

# CPC COOPERATIVE PATENT CLASSIFICATION

## F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING (NOTE omitted)

### LIGHTING; HEATING

**F24 HEATING; RANGES; VENTILATING** (protecting plants by heating in gardens, orchards, or forests [A01G 13/06](#); baking ovens and apparatus [A21B](#); cooking devices other than ranges [A47J](#); forging [B21J](#), [B21K](#); specially adapted for vehicles, see the relevant subclasses of [B60](#) - [B64](#); combustion apparatus in general [F23](#); drying [F26B](#); ovens in general [F27](#); electric heating elements and arrangements [H05B](#))  
(NOTE omitted)

**F24S SOLAR HEAT COLLECTORS; SOLAR HEAT SYSTEMS** (for producing mechanical power from solar energy [F03G 6/00](#))

**NOTE**

In this subclass, the following terms or expressions are used with the meanings indicated:

- "solar heat collector modules", often referred to simply as "modules", covers;
  - a. whole solar heat collectors
  - b. elements of solar heat collectors, e.g. reflectors, lenses or heat storage elements.
- "absorbing elements" covers elements for absorbing solar-rays and converting it into heat.
- "solar heat systems" covers systems having solar heat collectors as their components and using the collected heat

<b>10/00</b>	<b>Solar heat collectors using working fluids</b>	10/60	• the working fluids trickling freely over absorbing elements
10/10	• the working fluids forming pools or ponds		
10/13	• . . Salt-gradient ponds	10/70	• the working fluids being conveyed through tubular absorbing conduits
10/17	• . . using covers or floating solar absorbing elements		
10/20	• having circuits for two or more working fluids (with means for exchanging heat between two or more fluids <a href="#">F24S 10/30</a> )	2010/71	• . . {the conduits having a non-circular cross-section}
		10/72	• . . {the tubular conduits being integrated in a block; the tubular conduits touching each other}
10/25	• having two or more passages for the same working fluid layered in direction of solar-rays, e.g. having upper circulation channels connected with lower circulation channels	10/73	• . . {the tubular conduits being of plastic material}
		10/74	• . . {the tubular conduits are not fixed to heat absorbing plates and are not touching each other}
10/30	• with means for exchanging heat between two or more working fluids	10/742	• . . . {the conduits being parallel to each other}
		10/744	• . . . {the conduits being helically coiled}
10/40	• in absorbing elements surrounded by transparent enclosures, e.g. evacuated solar collectors	10/746	• . . . {the conduits being spirally coiled}
		10/748	• . . . {the conduits being otherwise bent, e.g. zig-zag}
10/45	• . . {the enclosure being cylindrical}	10/75	• . . with enlarged surfaces, e.g. with protrusions or corrugations (collectors comprising porous material or permeable masses directly contacting the working fluids <a href="#">F24S 10/80</a> )
10/50	• the working fluids being conveyed between plates		
10/501	• . . {having conduits of plastic material}		
10/502	• . . {having conduits formed by paired plates and internal partition means}	2010/751	• . . . {Special fins}
10/503	• . . {having conduits formed by paired plates, only one of which is plane}	2010/752	• . . . . {extending obliquely}
		10/753	• . . . {the conduits being parallel to each other}
10/504	• . . {having conduits formed by paired non-plane plates}	10/754	• . . . {the conduits being spirally coiled}
		10/755	• . . . {the conduits being otherwise bent, e.g. zig-zag}
10/505	• . . {having curved plate-like conduits, e.g. semi-spherical}		
10/506	• . . {having conduits formed by inflation of portions of a pair of joined sheets}		
10/55	• . . with enlarged surfaces, e.g. with protrusions or corrugations (collectors comprising porous materials or permeable masses directly contacting the working fluids <a href="#">F24S 10/80</a> )		

