SLW INSTITUTE
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Destination IP Virtual Summit

Patents in Construction: A Rooftop View*

* A Former Structural Engineer's Perspective

Before We Get Started...

Recording

A link to the recording and slides will be emailed to all registrants.

Questions

Type in the question box and we will answer in real time or during the Q&A.

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Follow us on LinkedIn or go to SLW Institute on slwip.com to see upcoming and on demand webinars.

Episode Overview

- Why Patent Construction Products?
- Survey of Patents in Construction
- Opportunities for Disruption

Brett Klein

Senior Attorney

Brett Klein is a registered patent attorney at Schwegman and works with independent inventors, small businesses, and large companies on issues of patentability, patent infringement, freedom-to-operate, IP due diligence, and strategic counseling. Brett received his bachelor's degree in Civil Engineering from Iowa State University in 1997 (B.S., with Distinction). After college, Brett practiced structural engineering for a flat-bottom and elevated tank manufacturer before moving into a consulting engineering position. In this position, Brett performed structural engineering design of buildings and industrial equipment and became a Licensed Engineer in the state of Minnesota.

Why Patent Construction Products?

Why Patent Construction Products?

Why Patent Construction Products?

Why Patent Construction Products?

Survey of Patents in Construction

Survey of Patents in Construction

- Modular Construction
  - Retaining Walls
  - ICF
  - Above Grade
- Component Manufacturing
- Wood Connectors
- Inspection
- Integration of Other Tech
- DIY

Survey of Patents in Construction

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Modular Construction – It's been around a while

Survey of Patents in Construction

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- DIY

Modular Construction – Keystone Retaining Walls

Photo Taken from https://www.keystonewalls.com/products/structural-retaining-walls/keygrid-keysystem-ii

Modular Construction – Keystone Retaining Walls

Photo Taken from https://www.keystonewalls.com/products/landscape-retaining-walls/verazzo-stone-wall

Modular Construction – Keystone Retaining Walls

Patents

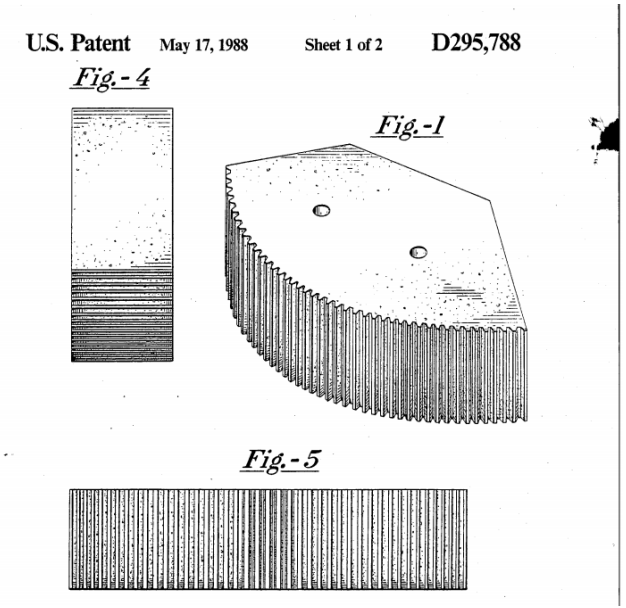
201 Patents and Design Patents extending from 1988 to present

