

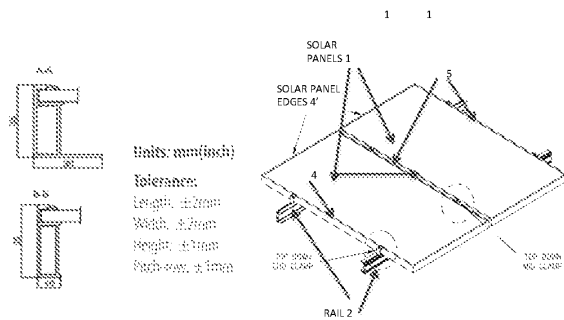


Fig. 1 represents cross sections of typical (prior art) solar panels (or module) with frame, and the frames are fastened to rail by mid and end clamps

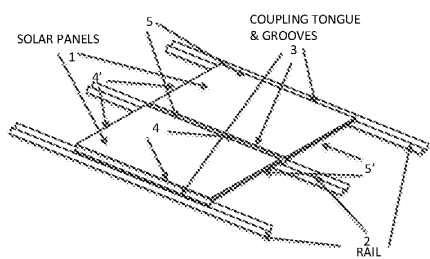


Fig. 2 represents a diagram of solar panels assembled for fixed tiled solar system, with rails and frames coupled according to this invention

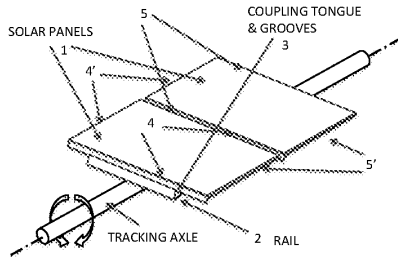


Fig. 3 represents a schematic diagram of solar panels assembled for single axle tracking solar system, with rails and frames coupled according to this invention

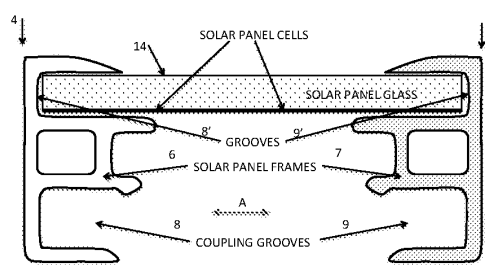


Fig. 4A represents a schematic cross section of a solar panel, single glass, with frame according to this invention, glass inserts into groove.

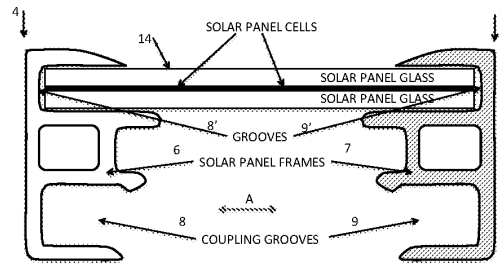


Fig. 4B represents a schematic cross section of a solar panel, double glasses, with frame according to this invention, glasses insert into groove.

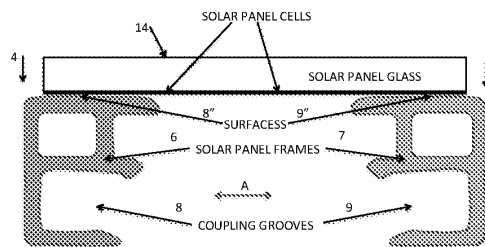


Fig. 5A represents a schematic cross section of a solar panel, single glass, with frame according to this invention, glass glued on frame

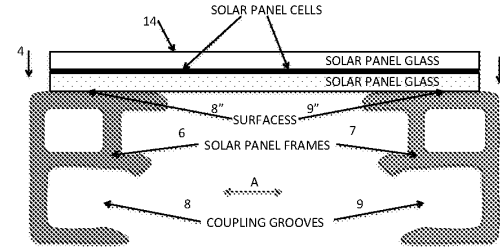


Fig. 5B represents a schematic cross section of a solar panel, double glasses, with frame according to this invention, glasses glued on frame

