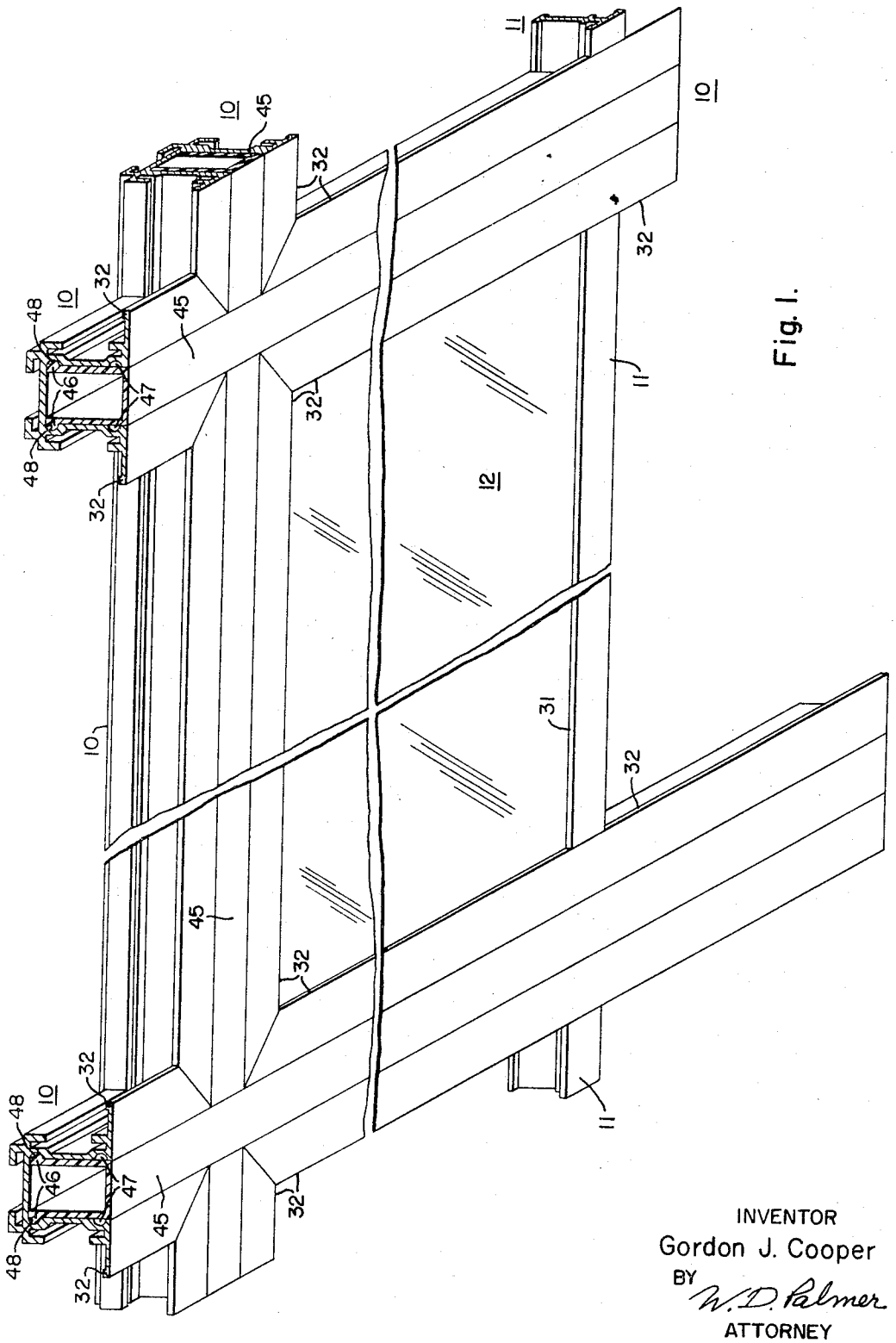


Fig. 1.