10/80	<ul style="list-style-type: none"> <li>comprising porous material or permeable masses directly contacting the working fluids (for conveying liquefied working fluid from evaporator sections to condenser sections with capillary force <a href="#">F24S 10/95</a>)</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 10/80</a> is impacted by reclassification into group <a href="#">F24S 10/95</a>.</p> <p>Groups <a href="#">F24S 10/80</a> and <a href="#">F24S 10/95</a> should be considered in order to perform a complete search.</p>	20/20	<ul style="list-style-type: none"> <li>Solar heat collectors for receiving concentrated solar energy, e.g. receivers for solar power plants</li> </ul>
		2020/23	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{movable or adjustable}</li> </ul> </li> </ul>
		20/25	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>using direct solar radiation in combination with concentrated radiation</li> </ul> </li> </ul>
		20/30	<ul style="list-style-type: none"> <li>Solar heat collectors for heating objects, e.g. solar cookers or solar furnaces</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 20/30</a> is impacted by reclassification into group <a href="#">F24S 50/20</a>.</p> <p>Groups <a href="#">F24S 20/30</a> and <a href="#">F24S 50/20</a> should be considered in order to perform a complete search.</p>
10/90	<ul style="list-style-type: none"> <li>using internal thermosiphonic circulation</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 10/90</a> is incomplete pending reclassification of documents from group <a href="#">F24S 90/10</a>.</p> <p>Group <a href="#">F24S 10/90</a> is also impacted by reclassification into groups <a href="#">F24S 10/95</a> and <a href="#">F24S 90/10</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>	20/40	<ul style="list-style-type: none"> <li>Solar heat collectors combined with other heat sources, e.g. using electrical heating or heat from ambient air</li> </ul>
		20/50	<ul style="list-style-type: none"> <li>Rollable or foldable solar heat collector modules</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 20/50</a> is impacted by reclassification into group <a href="#">F24S 20/55</a>.</p> <p>Groups <a href="#">F24S 20/50</a> and <a href="#">F24S 20/55</a> should be considered in order to perform a complete search.</p>
10/95	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>having evaporator sections and condenser sections, e.g. heat pipes</li> </ul> </li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 10/95</a> is incomplete pending reclassification of documents from groups <a href="#">F24S 10/80</a>, <a href="#">F24S 10/90</a> and <a href="#">F24S 90/10</a>.</p> <p>Groups <a href="#">F24S 10/80</a>, <a href="#">F24S 10/90</a>, <a href="#">F24S 90/10</a>, and <a href="#">F24S 10/95</a> should be considered in order to perform a complete search.</p>	20/55	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>made of flexible materials</li> </ul> </li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 20/55</a> is incomplete pending reclassification of documents from group <a href="#">F24S 20/50</a>.</p> <p>Groups <a href="#">F24S 20/50</a> and <a href="#">F24S 20/55</a> should be considered in order to perform a complete search.</p>
<b>20/00</b>	<p><b>Solar heat collectors specially adapted for particular uses or environments</b></p> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 20/00</a> is incomplete pending reclassification of documents from group <a href="#">F24S 21/00</a>.</p> <p>Groups <a href="#">F24S 20/00</a> and <a href="#">F24S 21/00</a> should be considered in order to perform a complete search.</p>	20/60	<ul style="list-style-type: none"> <li>Solar heat collectors integrated in fixed constructions, e.g. in buildings</li> </ul>
		20/61	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Passive solar heat collectors, e.g. operated without external energy source</li> </ul> </li> </ul>
		20/62	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>in the form of fences, balustrades or handrails</li> </ul> </li> </ul>
		20/63	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>in the form of windows</li> </ul> </li> </ul>
		20/64	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>in the form of floor constructions, grounds or roads</li> </ul> </li> </ul>
		20/66	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>in the form of facade constructions, e.g. wall constructions (in the form of shingles or tiles <a href="#">F24S 20/69</a>)</li> </ul> </li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">F24S 20/66</a> is impacted by reclassification into group <a href="#">F24S 20/69</a>.</p> <p>Groups <a href="#">F24S 20/66</a> and <a href="#">F24S 20/69</a> should be considered in order to perform a complete search.</p>
20/02	<ul style="list-style-type: none"> <li>{for swimming pools}</li> </ul>		
20/04	<ul style="list-style-type: none"> <li>{for showers}</li> </ul>		
2020/10	<ul style="list-style-type: none"> <li>{Solar modules layout; Modular arrangements}</li> </ul>		
2020/11	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{in the form of multiple rows and multiple columns, all solar modules being coplanar}</li> </ul> </li> </ul>		
2020/12	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Coplanar arrangements with frame overlapping portions}</li> </ul> </li> </ul>		
2020/13	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Overlaying arrangements similar to roof tiles}</li> </ul> </li> </ul>		
2020/14	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Stepped arrangements, e.g. in parallel planes, without module overlapping}</li> </ul> </li> </ul>		
2020/15	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Non-parallel arrangements}</li> </ul> </li> </ul>		
2020/16	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Preventing shading effects}</li> </ul> </li> </ul>		
2020/17	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{Arrangements of solar thermal modules combined with solar PV modules}</li> </ul> </li> </ul>		
2020/18	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{having a particular shape, e.g. prismatic, pyramidal}</li> </ul> </li> </ul>		
2020/183	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{in the form of louvers}</li> </ul> </li> </ul> </li> </ul>		
2020/186	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{allowing change of position for optimization of heat collection}</li> </ul> </li> </ul> </li> </ul>		
		20/67	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>in the form of roof constructions (in the form of shingles or tiles <a href="#">F24S 20/69</a>)</li> </ul> </li> </ul>

