

CPC COOPERATIVE PATENT CLASSIFICATION

F24J **PRODUCING OR USE OF HEAT NOT OTHERWISE PROVIDED FOR** ([materials therefor C09K 5/00](#); engines or other mechanisms for producing mechanical power from heat, [see the relevant classes, e.g. F03G](#) for using natural heat)

1/00	Apparatus or devices using heat produced by exothermal chemical reactions other than by combustion (for cooking-vessels A47J 36/28 ; self-heating compresses A61F {A61F 7/03} ; materials for the production of heat or cold involving non-reversible chemical reactions, other than by combustion, when used C09K 5/18)	2/0427	. . . {in the form of a fence, a balustrade or a handrail}
		2/0433	. . . {in the form of a window}
		2/0438	. . . {in the form of a floor construction}
		2/0444	. . . {in the form of a façade construction}
		2/045	. . . {in the form of a roof construction (F24J 2/0455 takes precedence)}
2/00	Use of solar heat, e.g. solar heat collectors (distillation or evaporation of water using solar energy C02F 1/14 ; devices for producing mechanical power from solar energy F03G 6/00 ; semiconductor devices specially adapted for converting solar energy into electrical energy H01L 31/00 ; photovoltaic [PV] cells including means directly associated with the PV cell to utilise heat energy H01L 31/0525 ; PV modules including means associated with the PV module to utilise heat energy H02S 40/44)	2/0455	. . . {in the form of shingles or tiles}
		2/0461	. . {using pools or ponds}
		2/0466	. . . {Salt gradient solar ponds}
		2/0472	. . . {Floating solar collectors or covers}
		2/0477	. . {having circuits for more than one working fluid (F24J 2/30 takes precedence)}
		2/0483	. . {having two or more passages for the same working fluid (F24J 2/20 , F24J 2/24 take precedence)}
		2/0488	. . {Solar heat collectors having absorber surfaces of a particular form}
		2/0494	. . . {having two or more absorber surfaces}
		2/05	. . surrounded by a transparent enclosure, e.g. evacuated solar collectors
		2/055	. . . {the enclosure being cylindrical}
2/0007	. {Passive solar heat collectors}	2/06	. . having concentrating elements (optical elements or systems per se G02B)
2/0015	. {Solar heat collectors absorbing essentially direct solar radiation combined with a solar heat collector absorbing concentrated radiation}	2/062	. . . {Prisms}
		2/065	. . . {Fluorescent material}
2/0023	. {Solar heat collector using additional ambient air heat or another heat source, e.g. electrical}	2/067	. . . {Light guides}
		2/07	. . . Receivers working at high temperature, e.g. for solar power plants
2002/003	. {Heat traps}	2002/075	. . . . {movable or adjustable}
2002/0038	. {Solar modules layout; Modular arrangements}	2/08	. . . having lenses as concentrating elements
2002/0046	. . {in the form of multiple rows and multiple columns, all solar modules being coplanar}	2/085	. . . . {having discontinuous faces, e.g. Fresnel lenses}
2002/0053	. . {Coplanar arrangements with frame overlapping portions}	2/10	. . . having reflectors as concentrating elements
2002/0061	. . {Overlaying arrangements similar to roof tiles}	2002/1004	. . . . {Special shape not covered by F24J 2/1047 - F24J 2/18 }
2002/0069	. . {Stepped arrangements, e.g. in parallel planes, without module overlapping}	2002/1009	. . . . . {corrugated}
2002/0076	. . {Non-parallel arrangements}	2002/1014	. . . . . {curved}
2002/0084	. . {Preventing shading effects}	2002/1019	. . . . . {dish-shaped}
2002/0092	. . {Arrangements of solar thermal modules combined with solar PV modules}	2002/1023	. . . . . {trough-shaped}
		2002/1028	. . . . . {asymmetric}
2/02	. Solar heat collectors with support for article heated, e.g. stoves, ranges, crucibles, furnaces or ovens using solar heat	2002/1033	. . . . . {spiral}
		2002/1038	. . . . . {hyperbolic}
2/04	. Solar heat collectors having working fluid conveyed through collector	2002/1042	. . . . . {involute}
2002/0405	. . {having a particular shape, e.g. prismatic, pyramidal}	2/1047	. . . . {having discontinuous faces}
		2/1052	. . . . {flexible (F24J 2/125 , F24J 2/145 take precedence)}
2002/0411	. . . {in the form of louvers}	2/1057	. . . . {characterised by the material or the construction of the reflector}
2002/0416	. . . {allowing change of position for optimization of heat collection}	2002/1061	. . . . {Reflective elements inside solar collector casings}
		2002/1066	. . . . {Micro-reflectors}
2/0422	. . {Solar collectors integrated in fixed constructions, e.g. in buildings}	2002/1071	. . . . {in the form of reflective coatings}
		2002/1076	. . . . {Reflectors layout}