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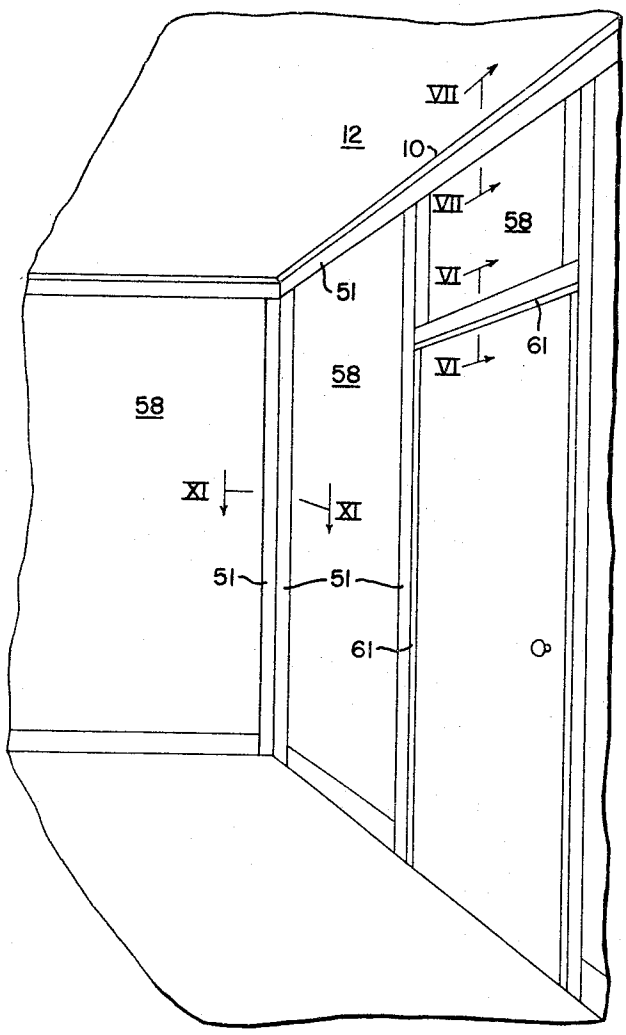


Fig. 2.

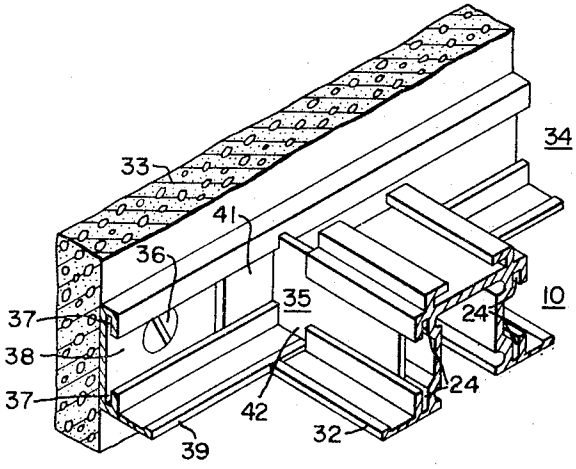


Fig. 3.

