

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property

Organization

International Bureau

(43) International Publication Date

01 April 2021 (01.04.2021)



(10) International Publication Number

WO 2021/056092 A1

(51) International Patent Classification:

H02S 20/10 (2014.01) F24S 23/77 (2018.01)

H04H 12/00 (2006.01) F24S 25/00 (2018.01)

F24S 20/60 (2018.01)

Published:

- with international search report (Art. 21(3))
- in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE

(21) International Application Number:

PCT/CA2019/051358

(22) International Filing Date:

23 September 2019 (23.09.2019)

(25) Filing Language:

English

(26) Publication Language:

English

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(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

(54) Title: SOLAR TOWER

(57) Abstract: A system and method for collecting solar energy wherein the system comprising a tower formed having a plurality of stories, the tower formed of a plurality of structural members extending between hub connectors to form a space frame providing a vertical airflow path therethrough and a plurality of solar panels secured to an outside periphery of the tower. The method comprises providing a tower formed having a plurality of stories, the tower formed of a plurality of structural members extending between hub connectors to form a space frame providing a vertical airflow path therethrough and securing a plurality of solar panels to and around an outside periphery of the tower.



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SOLAR TOWER

BACKGROUND OF THE INVENTION

1. Field of Invention

5 The present invention relates generally to energy collection and in particular to a tower for collecting solar energy.

2. Description of Related Art

10 Solar power is a common form of collecting energy for industrial commercial and residential use. One difficulty with collecting solar energy is the inefficiencies of conventional solar panels. This inefficiency therefore requires larger surface areas of solar panels to collect sufficient energy. One solution to this problem is to provide a large area of land to locate solar panels on. It will be appreciated however that such solutions may not be practical in all
15 locations such as, by way of non-limiting example, within city limits or high population neighborhoods.

One attempted solution to increasing solar collection with smaller footprints has been to locate solar panels on towers or buildings. Disadvantageously,
20 when located on towers or the like, such solar panels may be expensive and time consuming to construct and may also be prone to effects of wind or the like.

SUMMARY OF THE INVENTION

25 According to a first embodiment of the present invention there is disclosed a system for collecting solar energy comprising a tower formed having a plurality of stories, the tower formed of a plurality of structural members extending between hub connectors to form a space frame providing a vertical airflow path therethrough and a plurality of solar panels secured to an outside
30 periphery of the tower.

The tower may have a trapezoidal cross section having a long front wall, a short rear wall and angled sidewalls. The plurality of solar panels may be

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secured to the long front wall and the angled sidewalls. The plurality of solar panels may be secured in a vertical orientation to the tower. The plurality of solar panels may be arranged in rows around the tower.

5 Each of the plurality of solar panels may include reflector panels posited therebelow. The reflector panels may be angled outwardly from the tower. The reflector panels may form a vent gap between a bottom edge thereof and the tower. The tower may include grated decking between levels therein.

10 According to a further embodiment of the present invention there is disclosed a method for collecting solar energy comprising providing a tower formed having a plurality of stories, the tower formed of a plurality of structural members extending between hub connectors to form a space frame providing a vertical airflow path therethrough and securing a plurality of solar panels to
15 and around an outside periphery of the tower.

Other aspects and features of the present invention will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying
20 figures.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate embodiments of the invention wherein similar characters of reference denote corresponding parts in each view,

25 Figure 1 is a perspective view of a tower for collecting solar energy according to a first embodiment of the present invention.

Figure 2 is a top plan view of the tower of Figure 1.

Figure 3 is a side view of the tower of Figure 2.

Figure 4 is a partial cross sectional view of the tower of figure 1 as taken
30 along the line 4-4.

Figure 5 is a perspective view of a tower for collecting solar energy according to a further embodiment of the present invention.

DETAILED DESCRIPTION

Referring to Figure 1, a tower for collecting energy according to a first embodiment of the invention is shown generally at **10**. The tower comprises a space frame **12** having a plurality of solar panels **40** supported around a periphery thereof. The space frame **12** is formed of a plurality of structural members **14** connected to each other by a plurality of hub members **16**. It will be appreciated that any such space frame system may be utilized such as, by way of non-limiting example, US Patent No. **3,275,351** filed February **10, 1064** the entirety of which is hereby incorporated by reference.