2002/108	. . . . .	{Assemblies of spaced reflective elements on common support, e.g. Fresnel reflectors}	2/30	. . .	with means to exchange heat between plural fluids
2002/1085	. . . . .	{Reflectors formed by assemblies of adjacent similar reflective facets}	2/32	. . .	having evaporator and condenser section, e.g. heat pipe
2002/109	. . . . .	{Reflectors formed by assemblies of adjacent reflective elements having different orientation or different features}	2/34	. . .	having heat storage mass
2002/1095	. . . . .	{Assemblies of spaced reflective elements in the form of grids, e.g. vertical or inclined reflective elements extending over heat absorbing elements}	2/345	. . .	{Hot water storage}
			2/36	. . .	Rollable or foldable collector units
			2/38	. . .	employing tracking means (F24J 2/02 , F24J 2/06 take precedence; rotary supports or mountings therefor F24J 2/54 ; supporting structures of photovoltaic modules for generation of electric power specially adapted for solar tracking systems H02S 20/32)
2/12	. . . . .	parabolic	2002/385	. . .	{Calibration means; Methods for initial positioning of solar concentrators or solar receivers}
2/125	. . . . .	{flexible}	2/40	. . .	Control arrangements; {(Control of position for tracking F24J 2/38)}
2/13	. . . . .	hemispherical	2/402	. . .	{responsive to temperature}
2/14	. . . . .	semi-cylindrical or cylindro-parabolic	2/405	. . .	{responsive to wind}
2/145	. . . . .	{flexible}	2/407	. . .	{for controlling transmission of solar radiation}
2/15	. . . . .	conical	2/42	. . .	Solar heat systems not otherwise provided for {(solar heat systems in greenhouses A01G 9/243 ; distillation by solar energy C02F 1/14 ; devices for producing mechanical power from solar energy F03G 6/00 ; central heat systems using heat solar energy F24D 11/003 , F24D 11/007 , F24D 11/0221 , F24D 11/0264 ; domestic hot-water supply systems using solar energy F24D 17/0015 , F24D 17/0042 , F24D 17/0063 ; air-conditioning systems using solar energy F24F 5/0046 ; refrigeration machines, plants or systems using solar energy F25B 27/002 ; drying solid materials or objects by radiation, e.g. from the sun F26B 3/28)}
2/16	. . . . .	having flat plates	2/423	. . .	{for swimming pools}
2/18	. . . . .	spaced, opposed interacting reflecting surfaces	2/426	. . .	{for showers}
2/20	. . .	the working fluid being conveyed between plates	2/44	. . .	having thermosiphonic circulation
2/201	. . .	{having conduits of plastic material}	2/46	. . .	Component parts, details or accessories of solar heat collectors
2/202	. . .	{having conduits formed by paired plates and internal partition means}	2002/4601	. . .	{Arrangements for heat transfer optimization}
2/204	. . .	{having conduits formed by paired plates, only one of which is plane}	2002/4603	. . .	{Flow guiding means; Inserts inside conduits}
2/205	. . .	{having conduits formed by paired non-plane plates}	2002/4605	. . .	{Arrangements for one-way heat transfer, e.g. thermal diodes}
2/207	. . .	{having curved plate-like conduits, e.g. semi-spherical}	2/4607	. . .	{Safety or protection arrangements; Arrangements for preventing malfunction; Auxiliary devices, e.g. means for testing (control means F24J 2/40)}
2/208	. . .	{having conduits formed by inflation of portions of a pair of joined sheets}	2/4609	. . .	{Protective covers, lids; closure members (F24J 2/50 takes precedence)}
2/22	. . .	having extended surfaces, e.g. protrusions, corrugations (F24J 2/28 takes precedence)	2/461	. . .	{Means for cleaning or for removing snow}
2/23	. . .	the working fluid trickling freely {or flowing in a continuous film} over collector elements	2/4612	. . .	{Means for preventing corrosion or protecting against contaminants, e.g. preventing condensations}
2/24	. . .	the working fluid being conveyed through tubular heat absorbing conduits	2/4614	. . . . .	{for draining rain water}
2002/241	. . .	{the conduits having a non-circular cross-section}	2/4616	. . . . .	{for maintaining vacuum, e.g. by using getters}
2/242	. . .	{the tubular conduits being integrated in a block; the tubular conduits touching each other}	2/4618	. . . . .	{for preventing condensation}
2/243	. . .	{the tubular conduits being of plastic material}	2/462	. . . . .	{for deaerating or degassing the working fluid}
2/244	. . .	{the tubular conduits are not fixed to heat absorbing plates and are not touching each other}	2/4621	. . .	{Means for overtemperature protection (arrangements for draining the working fluid: F24J 2/4634); Means for overpressure protection}
2/245	. . . . .	{the conduits being parallel to each other}			
2/246	. . . . .	{the conduits being helically coiled}			
2/247	. . . . .	{the conduits being spirally coiled}			
2/248	. . . . .	{the conduits being otherwise bent, e.g. zig-zag}			
2/26	. . .	having extended surfaces, e.g. protrusions (F24J 2/28 takes precedence)			
2002/261	. . . . .	{Special fins}			
2002/263	. . . . .	{extending obliquely}			
2/265	. . . . .	{the conduits being parallel to each other}			
2/266	. . . . .	{the conduits being spirally coiled}			
2/268	. . . . .	{the conduits being otherwise bent, e.g. zig-zag}			
2/28	. . .	having permeable mass, foraminous or porous materials			