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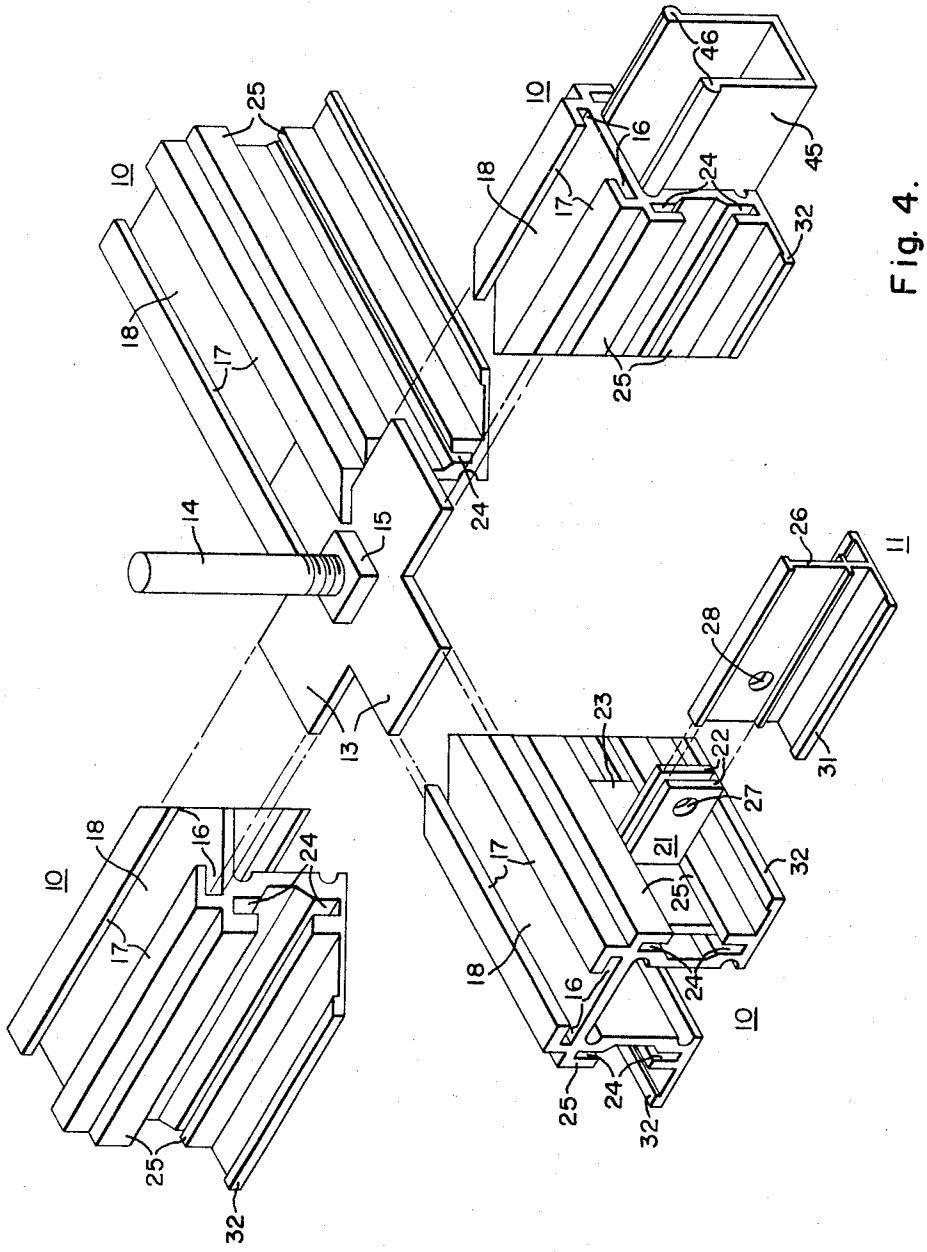


Fig. 4.

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Fig. 5.

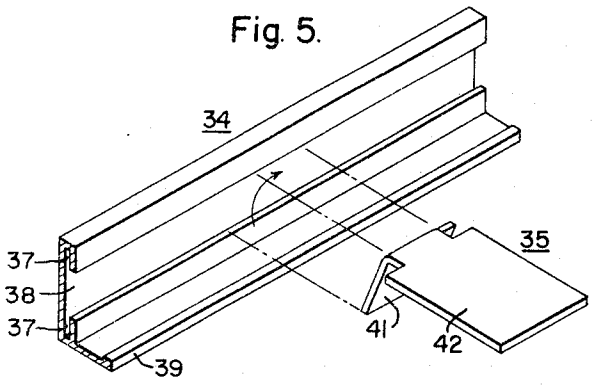


Fig. 6.

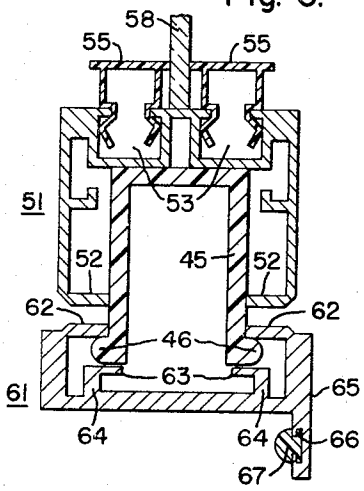


Fig. 7.

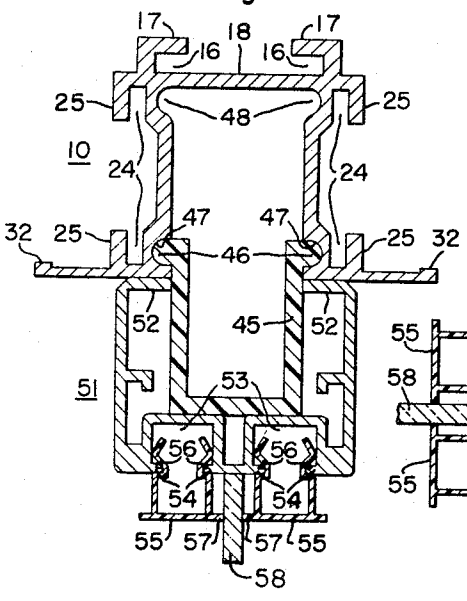


Fig. 8.