60% Design Patents

40% Utility Patents

Modular Construction – Keystone Retaining Walls

First Design Patent in 1988



Modular Construction – Keystone Retaining Walls

More recent Design

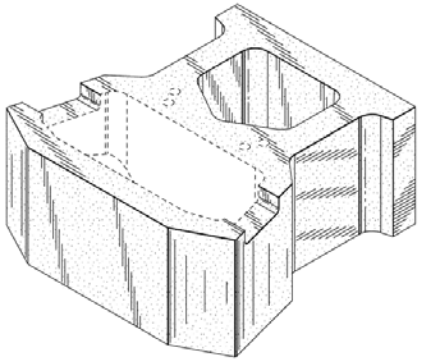


FIG. 1

Survey of Patents in Construction

- Modular Construction
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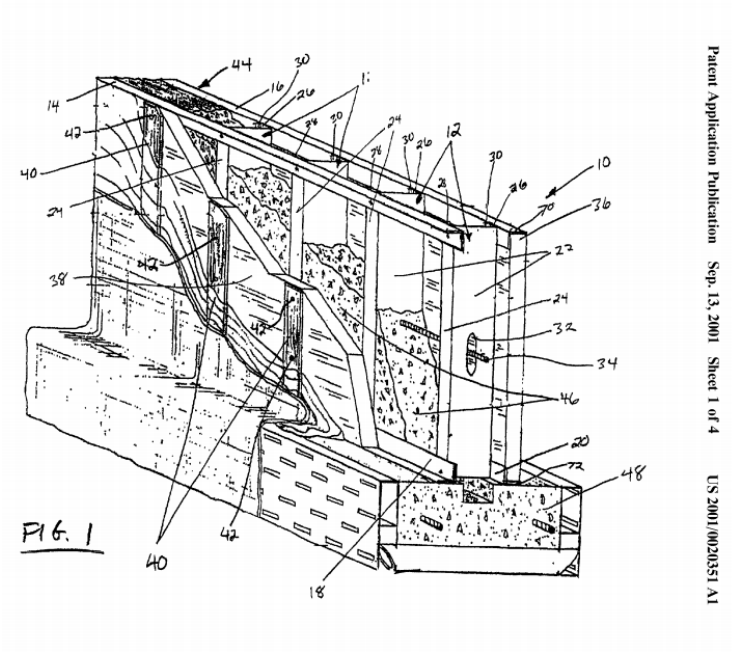
Modular Construction – Insulated Concrete Forms