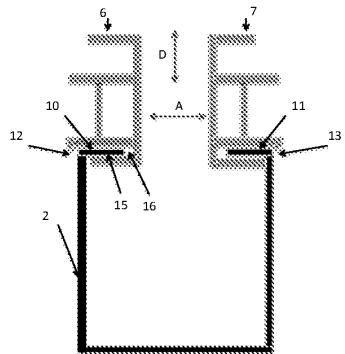


Fig. 6 represents a cross section of solar panel frames coupled with a rail by tongue and groove according to this invention

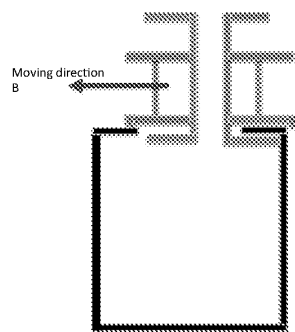


Fig. 7 represents a cross section of solar panel frames coupled with a rail by tongue and groove according to this invention, by parallel move to engage

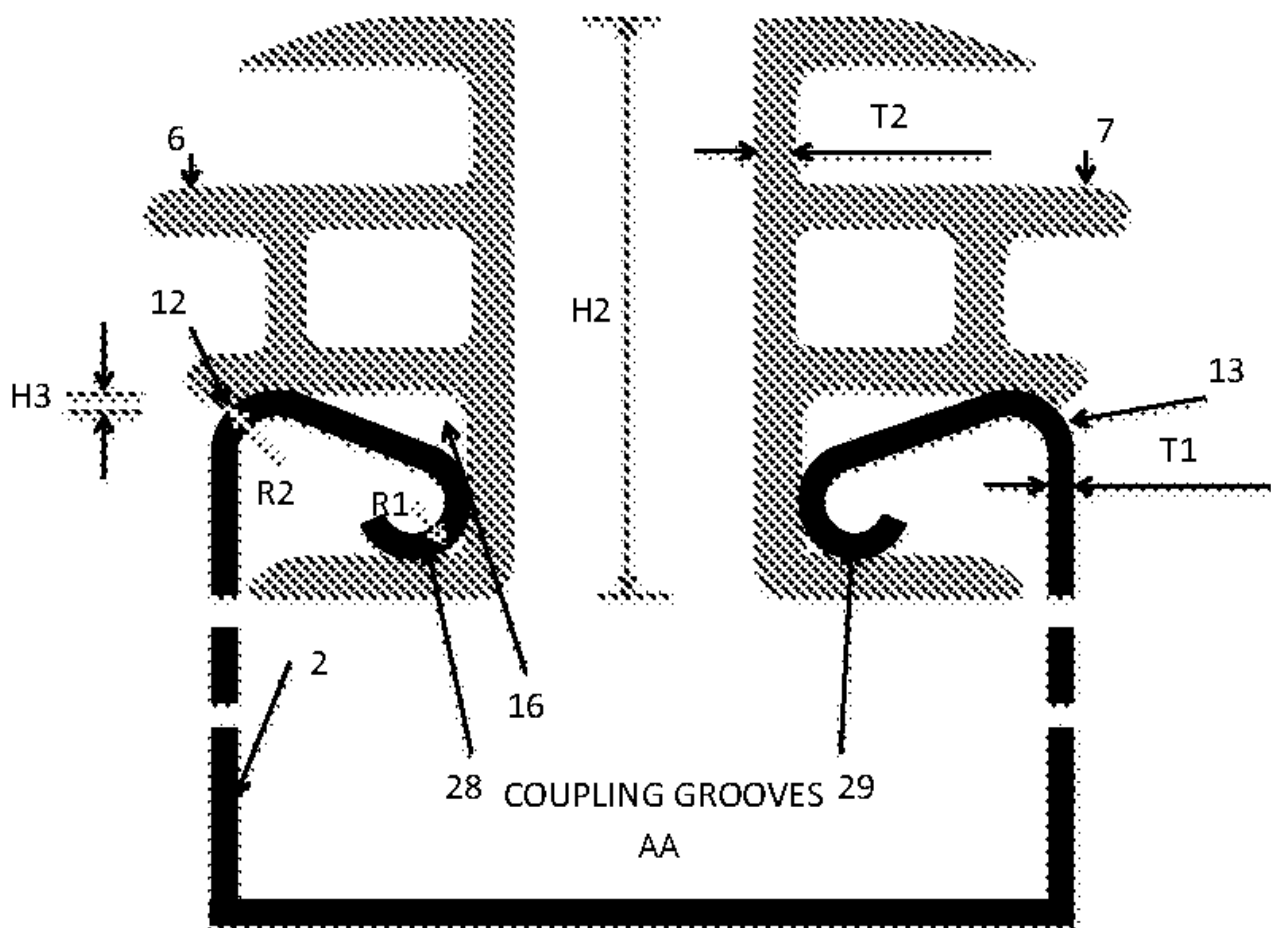


Fig. 24 represents a cross section of solar panel frames coupled with a rail according to this invention

BB

AA RAINURES D'ACCOUPLEMENT

BB LA FIG. 24 REPRÉSENTE UNE COUPE TRANSVERSALE DE CADRES DE PANNEAU SOLAIRE ACCOUPLÉES À UN RAIL SELON L'INVENTION

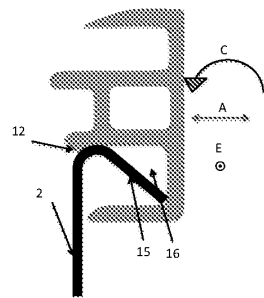


Fig. 14 represents a cross section of a coupling rail according to this invention

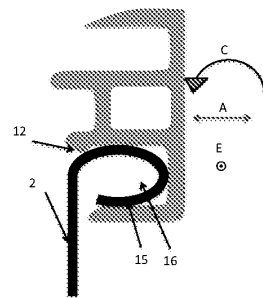


Fig. 15 represents a cross section of a coupling rail according to this invention

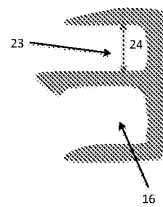


Fig. 16 represents a cross section of a solar panel frame according to this invention