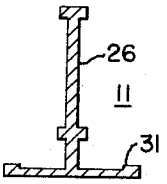


Fig. 11.

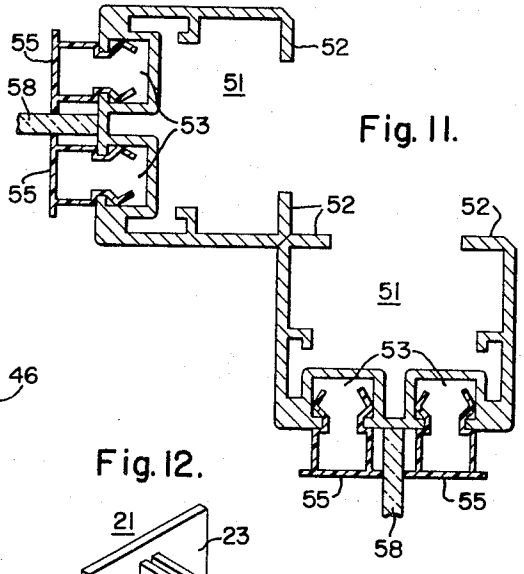


Fig. 9.

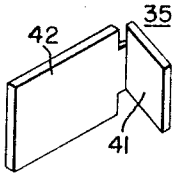


Fig. 10.

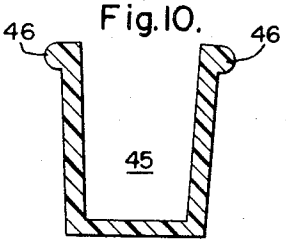
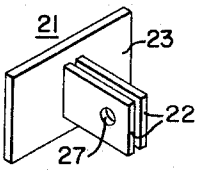


Fig. 12.



United States Patent Office 3,327,438 Patented June 27, 1967

3,327,438

BUILDING CONSTRUCTION

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Filed Feb. 24, 1964, Ser. No. 346,821
15 Claims. (Cl. 52—205)

This invention relates, generally, to building constructions and, more particularly, to ceiling and partition means for the interiors of buildings.

Many modern buldings have ceilings of the suspended or drop type in order to provide space above the ceiling for heating and air conditioning equipment and also electrical wiring. In office buildings it is desirable to provide partitions which can be readily moved from one location to another.

An object of the invention, generally stated, is to provide ceiling and partition structural members which are simple and effective in operation and which may be economically manufactured and installed.

A more specific object of the invention is to provide extruded structural members which are of a sturdy construction.

Another object of the invention is to provide structural members which may be readily assembled and retained in position.

A further object of the invention is to provide a ceiling supporting member which may also be utilized to retain movable partitions in position.

Still another object of the invention is to provide a grid structure for supporting ceiling panels which may be of either a luminous or an acoustical type.

Other objects of the invention will be explained fully hereinafter or will be apparent to those skilled in the art.

In accordance with one embodiment of the invention, inverted generally channel-shaped ceiling members of a predetermined length are joined together at their ends by equilateral crosses to form a framework of square grids. Inverted generally T-shaped ceiling members divide each square grid into two rectangular parts. Laterally extending flanges on the legs of the channel members and the T-members support rectangular ceiling panels. A generally channel-shaped snap-in-member is retained in each channel member in either a raised or a lowered position. When raised, its base is flush with the face of the channel member. When lowered, it retains a glazing channel in position. The glazing channel retains a partition wall panel in position. The snap-in member may also be utilized with the glazing channel to retain a door-jam channel in position.

For a better understanding of the nature and objects of the invention reference may be had to the following detailed description, taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is an isometric view of a portion of a ceiling structure embodying features of the invention;

FIG. 2 is a view, in perspective, of a portion of a room having wall partition members embodying features of the invention;

FIG. 3 is an isometric view, partly in section, showing the manner of supporting one end of a ceiling member on a generally L-shaped member attached to a wall of a building;

FIG. 4 is an exploded isometric view showing the manner of joining and supporting the ends of four ceiling channel members;

FIG. 5 is an isometric view showing the manner of inserting a supporting angle clip into grooves in the L-shaped member shown in FIG. 3;

FIG. 6 is an enlarged view, in section, taken along the line VI—VI in FIG. 2;

FIG. 7 is an enlarged view, in section, taken along the line VII—VII in FIG. 2;

FIG. 8 is an enlarged view, in section, of the T-shaped ceiling member;

FIG. 9 is an isometric view of the angle-shaped supporting clip;

FIG. 10 is an enlarged view, in section, of the snap-in member;

FIG. 11 is an enlarged view, in section, taken along the line XI—XI in FIG. 2; and

FIG. 12 is an isometric view of the T-shaped supporting clip.