- 20/69 . . . in the form of shingles or tiles
- WARNING**
- Group [F24S 20/69](#) is incomplete pending reclassification of documents from group [F24S 20/66](#).
- Groups [F24S 20/66](#) and [F24S 20/69](#) should be considered in order to perform a complete search.
- 20/70 . Waterborne solar heat collector modules (for working fluids forming pools or ponds [F24S 10/10](#))
- WARNING**
- Group is impacted by reclassification into groups [F24S 30/00](#), [F24S 30/20](#), [F24S 30/40](#), [F24S 30/42](#), [F24S 30/422](#), [F24S 30/425](#), [F24S 30/428](#), [F24S 30/45](#), [F24S 30/452](#), [F24S 30/455](#), [F24S 30/458](#), and [F24S 30/48](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 20/80 . Airborne solar heat collector modules, e.g. inflatable structures
- 21/00 Solar heat collectors not provided for in groups [F24S 10/00](#)-[F24S 20/00](#)**
- WARNING**
- Group [F24S 21/00](#) is impacted by reclassification into group [F24S 20/00](#).
- Groups [F24S 21/00](#) and [F24S 20/00](#) should be considered in order to perform a complete search.
- 23/00 Arrangements for concentrating solar-rays for solar heat collectors**
- WARNING**
- Group [F24S 23/00](#) is impacted by reclassification into group [F24S 50/20](#).
- Groups [F24S 23/00](#) and [F24S 50/20](#) should be considered in order to perform a complete search.
- 23/10 . {Prisms}
- 23/11 . {Fluorescent material}
- 23/12 . {Light guides}
- 23/30 . with lenses
- 23/31 . . {having discontinuous faces, e.g. Fresnel lenses}
- 23/70 . with reflectors
- 23/71 . . with parabolic reflective surfaces (with cylindro-parabolic reflective surfaces [F24S 23/74](#))
- WARNING**
- Group [F24S 23/71](#) is impacted by reclassification into group [F24S 23/74](#).
- Groups [F24S 23/71](#) and [F24S 23/74](#) should be considered in order to perform a complete search.
- 23/715 . . . {flexible}
- 23/72 . . with hemispherical reflective surfaces
- 23/74 . . with trough-shaped or cylindro-parabolic reflective surfaces
- WARNING**
- Group [F24S 23/74](#) is incomplete pending reclassification of documents from group [F24S 23/71](#).
- Groups [F24S 23/71](#) and [F24S 23/74](#) should be considered in order to perform a complete search.
- 23/745 . . . {flexible}
- 23/75 . . with conical reflective surfaces
- 23/77 . . with flat reflective plates
- 23/79 . . with spaced and opposed interacting reflective surfaces
- 23/80 . . {having discontinuous faces}
- 23/81 . . {flexible ([F24S 23/715](#), [F24S 23/745](#) take precedence)}
- 23/82 . . {characterised by the material or the construction of the reflector}
- 2023/83 . . {Other shapes}
- 2023/831 . . . {corrugated}
- 2023/832 . . . {curved}
- 2023/833 . . . {dish-shaped}
- 2023/834 . . . {trough-shaped}
- 2023/835 . . . . {asymmetric}
- 2023/836 . . . {spiral}
- 2023/837 . . . {hyperbolic}
- 2023/838 . . . {involutes}
- 2023/84 . . {Reflective elements inside solar collector casings}
- 2023/85 . . {Micro-reflectors}
- 2023/86 . . {in the form of reflective coatings}
- 2023/87 . . {Reflectors layout}
- 2023/872 . . . {Assemblies of spaced reflective elements on common support, e.g. Fresnel reflectors}
- 2023/874 . . . {Reflectors formed by assemblies of adjacent similar reflective facets}
- 2023/876 . . . {Reflectors formed by assemblies of adjacent reflective elements having different orientation or different features}
- 2023/878 . . . {Assemblies of spaced reflective elements in the form of grids, e.g. vertical or inclined reflective elements extending over heat absorbing elements}
- 2023/88 . . {Multi reflective traps}
- WARNING**
- Group [F24S 2023/88](#) is impacted by reclassification into group [F24S 2070/62](#).
- Groups [F24S 2023/88](#) and [F24S 2070/62](#) should be considered in order to perform a complete search.
- 25/00 Arrangement of stationary mountings or supports for solar heat collector modules**
- NOTE**
- Arrangements also intended for use with photovoltaic modules should further be classified in the relevant groups of subclass [H02S](#).
- 2025/01 . {Special support components; Methods of use}