2001



Modular Construction –Insulated Concrete Forms

2005

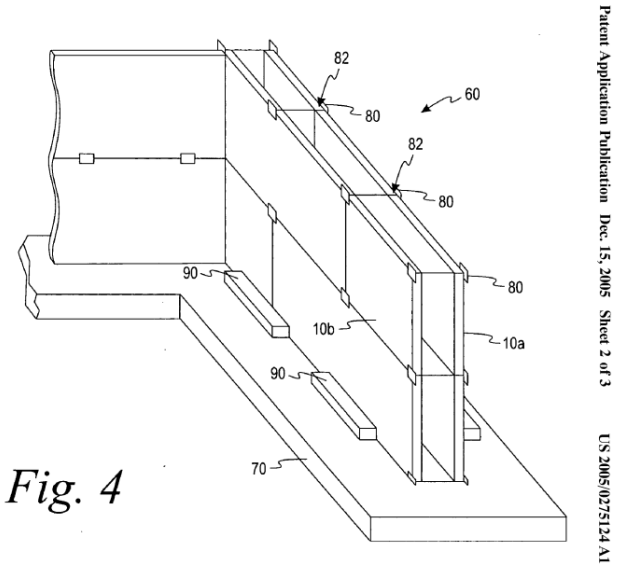


Fig. 4

Patent Application Publication Dec. 15, 2005 Sheet 2 of 3 US 2005/0275124 A1

Modular Construction –Insulated Concrete Forms

2006

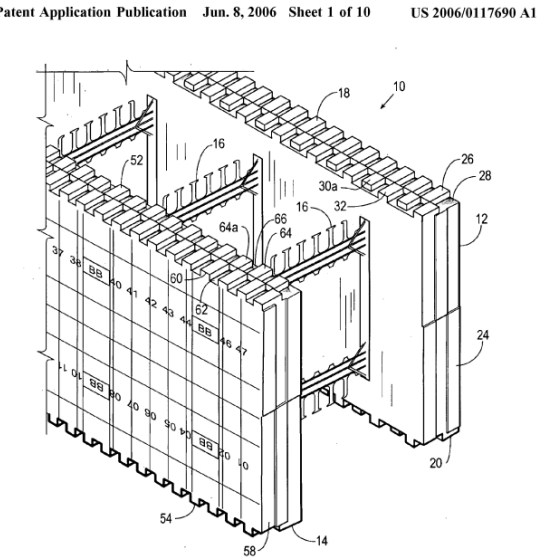


Fig. 1

Modular Construction – Insulated Concrete Forms

2007

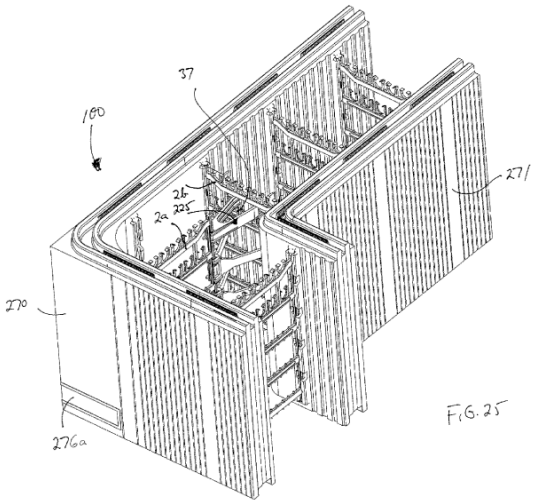
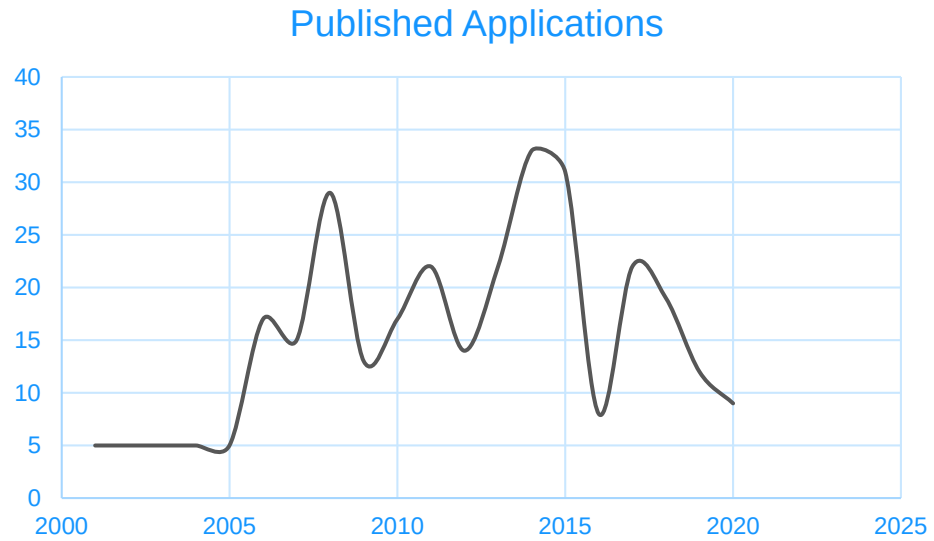


Fig. 25

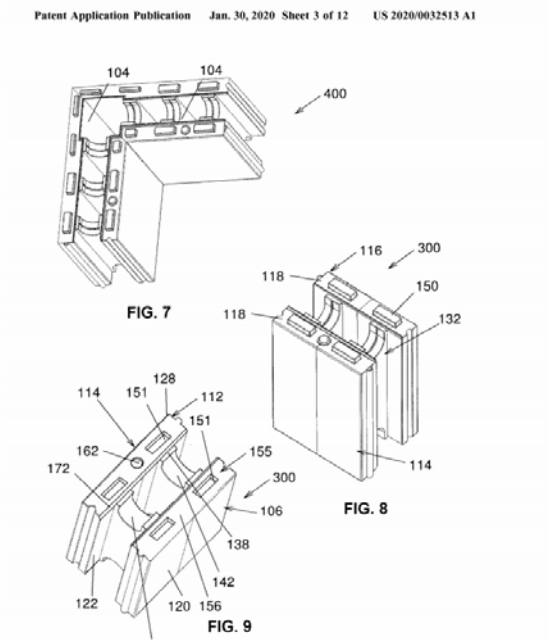
Patent Application Publication Dec. 27, 2007 Sheet 18 of 24 US 2007/0294970 A1

Modular Construction – Insulated Concrete Forms



Modular Construction – Insulated Concrete Forms

2020



Survey of Patents in Construction

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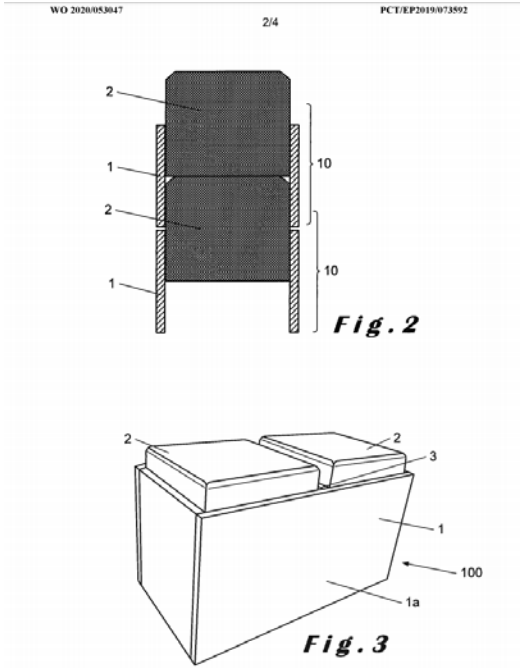
- DIY