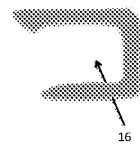


Fig. 16B represents a cross section of a solar panel frame according to this invention, for glass or glasses glued on frame

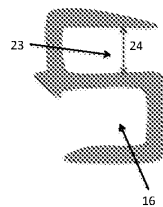


Fig. 17 represents a cross section of a solar panel frame according to this invention

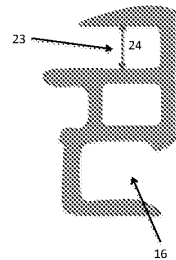


Fig. 18 represents a cross section of a solar panel frame according to this invention

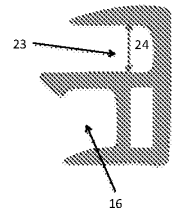


Fig. 19 represents a cross section of a solar panel frame according to this invention

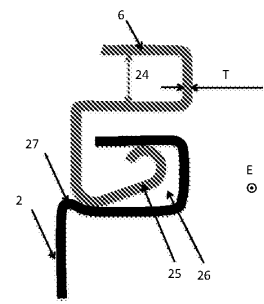


Fig. 20 represents a cross section of a solar panel frame according to this invention

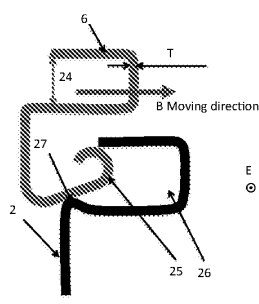


Fig. 21 represents a cross section of a solar panel frame according to this invention

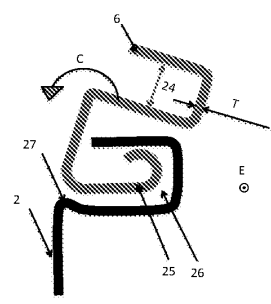


Fig. 22 represents a cross section of a solar panel frame according to this invention

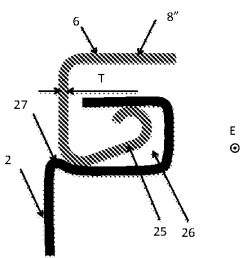


Fig. 20B represents a cross section of a solar panel frame according to this invention