- 2025/011 . . {Arrangements for mounting elements inside solar collectors; Spacers inside solar collectors}
  - 2025/012 . . {Foldable support elements}
  - 2025/013 . . {Stackable support elements}
  - 2025/014 . . {Methods for installing support elements}
  - 2025/015 . . {Supports with play between elements}
  - 2025/016 . . {Filling or spacing means; Elastic means}
  - 2025/017 . . {Tensioning means}
  - 2025/018 . . {Means for preventing movements, e.g. stops}
  - 2025/019 . . {Means for accommodating irregularities on mounting surface; Tolerance compensation means}
  
  - 2025/02 . . {Ballasting means}
  - 2025/021 . . {Sealing means between support elements and mounting surface}
  - 2025/022 . . {Sealing means between support elements, e.g. overlapping arrangements; Gap closing arrangements}
  - 2025/023 . . {Means for preventing theft; Locking means}
  - 25/10 . . extending in directions away from a supporting surface
  - 25/11 . . using shaped bodies, e.g. concrete elements, foamed elements or moulded box-like elements
  - 25/12 . . using posts in combination with upper profiles
  - 25/13 . . Profile arrangements, e.g. trusses ([F24S 25/12 takes precedence](#))
  - 25/15 . . using bent plates; using assemblies of plates
  - 25/16 . . Arrangement of interconnected standing structures; Standing structures having separate supporting portions for adjacent modules
  - 25/20 . . Peripheral frames for modules
  - 25/30 . . using elongate rigid mounting elements extending substantially along the supporting surface, e.g. for covering buildings with solar heat collectors ([extending in directions away from the supporting surface F24S 25/10; peripheral frames for modules F24S 25/20](#))
  - 25/33 . . forming substantially planar assemblies, e.g. of coplanar or stacked profiles
  - 25/35 . . . by means of profiles with a cross-section defining separate supporting portions for adjacent modules
  - 25/37 . . . forming coplanar grids comprising longitudinal and transversal profiles
  - 25/40 . . using plate-like mounting elements, e.g. profiled or corrugated plates; Plate-like module frames ([extending in directions away from a supporting surface F24S 25/10](#))
  - 25/50 . . comprising elongate non-rigid elements, e.g. straps, wires or ropes
  - 25/60 . . Fixation means, e.g. fasteners, specially adapted for supporting solar heat collector modules
  