As illustrated the space frame **12** may be arranged into levels **18** with floors **20** therebetween. The floor **20** may be formed of grating or any other suitable air permeable material so as to permit airflow in a vertical direct through the tower **10**. A ladder **32** or other means for providing access to each floor **20** of the tower **10** may also be provided as is commonly known.

As illustrated in Figure tower **10** has a trapezoidal cross section formed of a wide front wall **22**, a narrow rear wall **24** and angled side walls **26** therebetween. The plurality of solar panels **40** are arranged on each of the front wall **22** and side walls **26** such that as the sun **8** moves through it's daily path, each of the front and side walls **22** and **26** will have the solar panels **40** located thereon exposed to sunlight so as to maximize the duration of collection. The side panels may be angular offset from perpendicular to the front and rear walls **22** and **24** by an angle of between **18** and **22** degrees. It will also be appreciated that the orientation of the tower **10** should be selected so as to optimize solar collection such as, by way of non-limiting example, orienting the front wall **22** south. In practice it has been found that providing a front wall **22** and side walls **26** which are substantially the same length has been found useful to equalize solar collection however, the front wall may also be sized up to **25%** wider than the side walls as well to increase collection at the brightest times of the day.

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The solar panels **40** are arranged around the tower **10** in horizontal rows. As illustrated in Figure **1**, the tower may include two rows **42** and **44** for each level although different numbers of rows may also be utilized. Although each row **42** and **44** in Figure **1** is illustrated with a single solar panel **40**, it will be appreciated that more than one solar panel may be utilized. Each row **42** or **44** of solar panels includes a reflector panel **50** located therebelow. As illustrated in Figure **4**, the reflector panel is angled relative to horizontal by a reflector angle **52** selected to be between **72** and **84** degrees. The reflector panels **50** may be mirrored or formed of any other reflective material. The reflector panels **50** are secured to the tower **10** or solar panel **40** below the solar panel **40** with a bottom edge **54** of the reflector panels spaced apart from the tower **10** to form a vent gap **56**. The vent gap **56** may be open or may contain a screen **58** or the like so as to permit airflow therethrough. In operation, the reflector panels reflect sunlight **80** onto the solar panel above it so as to increase light collection. Furthermore, the vent gaps **56** permit airflow therethrough which in combination with the grating on the floors **20** permits a generally upward airflow **100** through the tower. This airflow will be useful in cooling the solar panels thereby increasing efficiency.

While specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention as construed in accordance with the accompanying claims.

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What is claimed is:

1. A system for collecting solar energy comprising:

5 a tower formed having a plurality of stories, said tower formed of a plurality of structural members extending between hub connectors to form a space frame providing a vertical airflow path therethrough; and

a plurality of solar panels secured to an outside periphery of said tower.
- 10 2. The system of claim 1 wherein said tower has a trapezoidal cross section having a long front wall, a short rear wall and angled sidewalls.
3. The system of claim 1 wherein said plurality of solar panels are secured to said long front wall and said angled sidewalls.
- 15 4. The system of claim 3 wherein said plurality of solar panels are secured in a vertical orientation to said tower.
5. The system of claim 4 wherein said plurality of solar panels are
20 arranged in rows around said tower.
6. The system of claim 5 wherein each of said plurality of solar panels include reflector panels posited therebelow.
- 25 7. The system of claim 6 wherein said reflector panels are angled outwardly from said tower.
8. The system of claim 6 wherein said reflector panels form a vent gap between a bottom edge thereof and said tower.
- 30 9. The system of claim 1 wherein said tower includes grated decking between levels therein.

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10. A method for collecting solar energy comprising:

5 providing a tower formed having a plurality of stories, said tower formed of a plurality of structural members extending between hub connectors to form a space frame providing a vertical airflow path therethrough; and

10 securing a plurality of solar panels to and around an outside periphery of said tower.

