CLAIMS

1. A roof apparatus, comprising:

a) multiple supporting members that are selected from purlins, channels, joists, U-beams or hat channels;

b) clip assemblies on said supporting members, each said clip assembly including a bottom member, a top member, and a sliding anchor;

c) multiple roof panels that each have an upper portion, a lower portion, wherein an edge portion of one said roof panel connects to an edge portion of another roof panel;

d) valley portions on each roof panel that enable collection of rainwater and a channeling of the rainwater to each roof panel lower portion, each valley portion having a bottom; and

e) a shear connection that fasten each roof panel to a sliding anchor above the valley portion bottom.

2. The roof apparatus of claim 1 further comprising a panel cap that connects to said roof panel at a said valley portion, or a panel cap fitting that occupies a said valley portion and fasteners that connect said panel cap fitting to a said valley portion, or a panel cap that connects to said roof panel at a said channel portion, or a panel cap fitting that occupies a said valley portion and fasteners that connect said panel cap fitting to a said channel portion, or a stiffening flange on each roof panel, or multiple bracket bridges that each span from one said valley portion to another said valley portion, wherein said panel cap interlocks with said panel cap fitting, or wherein each roof panel has a planar upper surface and one or more offset portions at a said edge that is below said planar upper surface, and wherein said panel cap extends laterally to said offset portions, or wherein each valley portion has a U or V shape in transverse cross section, or wherein each bottom member has a flange with a bend portion that extends laterally away from the bottom member, or wherein said sliding anchor is able to move in multiple directions relative to said top and bottom plates or wherein said top member has spaced apart openings and each valley portion connects to said sliding member next to a said top member opening, or wherein the shear connection includes fasteners that extend through a said panel cap fitting, a said bracket, and a said roof panel, or wherein the shear connection includes fasteners that extend through a said panel cap fitting and a said roof panel at a said valley portion.

~~3. The roof apparatus of claim 2 further comprising a panel cap fitting that occupies a said valley portion and fasteners that connect said panel cap fitting to a said valley portion.~~

~~4. The roof apparatus of claim 3 wherein said panel cap interlocks with said panel cap fitting.~~

~~5. The roof apparatus of claim 2 wherein each roof panel has a planar upper surface and one or more offset portions at a said edge that is below said planar upper surface.~~

~~6. The roof apparatus of claim 5 wherein said panel cap extends laterally to said offset portions.~~

~~7~~3. The roof apparatus of claim 1 wherein said sliding anchor is able to move in all directions relative to said top member, or wherein said top member has spaced apart openings and each valley portion connects to said sliding anchor at a said top member opening, or wherein the shear connection includes fasteners that extend through a said panel cap fitting and a said roof panel, or wherein the shear connection includes fasteners that extend through a said panel cap fitting and a said roof panel at a said valley portion.

~~8. The roof apparatus of claim 1 wherein said top member has spaced apart openings and each valley portion connects to said sliding anchor at a said top member opening.~~

~~9. The roof apparatus of claim 1 wherein the shear connection includes fasteners that extend through a said panel cap fitting and a said roof panel.~~

~~10. The roof apparatus of claim 1 wherein the shear connection includes fasteners that extend through a said panel cap fitting and a said roof panel at a said valley portion.~~

~~11~~4. A roof apparatus, comprising:

a) multiple supporting members;

b) multiple roof panels that each have an upper portion, a lower portion, wherein an edge portion of one said roof panel connects to an edge portion of another roof panel;

c) a connection assembly that forms an interface between said support members and said roof panels;

d) each roof panel having an upper planar section and one or more channels that extend below the upper planar section, wherein said upper planar section and said channels are configured to channel and drain rain water from said roof panels;

e) said connection assembly including a bottom member, a top member having spaced apart top member openings and a sliding anchor that is movable in multiple directions relative to said top and bottom members; and

f) one or more fittings that connect the roof panels to said sliding anchors, each said fitting extending through a top member opening.