  - 2025/6001 . . {by using hook and loop-type fasteners}
  - 2025/6002 . . {by using hooks}
  - 2025/6003 . . {by clamping}
  - 2025/6004 . . {by clipping, e.g. by using snap connectors}
  - 2025/6005 . . {by screwed connection}
  - 2025/6006 . . {by using threaded elements, e.g. stud bolts}
  - 2025/6007 . . {by using form-fitting connection means, e.g. tongue and groove}
  - 2025/6008 . . {by using toothed elements}
  - 2025/6009 . . {by deforming the material, e.g. by crimping or clinching}
  - 2025/601 . . {by bonding, e.g. by using adhesives}
  
  - 2025/6011 . . {by welding or brazing}
  - 2025/6012 . . {Joining different materials}
  - 2025/6013 . . . {Joining glass with non-glass elements}
  - 25/61 . . for fixing to the ground or to building structures
  - 25/613 . . . in the form of bent strips or assemblies of strips; Hook-like connectors; Connectors to be mounted between building-covering elements
  - 25/615 . . . for fixing to protruding parts of buildings, e.g. to corrugations or to standing seams
  - 25/617 . . . Elements driven into the ground, e.g. anchor-piles; Foundations for supporting elements; Connectors for connecting supporting structures to the ground or to flat horizontal surfaces
  - 25/63 . . for fixing modules or their peripheral frames to supporting elements
  - 25/632 . . . Side connectors; Base connectors
  - 25/634 . . . Clamps; Clips
  - 25/636 . . . . clamping by screw-threaded elements
  - 25/65 . . for coupling adjacent supporting elements, e.g. for connecting profiles together
  - 25/67 . . for coupling adjacent modules or their peripheral frames ([for fixing modules or their peripheral frames to supporting elements F24S 25/63](#))
  - 25/70 . . with means for adjusting the final position or orientation of supporting elements in relation to each other or to a mounting surface; with means for compensating mounting tolerances
  
  - 2025/80 . . {Special profiles}
  - 2025/801 . . {having hollow parts with closed cross-section}
  - 2025/802 . . {having circular or oval cross-section}
  - 2025/803 . . {having a central web, e.g. I-shaped, inverted T-shaped}
  - 2025/804 . . {U-, C- or O-shaped; Hat profiles}
  - 2025/805 . . {in the form of corrugated profiles}
  - 2025/806 . . {having curved portions}
  - 2025/807 . . {having undercut grooves}
- 30/00 Arrangements for moving or orienting solar heat collector modules**
- NOTE**
- Arrangements also intended for use with photovoltaic modules should further be classified in the relevant groups of subclass [H02S](#).
- WARNING**
- Group [F24S 30/00](#) is incomplete pending reclassification of documents from groups [F24S 20/70](#) and [F24S 30/20](#)
- Groups [F24S 20/70](#), [F24S 30/20](#), and [F24S 30/00](#) should be considered in order to perform a complete search.
- 2030/10 . . {Special components}
  - 2030/11 . . {Driving means}
  - 2030/115 . . . {Linear actuators, e.g. pneumatic cylinders}
  - 2030/12 . . {Coupling means}
  - 2030/13 . . {Transmissions}
  - 2030/131 . . . {in the form of articulated bars}
  - 2030/132 . . . . {in the form of compasses, scissors or parallelograms}
  - 2030/133 . . . {in the form of flexible elements, e.g. belts, chains, ropes}