15

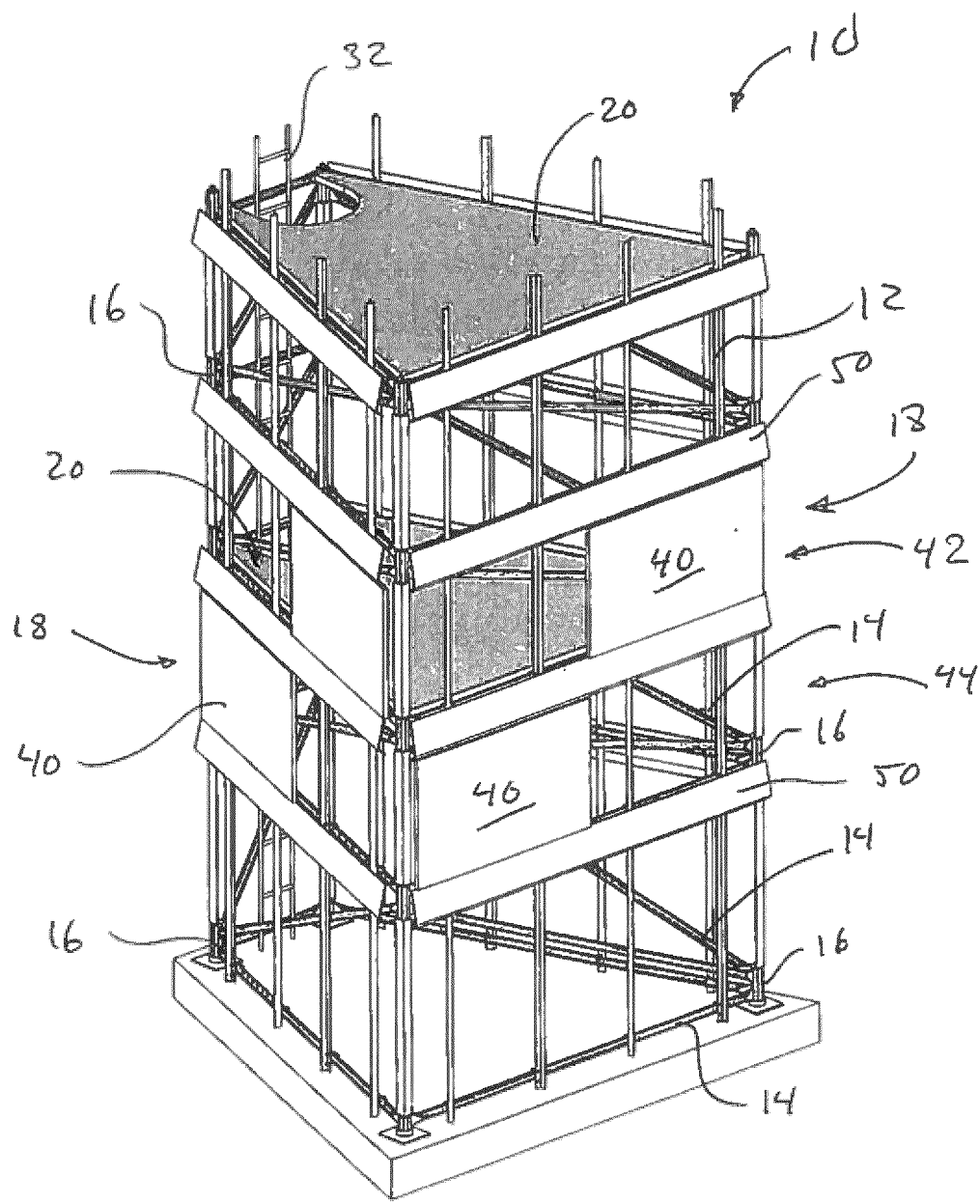


Fig. 1

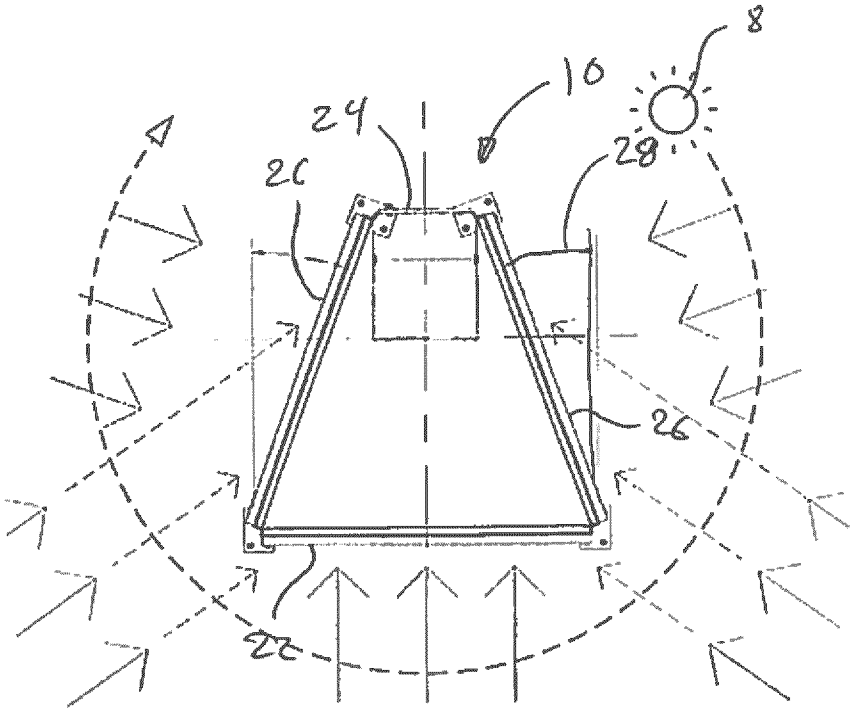