Referring to the drawings, and particularly to FIGS. 1 and 4, the ceiling structure shown therein comprises a plurality of inverted generally channel-shaped members **10** which are joined together to form a framework of square grids, a plurality of inverted T-shaped members **11** which are disposed between the channel members **10** to divide the square grids into rectangles, and a plurality of ceiling panels **12** which are supported by the channel members **10** and the T members **11**. The ceiling is of the suspended or drop type which provides space between the present ceiling and the building floor or structural framework above the drop ceiling. The ceiling panels may be of either a luminous or an acoustical type and of a standard size, such as 2′ x 4′.

As shown most clearly in FIG. 4, one end of each of the channel members **10** is mitered at two 45° angles. The abutting ends of four channel members **10** are supported by an equilateral cross **13** which is suspended from the structural framework of the building (not shown) by means of a bolt **14** threaded into a nut **15** which may be welded to the cross **13**. Each arm of the cross **13** is disposed in horizontally spaced grooves **16** provided in horizontally spaced ribs **17** on top of the channel member **10** to form a guideway **18** which extends the length of the channel member **10**. Thus, one of the supporting bolts **14** may be provided at each corner of the square grids of the ceiling framework, thereby providing ceiling supports at 4′ centers.

As also shown most clearly in FIG. 4, the ends of the inverted T members **11** may be supported by generally T-shaped clips **21**. As shown most clearly in FIG. 12, each clip **21** comprises two spaced stems or legs **22** which are secured to a flange or head **23** by welding or other suitable means. As shown in FIG. 4, the head **23** is slidably disposed in two vertically spaced grooves **24** provided in vertically spaced ribs **25** on the side of the channel member **10**. The stem or leg **26** of the T member **11** may be inserted between the spaced legs **22** of the clip **21** and retained in position by a bolt or other suitable fastening means inserted through openings **27** in the clip **21** and a matching opening **28** in the T member **11**.

When the T member **11** is in its proper position, the end of a flange or head **31** on the T member abuts against a flange **32** on the channel member **10**. The bottom faces of the flanges **31** and **32** are in alignment or flush. A horizontally extending flange **32** is provided on each side of the channel member **10**. Likewise, grooves **24** are provided on each side for receiving a clip **21**. Therefore, a T member **11** may be supported at each side of the channel member **10**.

As shown in FIG. 1, the ceiling panels **12** are supported by the flanges **31** and **32** on the T members **11** and the channel members **10**, respectively. Since the ceiling panels **12** merely rest on the flanges **31** and **32**, they may be raised at any time to provide access to the space above the drop ceiling.

As shown most clearly in FIGS. 3 and 5, an end of a channel member **10** may be supported on a partition or wall **33** of the building by means of a generally L-shaped member **34** and an angle clip **35**. One leg of the L-shaped member **34** may be attached to the wall **33** by means of screws **36**. Two vertically spaced grooves **37** are provided in the member **34** to provide a guideway **38** along the member **34**. One leg **41**, which is bent at right angles to the other leg **42** of the clip **35**, is slidably disposed in the guideway **38**. The leg **42** of the clip **35** is disposed in grooves **24** on the channel member **10**, thereby supporting the channel member. When the channel member is in its correct position, the ends of its flanges **32** abut against the one leg **39** of the L-shaped member **34**. A clip **35** may be provided at each side of the channel member **10** to properly support the channel member.

As shown most clearly in FIGS. 5 and 9, the angle clip **35** is so constructed that the leg **41** may be inserted into the guideway **38** on the L-shaped member **34** at any position along the guideway. The dimensions of the leg **41** are such that it may be inserted into the guideway when it is in the position shown in FIG. 5. After it is inserted into the guideway, the clip may be rotated 90° to cause diagonally opposite corners of the leg **41** to engage the sides of the grooves **37** to retain the clip in the guideway **38**. Opposite edges of the leg **41** are angularly disposed to permit the clip **35** to be rotated in the guideway **38**.

In order that the channel members **10** may be utilized to retain partition panels in position as well as to support the ceiling panels, a generally channel-shaped snap-in member **45** is removably disposed in each inverted channel member. The snap-in member **45** may be formed from a vinyl resin or other suitable material. As shown most clearly in FIG. 10, the legs of the channel member are normally flared outwardly slightly and the upper end of each leg is provided with an outwardly extending rounded flange or bead **46**.