- 2030/134 . . . {in the form of gearings or rack-and-pinion transmissions}
- 2030/135 . . . {in the form of threaded elements}
- 2030/136 . . . {for moving several solar collectors by common transmission elements}
- 2030/137 . . . {for deriving one movement from another one, e.g. for deriving elevation movement from azimuth movement}
- 2030/14 . . {Movement guiding means}
- 2030/145 . . . {Tracks}
- 2030/15 . . {Bearings}
- 2030/16 . . {Hinged elements; Pin connections}
- 2030/17 . . {Spherical joints}
- 2030/18 . . {Load balancing means, e.g. use of counter-weights}
- 2030/19 . . {Movement dampening means; Braking means}
- 30/20 . . for linear movement
- WARNING**
- Group [F24S 30/20](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Group [F24S 30/20](#) is also impacted by reclassification into group [F24S 30/00](#).
- Groups [F24S 20/70](#), [F24S 30/20](#), and [F24S 30/00](#) should be considered in order to perform a complete search
- 30/40 . . for rotary movement
- WARNING**
- Group [F24S 30/40](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/40](#) should be considered in order to perform a complete search.
- 30/42 . . with only one rotation axis
- WARNING**
- Group [F24S 30/42](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/42](#) should be considered in order to perform a complete search.
- 30/422 . . . Vertical axis
- WARNING**
- Group [F24S 30/422](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/422](#) should be considered in order to perform a complete search.
- 30/425 . . . Horizontal axis
- WARNING**
- Group [F24S 30/425](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/425](#) should be considered in order to perform a complete search.
- 30/428 . . . with inclined axis
- WARNING**
- Group [F24S 30/428](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/428](#) should be considered in order to perform a complete search.
- 30/45 . . with two rotation axes
- WARNING**
- Group [F24S 30/45](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/45](#) should be considered in order to perform a complete search.
- 30/452 . . . Vertical primary axis
- WARNING**
- Group [F24S 30/452](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/452](#) should be considered in order to perform a complete search.
- 30/455 . . . Horizontal primary axis
- WARNING**
- Group [F24S 30/455](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/455](#) should be considered in order to perform a complete search.
- 30/458 . . . with inclined primary axis
- WARNING**
- Group [F24S 30/458](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/458](#) should be considered in order to perform a complete search.

- 30/48 . . with three or more rotation axes or with multiple degrees of freedom
- WARNING**
- Group [F24S 30/48](#) is incomplete pending reclassification of documents from group [F24S 20/70](#).
- Groups [F24S 20/70](#) and [F24S 30/48](#) should be considered in order to perform a complete search.
- 40/00 Safety or protection arrangements of solar heat collectors; Preventing malfunction of solar heat collectors (control arrangements [F24S 50/00](#))**
- WARNING**
- Group [F24S 40/00](#) is impacted by reclassification into group [F24S 40/90](#).
- Groups [F24S 40/00](#) and [F24S 40/90](#) should be considered in order to perform a complete search.
- 40/10 . Protective covers or shrouds; Closure members, e.g. lids (transparent coverings [F24S 80/50](#))
- 40/20 . Cleaning; Removing snow
- 40/40 . Preventing corrosion; Protecting against dirt or contamination
- 40/42 . . Preventing condensation inside solar modules (by venting [F24S 40/53](#))
- WARNING**
- Group [F24S 40/42](#) is impacted by reclassification into group [F24S 40/53](#).
- Groups [F24S 40/42](#) and [F24S 40/53](#) should be considered in order to perform a complete search .
- 40/44 . . Draining rainwater or condensation
- 40/46 . . Maintaining vacuum, e.g. by using getters
- 40/48 . . Deaerating or degassing the working fluid
- 40/50 . Preventing overheating or overpressure (by draining the working fluid [F24S 40/60](#))
- 40/52 . . by modifying the heat collection, e.g. by defocusing or by changing the position of heat-receiving elements
- 40/53 . . by venting solar heat collector enclosures
- WARNING**
- Group [F24S 40/53](#) is incomplete pending reclassification of documents from group [F24S 40/42](#).
- Groups [F24S 40/42](#) and [F24S 40/53](#) should be considered in order to perform a complete search.
- 40/55 . . Arrangements for cooling, e.g. by using external heat dissipating means or internal cooling circuits (by venting [F24S 40/53](#))
- 40/57 . . Preventing overpressure in solar collector enclosures (by venting [F24S 40/53](#))
- 40/58 . . Preventing overpressure in working fluid circuits
- 40/60 . Arrangements for draining the working fluid
- 40/70 . Preventing freezing (arrangements for draining the working fluid [F24S 40/60](#))
- 40/80 . Accommodating differential expansion of solar collector elements
- 40/85 . . {Arrangements for protecting solar collectors against adverse weather conditions ([F24S 40/10](#) takes precedence)}
- 40/90 . Arrangements for testing solar heat collectors
- WARNING**
- Group [F24S 40/90](#) is incomplete pending reclassification of documents from group [F24S 40/00](#).
- Groups [F24S 40/00](#) and [F24S 40/90](#) should be considered in order to perform a complete search.
- 50/00 Arrangements for controlling solar heat collectors**
- 50/20 . for tracking
- WARNING**
- Group [F24S 50/20](#) is incomplete pending reclassification of documents from groups [F24S 20/30](#) and [F24S 23/00](#).
- Groups [F24S 50/20](#) and [F24S 50/20](#) should be considered in order to perform a complete search.
- 2050/25 . . {Calibration means; Methods for initial positioning of solar concentrators or solar receivers}
- 50/40 . responsive to temperature
- 50/60 . responsive to wind
- 50/80 . for controlling collection or absorption of solar radiation
- 60/00 Arrangements for storing heat collected by solar heat collectors (working fluids forming pools or ponds [F24S 10/10](#))**
- WARNING**
- Group [F24S 60/00](#) is impacted by reclassification into groups [F24S 60/10](#) and [F24S 60/20](#).
- Groups [F24S 60/00](#), [F24S 60/10](#), and [F24S 60/20](#) should be considered in order to perform a complete search.
- 60/10 . using latent heat
- WARNING**
- Group [F24S 60/10](#) is incomplete pending reclassification of documents from groups [F24S 60/00](#) and [F24S 60/30](#).
- Groups [F24S 60/00](#), [F24S 60/30](#), and [F24S 60/10](#) should be considered in order to perform a complete search.
- 60/20 . using chemical reactions, e.g. thermochemical reactions or isomerisation reactions
- WARNING**
- Group [F24S 60/20](#) is incomplete pending reclassification of documents from groups [F24S 60/00](#) and [F24S 60/30](#).
- Groups [F24S 60/00](#), [F24S 60/30](#), and [F24S 60/20](#) should be considered in order to perform a complete search.