Fig 2

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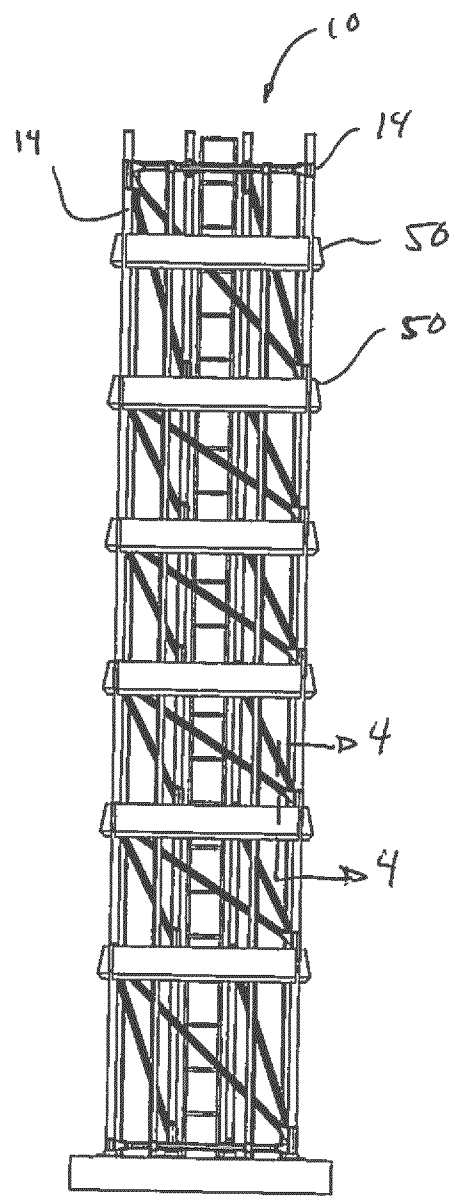