2/4623	. . . . {Arrangements for modifying heat collecting features, e.g. by defocusing or by changing the position of heat receiving elements}	2002/4694	. . . . {Textiles; Fabrics}
2/4625	. . . . {Cooling arrangements, e.g. by using external heat dissipating means or internal cooling circuits (F24J 2/4627 takes precedence)}	2002/4696	. . . . {Natural materials, e.g. wood}
2/4627	. . . . {Arrangements for venting solar collector enclosures}	2002/4698	. . . . {Recycled materials}
2/4629	. . . . {Arrangements for preventing overpressure inside solar collector enclosures (F24J 2/4627 takes precedence)}	2/48	. . characterised by absorber material
2/463	. . . . {Arrangements for preventing overpressure inside solar collector circuits}	2/481	. . . . {of metallic material (F24J 2/487 takes precedence)}
2/4632	. . . . {Means for freezing protection (arrangements for draining the working fluid: F24J 2/4634)}	2/482	. . . . {of plastic (F24J 2/488 takes precedence)}
2/4634	. . . . {Arrangements for draining the working fluid}	2/484	. . . . {of ceramic; of concrete; of natural stone (F24J 2/485 takes precedence)}
2/4636	. . . . {Arrangements to accommodate differential expansion of solar collector elements}	2/485	. . . . {using absorber coatings (radiation-absorbing paints C09D 5/32)}
2/4638	. . . . {Arrangements for protecting solar collectors against adverse weather conditions (F24J 2/4609 takes precedence)}	2/487	. . . . {of metallic material}
2/464	. . {Casings}	2/488	. . . . {of plastic material}
2/4641	. . . . {characterised by using specific material}	2/50	. . Transparent coverings
2/4643	. . . . {Plastic materials}	2002/501	. . . . {Special shape}
2/4645	. . . . {Metallic materials}	2002/502	. . . . {in the form of multiple covering elements}
2/4647	. . {Means for fluidically interconnecting different solar collectors or for connecting solar connectors with other components; Headers; Fluid distributing means}	2002/503	. . . . {in the form of curved covering elements}
2/4649	. . {Selection of particular working medium (materials for heat transfer C09K 5/00)}	2/505	. . . . {characterised by using specific material}
2/465	. . {Arrangements of sealing means}	2/506	. . . . {plastic material}
2/4652	. . {Solar heat collectors having absorber surfaces provided with special coatings, e.g. anti-reflective coatings}	2/507	. . . . {using evacuated elements (F24J 2/05 takes precedence)}
2/4654	. . {Materials for the heat-exchange conduits (F24J 2/201 , F24J 2/243 , F24J 2/48 take precedence)}	2002/508	. . . . {Transparent insulation; Convection preventing members}
2002/4656	. . {Arrangements for reinforcement of solar collector elements}	2/51	. . Thermal insulation (F24J 2/50 takes precedence)
2002/4658	. . {Fastening; Joining}	2/515	. . . . {characterised by the material}
2002/4659	. . . . {by using hook and loop-type fasteners}	2/52	. . Arrangement of mountings or supports
2002/4661	. . . . {by using hooks}	2/5201	. . . . {Stationary supporting structures for solar modules; Load-bearing elements for movable supporting structures}
2002/4663	. . . . {by clamping}	2/5203	. . . . {comprising elongated rigid mounting elements, e.g. mounting profiles or rails for covering a building surface with solar modules; Module frames (F24J 2/523 takes precedence)}
2002/4665	. . . . {by clipping, e.g. by using snap connectors}	2/5205	. . . . . {Substantially planar profile assemblies, e.g. grids comprising coplanar profiles or stacked profiles}
2002/4667	. . . . {by screwed connection}	2/5207	. . . . . {comprising profiles of particular shape having in cross-section first and second module supporting portions for coupling adjacent solar modules}
2002/4669	. . . . {by using threaded elements, e.g. stud bolts}	2/5209	. . . . . {Substantially coplanar profile assemblies comprising longitudinal profiles laterally coupled with transversal profiles}
2002/467	. . . . {by using form-fitting connection means, e.g. tongue and groove}	2/5211	. . . . . {Solar module peripheral frames}
2002/4672	. . . . {by using toothed elements}	2002/5213	. . . . . {Special profiles}
2002/4674	. . . . {by deforming the material, e.g. by crimping or clinching}	2002/5215	. . . . . {having hollow parts with closed cross-section}
2002/4676	. . . . {by bonding, e.g. by using adhesives}	2002/5216	. . . . . {having circular or oval cross-section}
2002/4678	. . . . {by welding or brazing}	2002/5218	. . . . . {having a central web, e.g. I-shaped, inverted T- shaped}
2002/4679	. . . . {Joining different materials}	2002/522	. . . . . {U-, C- or O-shaped; Hat profiles}
2002/4681	. . . . . {Joining glass with non-glass elements}	2002/5222	. . . . . {in the form of corrugated profiles}
2002/4683	. . {Selection of particular materials}	2002/5224	. . . . . {having curved portions}
2002/4685	. . . . {Ceramics}	2002/5226	. . . . . {having undercut grooves}
2002/4687	. . . . {Concrete}	2/5228	. . . . . {comprising plate-like mounting elements, e.g. profiled or corrugated plates; Plate-like module frames (F24J 2/523 takes precedence)}
2002/4689	. . . . {Foams}		
2002/469	. . . . {Carbone, e.g. graphite}		
2002/4692	. . . . {Plastics}		