As shown most clearly in FIG. 7, each channel member **10** is provided with two vertically spaced pairs of horizontally spaced grooves **47** and **48** which extend longitudinally of the channel member on the inside of the channel member. Thus, the snap-in member **45** may be frictionally retained in the channel member **10** in either a raised position or a lowered position. As shown most clearly in FIG. 1, when the snap-in member **45** is in its raised position, the beads **46** are disposed in the upper pair of grooves **48** and the base of the channel member **45** is substantially flush with the lower faces of the flanges **32** on the inverted channel **10**.

When it is desired to utilize the channel member **10** to retain the upper end of a partition wall in position, the snap-in member **45** is placed in its lowered position with the beads **46** disposed in the lower pair of grooves **47** in the channel member **10**. As shown most clearly in FIG. 7, a generally channel-shaped glazing channel **51** may be disposed on the snap-in member **45** when it is in its lowered position. Each leg of the glasing channel **51** has an inwardly extending flange **52** which engages the snap-in member **45**. Two horizontally spaced generally channel-shaped recesses **53** are provided in the base of the glazing channel **51**. Horizontally spaced inwardly extending projections or flanges **54** are provided at the entrances to the recesses **53**. A generally channel-shaped glazing member **55** is frictionally retained in each recess **53**. The legs of the glazing members **55** are provided with grooves **56** for receiving the flanges **54** to retain the glazing members in position. The glazing members **55** may be formed with a vinyl resin or other suitable material. The base of each glazing member **55** has an outwardly extending flange **57** which engages a partition panel **58** to retain the panel in position between the flanges **57** on the glazing members **55**. The partition

panels **58** may be composed of a decorative material or they may be glass.

As shown most clearly in FIG. 6, the glazing channel **51** and the snap-in member **45** may also be utilized to retain a doorjamb channel **61** in position. Each leg of the generally channel-shaped member **61** has an inwardly extending flange **62** which is spaced from an inwardly extending flange **63** on a rib **64** on the inside of the channel member **61**. Thus, the beads **46** on the snap-in member **45** are disposed between the flanges **62** and **63** to retain the channel member **61** on the snap-in member **45** which is disposed in the glazing channel **51**. As shown in FIG. 6, the member **61** has an external flange **65** which extends perpendicularly to the base of the channel member **61**. A groove **66** is provided in the flange **65** for receiving a resilient bumper **67**. The channels **51** and **61** may be disposed vertically as well as horizontally to provide a doorjamb at the sides and across the top of a doorway.

As shown in FIG. 11, the glazing channels **51** may also be disposed in a vertical or upright position and utilized as vertical supports for wall panels **58**. Two channels **51** may be disposed at right angles to form a corner construction as shown in FIG. 11. Two vertically disposed channel members **51** may be mounted back-to-back at desired locations in a partition wall to retain the partition panels in position. This arrangement has not been illustrated, as it is believed to be apparent in view of the arrangements which have been illustrated and described herein.

The members **10, 11, 34, 51** and **61** are preferably composed of aluminum or some other material which is suitable for utilization in an extrusion process by which these members may be formed. As previously explained, the members **45** and **55** are preferably molded from a vinyl resin material.

From the foregoing description, it is apparent that the invention provides a structural system which is particularly suitable for use in the interior of buildings having drop or suspended ceilings and movable or changeable partition walls. A relatively small number of members of different shapes are required to perform the necessary functions in a system of the present type. The members may be economically manufactured and readily assembled in a building structure. The system has a high degree of flexibility since it permits the interchanging of the ceiling panels and the changing of the location of the wall partitions.

Since numerousc hanges may be made in the above-described construction, and different embodiments of the invention may be made without departing from the spirit and scope thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim as my invention:

1. In a suspended ceiling for the interior of a building having structural members, in combination,

a plurality of inverted generally channel-shaped members disposed horizontally to form a grid-like framework,

said inverted channel members having outwardly extending flanges for supporting ceiling panels,

means for supporting the framework from the building structural members, and

generally channel-shaped members removably disposed in the inverted channel members.

2. In a suspended ceiling for the interior of a building having structural members, in combination,

a plurality of inverted generally channel-shaped members disposed horizontally to form a grid-like framework,

said channel members having outwardly extending flanges for supporting ceiling panels,

means for supporting the framework from the building structural members, and

generally channel-shaped members frictionally retained in the inverted channel members.