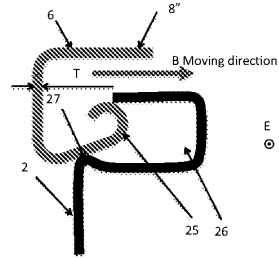


Fig. 21B represents a cross section of a solar panel frame according to this invention

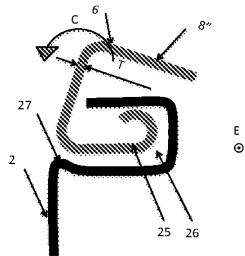


Fig. 22B represents a cross section of a solar panel frame according to this invention

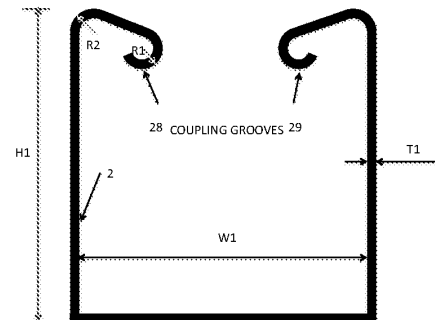


Fig. 23 represents a cross section of a solar panel coupling rail according to this invention

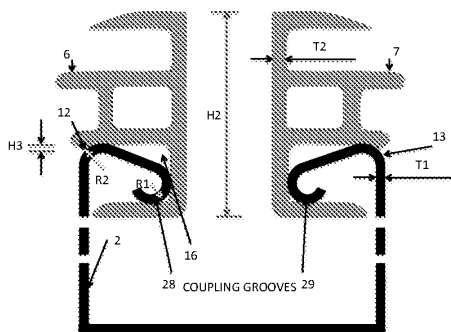


Fig. 24 represents a cross section of solar panel frames coupled with a rail according to this invention

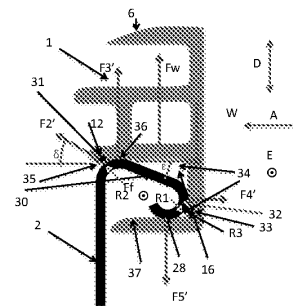


Fig. 25 represents a detail cross section of solar panel frames coupled with a rail according to this invention

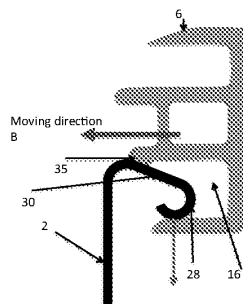


Fig. 26 represents a detail cross section of a solar panel frame couples with rail according to this invention, moving parallel to panel surface

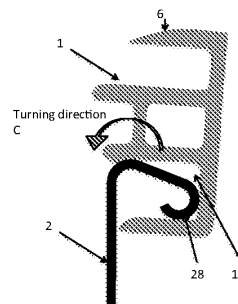


Fig. 27 represents a detail cross section of a solar panel frame couples by an angle to engage with the rail according to this invention

Fig. 1 represents cross sections of solar panels (prior art) with frame, and the frames are fastened to rail by mid and end clamps (solar panel and solar module can be used interchangeably)

Fig. 2 represents a diagram of solar panels assembled for fixed tiled solar system, with rails and frames coupled according to this invention

Fig. 3 represents a schematic diagram of solar panels assembled for single axle tracking solar system, with rails and frames coupled according to this invention

Fig. 4A-4B represents schematic cross sections of a solar panel, single and double glass, with frame according to this invention, glass inserts into groove

Fig. 5A-5B represents schematic cross sections of a solar panel, single and double glass, with frame according to this invention, glass glued on frame

Fig. 6-15 represent cross sections of several rail design embodiments with tongue according to this invention

Fig. 6-19 represent cross section of several frame design embodiments with groove according to this invention.

Fig. 16B represents cross section of frame with glass glued on. Other frames are similar relative to the change from cross section in Fig. 16 to Fig. 16B.

Fig. 20-22 represents cross section of an embodiment of frame design with tongue and rail design with groove. It further shows the uniform thickness of frame and rail.

Fig. 23-27 represent cross section of a most preferred embodiment of frame and rail with tongue and groove, as well as locking element, according to this invention. The solar panel and rail may engage, by slide along the edge of tongue and groove, by slide perpendicular to the edge of tongue and groove (Fig. 26), and by turning to snap-in (Fig. 27).