2/523	. . . .	{comprising elongated standing elements, e.g. posts, legs; Standing structures for supporting solar modules at defined orientation; Three-dimensional frameworks; Volumetric supporting structures, e.g. box-like elements or shaped bodies}	2/5271	. . . .	{Airborne solar collectors, e.g. using inflated structures (F24J 2/0472 , F24J 2/5267 take precedence)}
2/5232	. . . . .	{Posts coupled with upper profiles}	2002/5273	. . . .	{Details; Special support components or methods}
2/5233	. . . . .	{Profile arrangements, e.g. assemblies of base profiles with vertical or inclined profiles, three-dimensional frameworks (F24J 2/5232 takes precedence)}	2002/5275	. . . . .	{Arrangements for mounting elements inside solar collectors; Spacers inside solar collectors}
2/5235	. . . . .	{comprising bent plates or assemblies of plates}	2002/5277	. . . . .	{Foldable support elements}
2/5237	. . . . .	{comprising shaped bodies, e.g. molded box-like elements, concrete elements, foamed elements; Massive supporting structures}	2002/5279	. . . . .	{Stackable support elements}
2/5239	. . . . .	{Interconnected assemblies of stands; Stands having first and second module supporting portions for coupling adjacent modules}	2002/5281	. . . . .	{Methods for installing support elements}
2/5241	. . . . .	{comprising elongated non rigid elements, e.g. straps, wires, ropes}	2002/5283	. . . . .	{Supports with play between elements}
2/5243	. . . . .	{Fixation means, e.g. connectors or fasteners}	2002/5284	. . . . .	{Filling or spacing means; Elastic means}
2/5245	. . . . .	{Connectors for anchoring solar modules or supporting elements to the ground or to building structures}	2002/5286	. . . . .	{Tensioning means}
2/5247	. . . . .	{in the form of bent strips or assemblies of strips; Hook-like connectors; Connectors to be mounted between building covering elements}	2002/5288	. . . . .	{Means for preventing movements, e.g. stops}
2/5249	. . . . .	{for anchoring to protrusions of buildings, e.g. to corrugations or to standing seams}	2002/529	. . . . .	{Means for accommodating irregularities on mounting surface; Tolerance compensation means}
2/525	. . . . .	{Ground anchoring means; Foundations for supporting elements; Massive elements for anchoring supporting structures to the ground or to flat horizontal surfaces}	2002/5292	. . . . .	{Ballasting means}
2/5252	. . . . .	{Connectors for fixing solar modules, or solar module peripheral frames to supporting elements, e.g. to profiled mounting members}	2002/5294	. . . . .	{Sealing means between support elements and mounting surface}
2/5254	. . . . .	{Solar module side connectors or base connectors}	2002/5296	. . . . .	{Sealing means between support elements, e.g. overlapping arrangements; Gap closing arrangements}
2/5256	. . . . .	{Clamping or clipping elements}	2002/5298	. . . . .	{Means for preventing theft; Locking means}
2/5258	. . . . .	{with clamping action by using screw-threaded elements}	2/54	. . . .	specifically adapted for rotary movement {(F24J 2/5269 takes precedence)}
2/526	. . . . .	{Connectors for coupling adjacent supporting elements together, e.g. profile to profile connectors}	2/5403	. . . . .	{with only one rotation axis}
2/5262	. . . . .	{Connectors for coupling adjacent solar modules or solar module peripheral frames together (F24J 2/5252 takes precedence)}	2/5406	. . . . .	{with vertical axis}
2/5264	. . . . .	{comprising means for adjusting the final position or the final orientation of a supporting element relative to another one or relative to a mounting surface; comprising means for compensating mounting tolerances}	2/541	. . . . .	{with horizontal axis}
2/5266	. . . .	{adapted for non-rotary movement}	2/5413	. . . . .	{with inclined axis}
2/5267	. . . .	{Waterborne solar collectors}	2/5417	. . . . .	{with two rotation axis}
2/5269	. . . .	{Moving platforms}	2/542	. . . . .	{with vertical primary axis}
			2/5424	. . . . .	{with horizontal primary axis}
			2/5427	. . . . .	{with inclined primary axis}
			2/5431	. . . . .	{with more than two rotation axis or with multiple degrees of freedom}
			2002/5434	. . . . .	{Special components}
			2002/5437	. . . . .	{Driving means}
			2002/5441	. . . . .	{hydraulic or pneumatic}
			2002/5444	. . . . .	{Coupling means}
			2002/5448	. . . . .	{Transmissions}
			2002/5451	. . . . .	{in the form of articulated bars}
			2002/5455	. . . . .	{in the form of compasses, scissors or parallelograms}
			2002/5458	. . . . .	{in the form of flexible elements, e.g. belts, chains, ropes}
			2002/5462	. . . . .	{in the form of gears or rack-and-pinion transmissions}
			2002/5465	. . . . .	{in the form of threaded elements}
			2002/5468	. . . . .	{for moving several solar collectors by common transmission elements}
			2002/5472	. . . . .	{for deriving one movement from another one, e.g. for deriving elevation movement from azimuth movement}
			2002/5475	. . . . .	{Movement guiding means}
			2002/5479	. . . . .	{Tracks}
			2002/5482	. . . . .	{Bearings}
			2002/5486	. . . . .	{Hinged elements; Pin connections}
			2002/5489	. . . . .	{Spherical joints}