~~12. The roof apparatus of claim 1 further comprising a panel cap that connects to said roof panel at a said channel portion.~~

~~13. The roof apparatus of claim 2 further comprising a panel cap fitting that occupies a said valley portion and fasteners that connect said panel cap fitting to a said channel portion.~~

~~14~~5. The roof apparatus of claim ~~11~~ 4 further comprising a stiffening flange on each roof panel, wherein each roof panel has a planar upper surface and one or more offset portions at a said edge that is below said planar upper surface, or wherein said sliding anchor is able to move in all directions relative to said top member, or wherein each said support member is selected from a group that includes purlin, joist, hat channel, U-beam, or wherein said U-beam is comprised of a pair of spaced apart webs, at top flange connecting to said webs, a closure plate below said top flange that is connected to said webs and one or more interval supports having one or more vertically spaced apart apertures, or wherein said closure plate has a longitudinal slot, or wherein each roof panel connects to said sliding anchor with multiple spaced apart shear clips, or wherein each valley portion has a U or V shape in transverse cross section.

~~15. The roof apparatus of claim 11 wherein said sliding anchor is able to move in all directions relative to said top member.~~

~~16. The roof apparatus of claim 11 wherein each said support member is selected from a group that includes purlin, joist, hat channel, U-beam.~~

~~17. The roof apparatus of claim 16 wherein said U-beam is comprised of a pair of spaced apart webs, at top flange connecting to said webs, a closure plate below said top flange that is connected to said webs and one or more interval supports having one or more vertically spaced apart apertures.~~

~~18. The roof apparatus of claim 17 wherein said closure plate has a longitudinal slot.~~

~~19. The roof apparatus of claim 1 further comprising a stiffening flange on each roof panel.~~

~~20. The roof apparatus of claim 11 further comprising a stiffening flange on each roof panel.~~

~~21. The roof apparatus of claim 11 wherein each roof panel connects to said sliding anchor with multiple spaced apart shear clips.~~

~~22. The roof apparatus of claim 1 further comprising multiple bracket bridges that each span from one said valley portion to another said valley portion.~~

~~23. The roof apparatus of claim 1 wherein each valley portion has a U or V shape in transverse cross section.~~

~~24. The roof apparatus of claim 11 wherein each valley portion has a U or V shape in transverse cross section.~~

~~25. The roof apparatus of claim 1 wherein each bottom member has a flange with a bend portion that extends laterally away from the bottom member.~~

~~2~~6. A roof apparatus, comprising:

a) multiple supporting members;

b) multiple roof panels that each have a top portion, a bottom portion, an edge portion of one said roof panel connecting to an edge portion of another roof panel;

c) a bracket that includes multiple panels and multiple bracket valleys;

d) a connection assembly that forms an interface between said support members and said roof panels;

e) each roof panel having an upper planar section and one or more channels that extend below the upper planar section, wherein said upper planar section and said channels are configured to channel and drain rain water from said roof panels;

f) said connection assembly including a bottom member, a top member having spaced apart top member openings and a sliding anchor that is movable in multiple directions relative to said top and bottom members; and

g) one or more fittings that connect the roof panels to said sliding anchors, each said fitting extending through a top member opening.

~~2~~7. A roof apparatus, comprising:

a) multiple under support members;

b) clip assemblies on said support members, each said clip assembly including a bottom plate, a top plate having one or more spaced apart openings, a sliding anchor and a bracket with one or more downwardly projecting portions that each extend through a said top plate opening;

c) multiple roof panels that each have an upper portion, a lower portion and opposing edge portions, wherein an edge portion of one said roof panel connects to an edge portion of another roof panel;

d) valley portions on each roof panel that enable collection of rain water and a channeling of the rain water to each roof panel lower portion, each valley portion having a bottom;

e) said bottom connected to a said under support member; and

f) a shear connection that fastens each roof panel to a sliding anchor.