- 60/30 . storing heat in liquids
- WARNING**
- Group [F24S 60/30](#) is impacted by reclassification into groups [F24S 60/10](#) and [F24S 60/20](#).
- Groups [F24S 60/30](#), [F24S 60/10](#), and [F24S 60/20](#) should be considered in order to perform a complete search.
- 70/00 Details of absorbing elements**
- WARNING**
- Group [F24S 70/00](#) is incomplete pending reclassification of documents from group [F24S 80/00](#).
- Groups [F24S 80/00](#) and [F24S 70/00](#) should be considered in order to perform a complete search.
- 70/10 . characterised by the absorbing material (absorbing coatings or surface treatment for increasing absorption [F24S 70/20](#))
- 70/12 . . made of metallic material
- 70/14 . . made of plastics
- 70/16 . . made of ceramic; made of concrete; made of natural stone
- 70/20 . characterised by absorbing coatings; characterised by surface treatment for increasing absorption
- WARNING**
- Group [F24S 70/20](#) is impacted by reclassification into group [F24S 70/225](#).
- Groups [F24S 70/20](#) and [F24S 70/225](#) should be considered in order to perform a complete search.
- 70/225 . . for spectrally selective absorption
- WARNING**
- Group [F24S 70/225](#) is incomplete pending reclassification of documents from groups [F24S 70/20](#), [F24S 70/25](#), and [F24S 70/275](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 70/25 . . Coatings made of metallic material
- WARNING**
- Group [F24S 70/25](#) is impacted by reclassification into group [F24S 70/225](#).
- Groups [F24S 70/25](#) and [F24S 70/225](#) should be considered in order to perform a complete search.
- 70/275 . . Coatings made of plastics
- WARNING**
- Group [F24S 70/275](#) is impacted by reclassification into group [F24S 70/225](#).
- Groups [F24S 70/275](#) and [F24S 70/225](#) should be considered in order to perform a complete search.
- 70/30 . Auxiliary coatings, e.g. anti-reflective coatings
- 70/60 . characterised by the structure or construction (absorbing coatings or surface treatment for increasing absorption [F24S 70/20](#); auxiliary coatings [F24S 70/30](#))
- 2070/62 . . {Heat traps}
- WARNING**
- Group [F24S 2070/62](#) is incomplete pending reclassification of documents from group [F24S 2023/88](#).
- Groups [F24S 2023/88](#) and [F24S 2070/62](#) should be considered in order to perform a complete search.
- 70/65 . . Combinations of two or more absorbing elements
- 80/00 Details, accessories or component parts of solar heat collectors not provided for in groups [F24S 10/00](#)-[F24S 70/00](#)**
- WARNING**
- Group [F24S 80/00](#) is impacted by reclassification into group [F24S 70/00](#).
- Groups [F24S 80/00](#) and [F24S 70/00](#) should be considered in order to perform a complete search.
- 2080/01 . {Selection of particular materials}
- 2080/011 . . {Ceramics}
- 2080/012 . . {Concrete}
- 2080/013 . . {Foams}
- 2080/014 . . {Carbone, e.g. graphite}
- 2080/015 . . {Plastics}
- 2080/016 . . {Textiles; Fabrics}
- 2080/017 . . {Natural materials, e.g. wood}
- 2080/018 . . {Recycled materials}
- 2080/03 . {Arrangements for heat transfer optimization}
- 2080/05 . . {Flow guiding means; Inserts inside conduits}
- 2080/07 . . {Arrangements for one-way heat transfer, e.g. thermal diodes}
- 2080/09 . {Arrangements for reinforcement of solar collector elements}
- 80/10 . Materials for heat-exchange conduits
- 80/20 . Working fluids specially adapted for solar heat collectors
- 80/30 . Arrangements for connecting the fluid circuits of solar collectors with each other or with other components, e.g. pipe connections; Fluid distributing means, e.g. headers
- 80/40 . Casings
- 80/45 . . characterised by the material
- 80/453 . . . made of metallic material
- 80/457 . . . made of plastics
- 80/50 . Elements for transmitting incoming solar rays and preventing outgoing heat radiation; Transparent coverings
- WARNING**
- Group [F24S 80/50](#) is impacted by reclassification into groups [F24S 80/56](#) and [F24S 80/58](#).
- Groups [F24S 80/50](#), [F24S 80/56](#), and [F24S 80/58](#) should be considered in order to perform a complete search.
- 2080/501 . . {Special shape}
- 2080/502 . . . {in the form of multiple covering elements}