- 2002/5493 {Load balancing means, e.g. use of counter-weights}
- 2002/5496 {Movement dampening means; Braking means}

3/00 Other production or use of heat, not derived from combustion (use of solar heat [F24J 2/00](#))

- 3/003 . {using heat resulting from internal friction of a moving fluid or from friction between a fluid and a moving body}
- 3/006 . . {the fluid passing through a restriction means}
- 3/06 . using natural heat
- 3/08 . . using geothermal heat
- 3/081 . . . {by circulating a working fluid through underground channels, the working fluid not coming into direct contact with the ground}
- 3/082 {Compact tube assemblies inserted into the ground, e.g. geothermal probes}
- 3/083 {in the form of bent tubes or in the form of tubes assembled with connectors or with return headers}
- 3/084 {in the form of tubes being closed at one end, i.e. return type}
- 3/085 . . . {by injecting a working fluid directly into the ground or by using underground water, e.g. systems using injection and recovery wells}
- 3/086 . . . {by injecting a working fluid into a closed well; by using intermediate working fluids, e.g. by using heat pipes}
- 2003/087 {Component parts, details or accessories}
- 2003/088 {Methods for installation}
- 2003/089 {Control arrangements}

2200/00 Prediction; Simulation

- 2200/04 . for solar techniques
- 2200/06 . for geothermal techniques