~~28~~8. The roof apparatus of claim ~~2~~7 further comprising a panel cap that connects to said roof panel at a said valley portion, or a panel cap fitting that occupies a said valley portion and fasteners that connect said panel cap fitting to a said valley portion, or multiple bracket bridges that each span from one said valley portion to another said valley portion, wherein said panel cap interlocks with said panel cap fitting, or wherein each roof panel has a planar upper surface and one or more offset portions at a said edge that is below said planar upper surface, or wherein said panel cap extends laterally to said offset portions, or wherein each valley portion has a U or V shape in transverse cross section, or wherein each bottom member has a flange with a bend portion that extends laterally away from the bottom member.

~~29. The roof apparatus of claim 28 further comprising a panel cap fitting that occupies a said valley portion and fasteners that connect said panel cap fitting to a said valley portion.~~

~~30. The roof apparatus of claim 29 wherein said panel cap interlocks with said panel cap fitting.~~

~~31. The roof apparatus of claim 28 wherein each roof panel has a planar upper surface and one or more offset portions at a said edge that is below said planar upper surface.~~

~~32. The roof apparatus of claim 31 wherein said panel cap extends laterally to said offset portions.~~

~~33. The roof apparatus of claim 1 wherein said sliding anchor is able to move in multiple directions relative to said top and bottom plates.~~

~~34. The roof apparatus of claim 1 wherein said top member has spaced apart openings and each valley portion connects to said sliding member next to a said top member opening.~~

~~35. The roof apparatus of claim 1 wherein the shear connection includes fasteners that extend through a said panel cap fitting, a said bracket, and a said roof panel.~~

~~36. The roof apparatus of claim 1 wherein the shear connection includes fasteners that extend through a said panel cap fitting and a said roof panel at a said valley portion.~~

~~37~~9. A roof apparatus, comprising:

a) multiple supporting members that are part of a building frame;

b) multiple roof panels that each have edge portions, an upper portion, a lower portion, wherein an edge portion of one said roof panel connects to an edge portion of another said roof panel;

c) a connection assembly that forms an interface between said support members and said roof panels that enables the roof panels to move 360 degrees relative to said supporting members;

d) said connection assembly including a bottom member, a top member having spaced apart top member openings, a sliding anchor that is movable in multiple directions relative to said top and bottom members and brackets that are connected to the sliding anchor; and

e) one or more fittings that connect the roof panels and brackets to said sliding anchors, each said fitting extending through a top member opening.

~~38~~10. The roof apparatus of claim ~~37~~ 9 further comprising a panel cap that connects to said roof panel at a said channel portion, or a panel cap fitting that occupies a said valley portion and fasteners that connect said panel cap fitting to a said channel portion, or a stiffening flange on each bracket, wherein each roof panel has a planar upper surface and one or more offset portions at a said edge that is below said planar upper surface, or wherein said sliding anchor is able to move in all directions relative to said top member, or wherein each said support member is selected from a group that includes purlin, joist,

hat channel, U-beam, or wherein said U-beam is comprised of a pair of spaced apart webs, at top flange connecting to said webs, a closure plate below said top flange that is connected to said webs and one or more interval supports having one or more vertically spaced apart apertures, or wherein said closure plate has a longitudinal slot, or wherein each roof panel connects to said sliding anchor with multiple spaced apart shear clips, or wherein each valley portion has a U or V shape in transverse cross section.