## F24S

- 2080/503 . . . {in the form of curved covering elements}
- 80/52 . . characterised by the material (for preventing heat loss [F24S 80/56](#))

### **WARNING**

Group [F24S 80/52](#) is impacted by reclassification into groups [F24S 80/56](#) and [F24S 80/58](#).

Groups [F24S 80/52](#), [F24S 80/56](#), and [F24S 80/58](#) should be considered in order to perform a complete search.

- 80/525 . . . made of plastics

### **WARNING**

Group [F24S 80/525](#) is impacted by reclassification into groups [F24S 80/56](#) and [F24S 80/58](#).

Groups [F24S 80/525](#), [F24S 80/56](#), and [F24S 80/58](#) should be considered in order to perform a complete search.

- 80/54 . . using evacuated elements

### **WARNING**

Group [F24S 80/54](#) is impacted by reclassification into groups [F24S 80/56](#) and [F24S 80/58](#).

Groups [F24S 80/54](#), [F24S 80/56](#), and [F24S 80/58](#) should be considered in order to perform a complete search.

- 80/56 . . characterised by means for preventing heat loss

### **WARNING**

Group [F24S 80/56](#) is incomplete pending reclassification of documents from groups [F24S 80/50](#), [F24S 80/52](#), [F24S 80/525](#), and [F24S 80/54](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 80/58 . . characterised by their mountings or fixing means

### **WARNING**

Group [F24S 80/58](#) is incomplete pending reclassification of documents from groups [F24S 80/50](#), [F24S 80/52](#), [F24S 80/525](#), and [F24S 80/54](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 80/60 . Thermal insulation ([transparent coverings F24S 80/50](#))

- 80/65 . . characterised by the material

- 80/70 . Sealing means

- 90/00 Solar heat systems not otherwise provided for**

- 90/10 . using thermosiphonic circulation

### **WARNING**

Group [F24S 90/10](#) is incomplete pending reclassification of documents from group [F24S 10/90](#).

Group [F24S 90/10](#) is also impacted by reclassification into groups [F24S 10/90](#) and [F24S 10/95](#).

All groups listed in this Warning should be considered in order to perform a complete search.

## **2201/00 Prediction; Simulation**