Fig 3

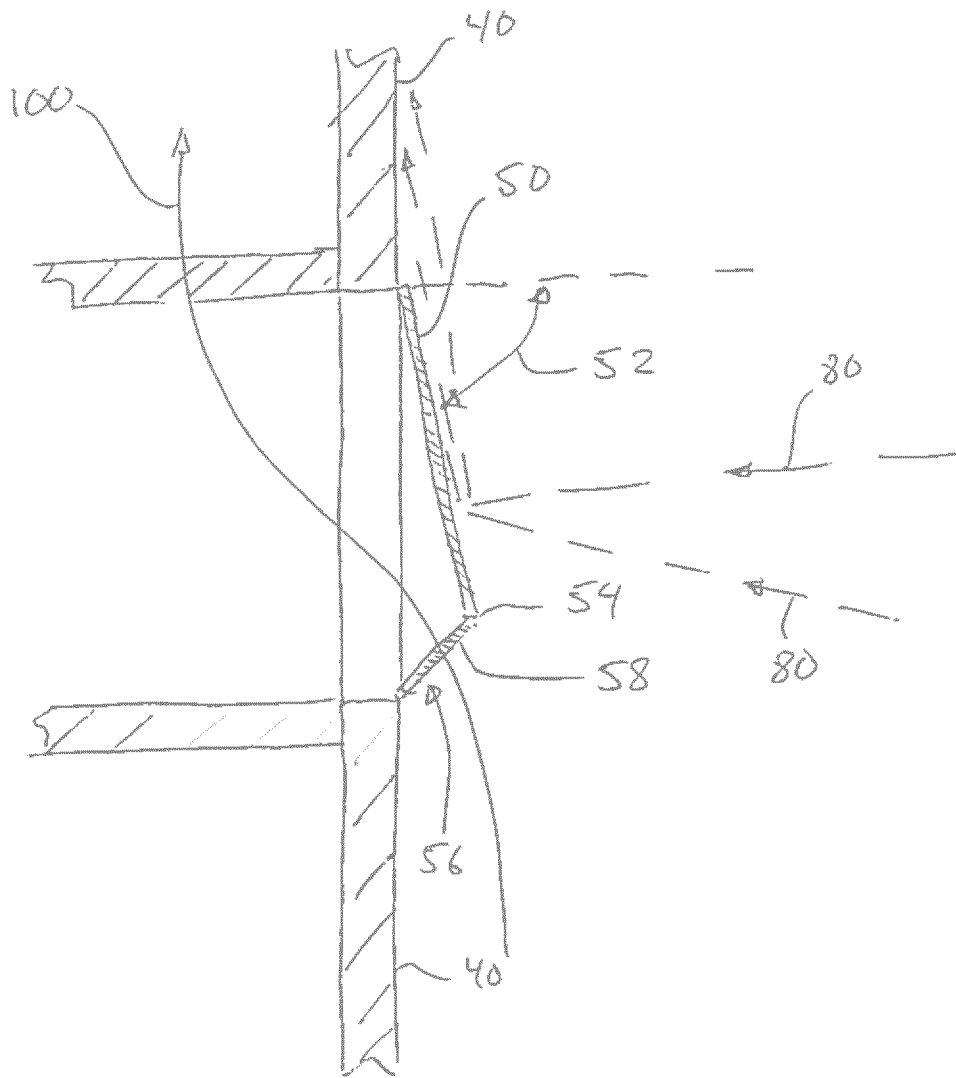


Fig. 4

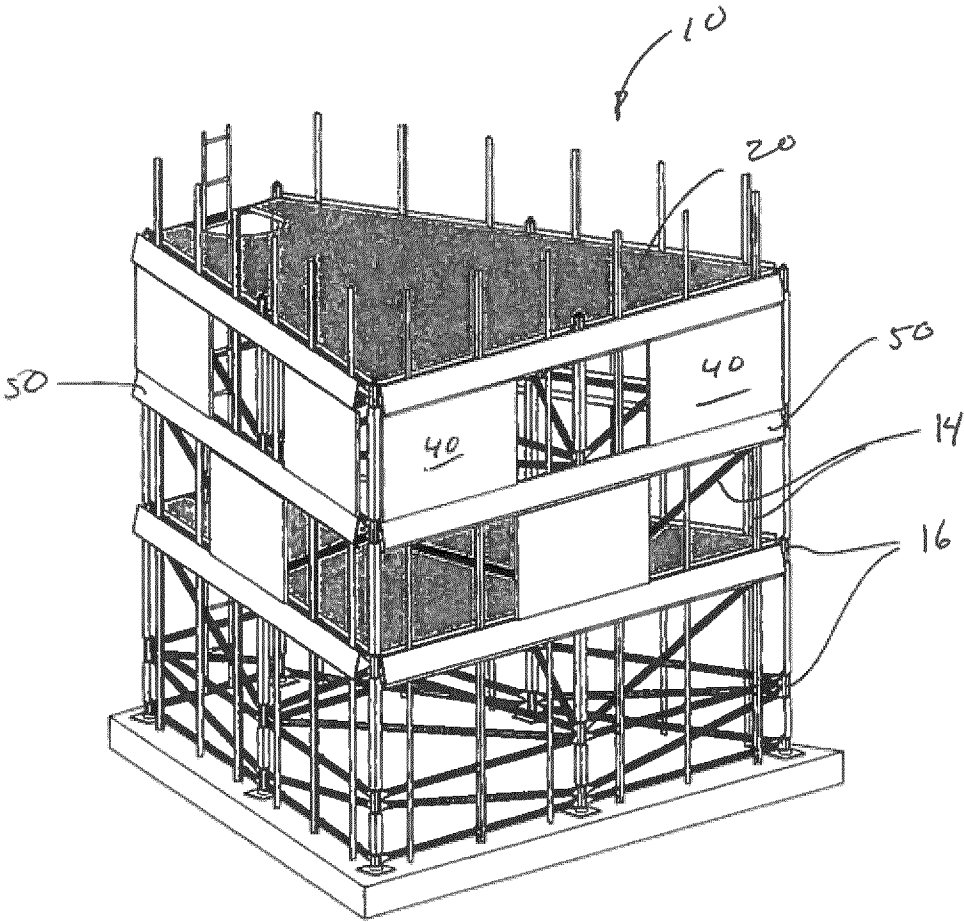


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CA2019/051358

A. CLASSIFICATION OF SUBJECT MATTER

IPC: *H02S 20/10* (2014.01), *E04H 12/00* (2006.01), *F24S 20/60* (2018.01), *F24S 23/77* (2018.01), *F24S 25/00* (2018.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H02S 20/10 (2014.01), *E04H 12/00* (2006.01), *F24S 20/60* (2018.01), *F24S 23/77* (2018.01), *F24S 25/00* (2018.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)

Questel-Orbit (Fampat) with key words, such as: solar, tower, floor, stories and panel

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 107542312 A (ZHANG, X. et al.) 5 January 2018 (05-01-2018) *fig. 1; page 2*	1, 3-5 and 9-10
X	CN 106049958 A (LU, R. Q.) 26 October 2016 (26-10-2016) *figs. 1-3; page 2*	1, 3-5 and 10
X	CN 206448597 U (LIANG, G. D.) 29 August 2017 (29-08-2017) * figs. 1-3; page 2*	1, 3-5 and 10

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* "A" "D" "E" "L" "O" "P"	Special categories of cited documents: document defining the general state of the art which is not considered to be of particular relevance document cited by the applicant in the international application earlier application or patent but published on or after the international filing date document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) document referring to an oral disclosure, use, exhibition or other means document published prior to the international filing date but later than the priority date claimed	"T" "X" "Y" "&"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art document member of the same patent family
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Date of the actual completion of the international search
25 May 2020 (25-05-2020)Date of mailing of the international search report
25 May 2020 (25-05-2020)Name and mailing address of the ISA/CA
Canadian Intellectual Property Office
Place du Portage I, C114 - 1st Floor, Box PCT
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Facsimile No.: 819-953-2476

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/CA2019/051358

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
CN 107542312 A	05 January 2018 (05-01-2018)	None	
CN 106049958 A	26 October 2016 (26-10-2016)	None	
CN 206448597 U	29 August 2017 (29-08-2017)	None	