~~39. The roof apparatus of claim 38 further comprising a panel cap fitting that occupies a said valley portion and fasteners that connect said panel cap fitting to a said channel portion.~~

~~40. The roof apparatus of claim 37 wherein each roof panel has a planar upper surface and one or more offset portions at a said edge that is below said planar upper surface.~~

~~41. The roof apparatus of claim 37 wherein said sliding anchor is able to move in all directions relative to said top member.~~

~~42. The roof apparatus of claim 37 wherein each said support member is selected from a group that includes purlin, joist, hat channel, U-beam.~~

~~43. The roof apparatus of claim 42 wherein said U-beam is comprised of a pair of spaced apart webs, at top flange connecting to said webs, a closure plate below said top flange that is connected to said webs and one or more interval supports having one or more vertically spaced apart apertures.~~

~~44. The roof apparatus of claim 43 wherein said closure plate has a longitudinal slot.~~

~~45. The roof apparatus of claim 26 further comprising a stiffening flange on each bracket.~~

~~46. The roof apparatus of claim 37 further comprising a stiffening flange on each bracket.~~

~~47. The roof apparatus of claim 37 wherein each roof panel connects to said sliding anchor with multiple spaced apart shear clips.~~

~~48. The roof apparatus of claim 27 further comprising multiple bracket bridges that each span from one said valley portion to another said valley portion.~~

~~49. The roof apparatus of claim 27 wherein each valley portion has a U or V shape in transverse cross section.~~

~~50. The roof apparatus of claim 37 wherein each valley portion has a U or V shape in transverse cross section.~~

~~51. The roof apparatus of claim 27 wherein each bottom member has a flange with a bend portion that extends laterally away from the bottom member.~~

~~52~~11. A metal building apparatus, comprising:

a) multiple supporting members that are part of a framework;

b) multiple metal roof panels that each have a top portion, a bottom portion, an edge portion of one said roof panel connecting to an edge portion of another roof panel;

c) a bracket that includes multiple panels and multiple bracket valleys, said bracket positioned below said roof panels;

d) a connection assembly that forms an interface between said multiple support members and said roof panels;

e) said connection assembly including a bottom member, a top member having spaced apart top member openings and a sliding anchor that is movable in multiple directions relative to said top and bottom members;

f) one or more fittings that connect the roof panels to said sliding anchors, each said fitting extending through a top member opening; and

g) each supporting member having opposed, parallel webs, an upper plate having an upper surface, a lower end portion and multiple spaced apart reinforcing members that each connect to said webs.

~~53~~12. The metal building apparatus of claim ~~52~~ 11 further comprising a longitudinally extending passageway that enables carriage of electrical lines, piping or other wiring, piping contained in said passageway or wiring contained in said passageway, wherein said passageway is positioned below said reinforcing members, wherein said webs are spaced apart a first distance and said passageway is a second distance wide that is a greater distance than said first distance, or wherein said passageway includes two spaced apart compartments with a gap in between said compartments, or wherein said bottom member is the upper surface of said upper plate.

~~54. The metal building apparatus of claim 53 wherein said passageway is positioned below said reinforcing members.~~

~~55. The metal building apparatus of claim 53 wherein said webs are spaced apart a first distance and said passageway is a second distance wide that is a greater distance than said first distance.~~

~~56. The metal building apparatus of claim 53 wherein said passageway includes two spaced apart compartments with a gap in between said compartments.~~

~~57. The metal building apparatus of claim 52 wherein said bottom member is the upper surface of said upper plate.~~

~~58. The metal building apparatus of claim 53 further comprising piping contained in said passageway.~~

~~59. The metal building apparatus of claim 53 further comprising wiring contained in said passageway.~~

~~60~~13. A metal building apparatus, comprising:

a) multiple supporting members that are part of a framework;

b) multiple metal roof panels that each have a top portion, a bottom portion, an edge portion of one said roof panel connecting to an edge portion of another roof panel;

c) a connection assembly that forms an interface between said multiple support members and said roof panels;

d) said connection assembly including a bottom member, a top member having spaced apart top member openings and a sliding anchor that is movable in multiple directions relative to said top and bottom members;

e) one or more fittings that connect the roof panels to said sliding anchors, each said fitting extending through a top member opening; and

f) each supporting member having opposed, parallel webs, an upper plate having an upper surface, a lower end portion and multiple spaced apart reinforcing members that each connect to said webs.