3. In a suspended ceiling for the interior of a building having structural members, in combination,

a plurality of inverted generally channel-shaped members disposed horizontally to form a grid-like framework,

said channel members having outwardly extending flanges for supporting ceiling panels,

means for supporting the framework from the building structural members,

generally channel-shaped members frictionally retained in the inverted channel members, and

each of said channel-shaped members being movable from a raised position to a lowered position in one of the inverted channel members.

4. In a suspended ceiling for the interior of a building having structural members, in combination,

a plurality of inverted generally channel-shaped members disposed horizontally to form a grid-like framework,

said channel members having outwardly extending flanges for supporting ceiling panels,

means for supporting the framework from the building structural members,

generally channel-shaped members frictionally retained in the inverted channel members,

each of said channel-shaped members being movable from a lowered position to a raised position in one of the inverted channel members, and

the bottom of the channel-shaped member being substantially flush with the flanges on the inverted channel member when the channel-shaped member is in its raised position.

5. In a ceiling of the drop type for use in a building having structural members, in combination,

a plurality of inverted generally channel-shaped members disposed horizontally to form a framework of square grids, at least four of said channel-shaped members having their ends in abutting relation,

inverted generally T-shaped members dividing the square grids into rectangles,

said channel members and said T members having horizontal flanges thereon for supporting ceiling panels,

grooved means at the top of the inverted channel members,

an equilateral cross disposed in said grooved means at said abutting ends,

means attached to said cross for supporting the channel members from the building structural members,

additional grooved means at the sides of the channel members, generally T-shaped means slidably disposed in the additional grooved means for supporting ends of the T members,

spaced grooves on the inside of the channel members, and

generally channel-shaped snap-in members disposed in said spaced grooves.

6. In a ceiling of the drop type for use in a building having structural members, in combination,

a plurality of inverted generally channel-shaped members disposed horizontally to form a framework of square grids, at least four of said channel-shaped members having their ends in abutting relation,

inverted generally T-shaped members dividing the square grids into rectangles,

said channel members and said T members having horizontal flanges thereon for supporting ceiling panels,

grooved means at the top of the inverted channel members,

an equilateral cross disposed in said grooved means at said abutting ends,

means attached to said cross for supporting the channel members from the building structural members,

additional grooved means at the sides of the channel members, generally T-shaped means slidably disposed in the additional grooved means for supporting ends of the T-members,

vertically spaced pairs of horizontally spaced grooves on the inside of the channel members, and

generally channel-shaped snap-in members disposed in selected pairs of said grooves.

7. In a ceiling of the drop type for use in a building having structural members, in combination,

a plurality of inverted generally channel-shaped members disposed horizontally to form a framework of square grids with the ends of certain of said channel-shaped members intersecting in an abutting relation,

inverted generally T-shaped members dividing the square grids into rectangles,

said channel members and said T members having horizontal flanges thereon for supporting ceiling panels,

grooved means at the top of the inverted channel members,

an equilateral cross disposed in said grooved means at the abutting ends of said intersecting channel members,

means attached to said cross for supporting the channel members from the building structural members,

additional grooved means at the sides of the channel members, generally T-shaped means slidably disposed in the additional grooved means for supporting ends of the T members,

vertically spaced pairs of horizontally spaced grooves on the inside of the channel members, and

generally channel-shaped snap-in members releasably retained in said grooves in either a raised position or a lowered position.

8. In a ceiling of the drop type for use in a building having structural members, in combination,

a plurality of inverted generally channel-shaped members disposed horizontally to form a framework of square grids with the ends of certain of said channel-shaped members intersecting in an abutting relation,

inverted generally T-shaped members dividing the square grids into rectangles,

said channel members and said T members having horizontal flanges thereon for supporting ceiling panels,

grooved means at the top of the inverted channel members,

an equilateral cross disposed in said grooved means at said abutting ends of said intersecting channel members,

means attached to said cross for supporting the channel members from the building structural members,

additional grooved means at the sides of the channel members, generally T-shaped means slidably disposed in the additional grooved means for supporting ends of the T members,

vertically spaced pairs of horizontally spaced grooves on the inside of the channel members,

generally channel-shaped snap-in members releasably retained in said grooves in either a lowered position or a raised position,

the bottom surfaces of the snap-in members being substantially flush with the faces of the flanges on the channel members when the snap-in members are in the raised position.

9. In a ceiling of the drop type for use in a building having structural members, in combination,

a plurality of inverted generally channel-shaped members disposed horizontally to form a framework of square gride with the ends of certain of said channel-shaped members intersecting in an abutting relation,

inverted generally T-shaped members dividing the square grids into rectangles,

said channel members and said T members having horizontal flanges thereon for supporting ceiling panels,
grooved means at the top of the inverted channel members,
an equilateral cross disposed in said grooved means at said abutting ends of said intersecting channel members,
means attached to said cross for supporting the channel members from the building structural members,
additional grooved means at the sides of the channel members, generally T-shaped means slidably disposed in the additional grooved means for supporting ends of the T members,
generally L-shaped members attached to the building structure,
grooved means on the L-shaped members, and
angle-shaped members disposed in the grooved means on the channel members and on the L-shaped members for supporting ends of the channel members.

10. In ceiling and partition means for the interior of a building having structural members, in combination,
a plurality of inverted generally channel-shaped members assembled horizontally at right angles to form a grid-like framework,
said channel members having outwardly extending flanges for supporting ceiling panels,
means for supporting the framework from the building structural members,
generally channel-shaped snap-in members frictionally retained in the inverted channel members in either a raised position or a lowered position,
glazing channels disposed on the snap-in members when they are in their lowered position,
each glazing channel having two generally channel-shaped recesses in its base, and
a glazing member disposed in each recess for retaining a partition panel in position between the glazing members.

11. In ceiling and partition means for the interior of a building having structural members, in combination,
a plurality of inverted generally channel-shaped members assembled horizontally at right angles to form a grid-like framework,
said channel members having outwardly extending flanges for supporting ceiling panels,
means for supporting the framework from the building structural members,
generally channel-shaped snap-in members frictionally retained in the inverted channel members in either a raised position or a lowered position,
glazing channels disposed on the snap-in members when they are in their lowered position,
each glazing channel having two horizontally spaced generally channel-shaped recesses in its base, and a glazing member frictionally retained in each recess for retaining a partition panel in position between the glazing members.

12. In ceiling and partition means for the interior of a building having structural members, in combination,
a plurality of inverted generally channel-shaped members assembled horizontally at right angles to form a grid-like framework,
said channel members having outwardly extending flanges for supporting ceiling panels,
means for supporting the framework from the building structural members,
generally channel-shaped snap-in members frictionally retained in the inverted channel members in either a raised position or a lowered position,
glazing channels disposed on the snap-in members when they are in their lowered position,
each glazing channel having two horizontally spaced generally channel-shaped recesses in its base,
a generally channel-shaped glazing member frictionally retained in each recess,

a partition panel having one edge disposed between said glazing members,
an additional glazing channel disposed on another edge of the partition panel,
a snap-in member invertedly disposed in the additional glazing channel, and
a doorjamb channel disposed on the inverted snap-in member.

13. In ceiling and partition means for the interior of a building having structural members, in combination,
a plurality of inverted generally channel-shaped members assembled horizontally at right angles to form a grid-like framework,
said channel members having outwardly extending flanges for supporting ceiling panels,
means for supporting the framework from the building structural members,
generally channel-shaped snap-in members frictionally retained in the inverted channel members in either a raised position or a lowered position,
glazing channels disposed on the snap-in members when they are in their lowered position,
each glazing channel having two horizontally spaced generally channel-shaped recesses in its base,
a generally channel-shaped glazing member frictionally retained in each recess,
a partition panel having one edge disposed between said glazing members,
an additional glazing channel disposed on another edge of the partition panel,
a snap-in member invertedly disposed on the additional glazing channel,
a doorjamb channel frictionally retained on the inverted snap-in member, and
a flange on the doorjamb channel for engaging a door.

14. In partition means for the interior of a building, in combination,
a generally channel-shaped glazing channel having an inwardly extending flange on each side,
a snap-in member disposed between the flanges,
a doorjamb channel member having inwardly extending flanges engaging the snap-in member, and
a flange extending from the base of the doorjamb channel for engaging a door.

15. A ceiling frame member comprising
an inverted channel having an outwardly extending flange on the lower edge of each side wall of the channel,
vertically spaced ribs on each side wall forming two vertically spaced grooves along the exterior of each side wall,
horizontally spaced ribs on the top of the inverted channel forming two horizontally spaced grooves along the exterior of the top, and
each side wall having two vertically spaced grooves along the interior of the channel.

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