Modular Construction – Above Ground

GABLOK

Modular Construction – Above Ground

2019



Modular Construction – Above Ground

ISR/WO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	DE 202007009654 U1 (KLB KLIMALEICHTBLOCK GMBH [DE]) 13 November 2008 (2008-11-13) paragraphs [0029] - [0035]; figures 1-3	1-4,6-8,10-12,14 9
X	AT 340640 B (EBENSEER BETONWERKE GMBH [AT]) 27 December 1977 (1977-12-27) page 3, line 35 - page 4, line 53; figures 1, 3	1-4,6-8,10-15
X	US 5349798 A (GROSS JEFFREY A [US]) 27 September 1994 (1994-09-27) abstract; figures 1-5	1,5
Y	US 3001602 A (TAYLOR ROBERT B) 26 September 1961 (1961-09-26) column 2, lines 25-31	9

Modular Construction – Above Ground

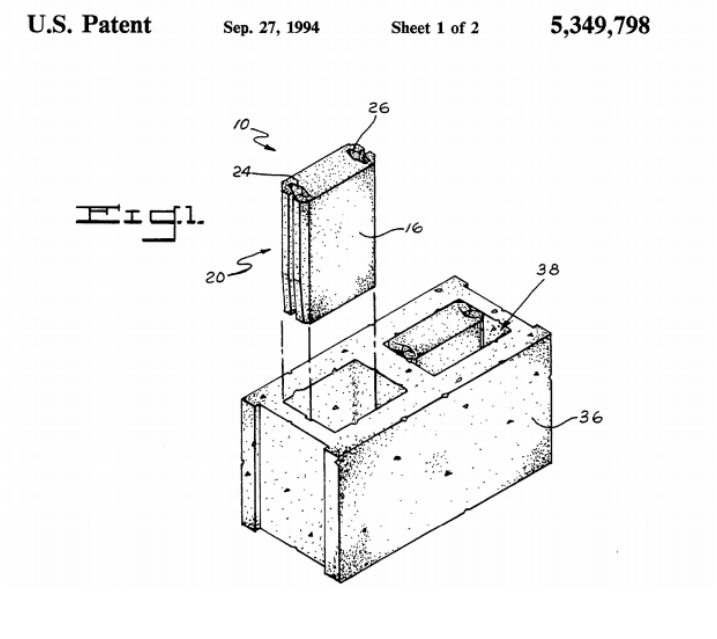
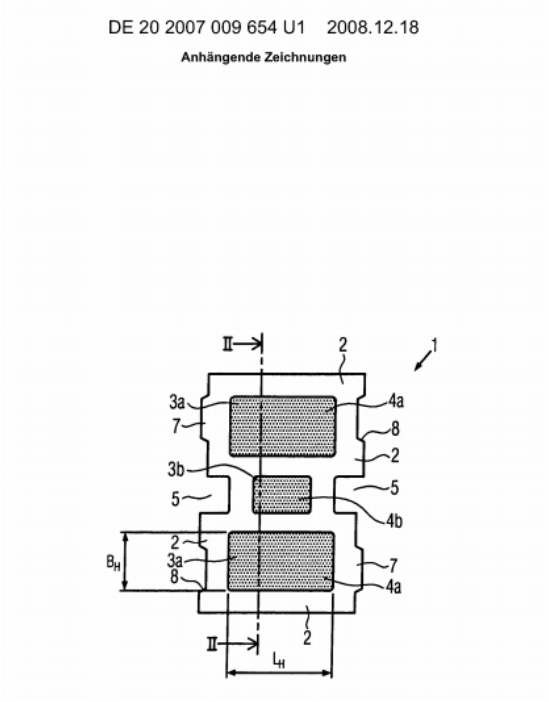

U.S. Patent Sep. 27, 1994 Sheet 1 of 2 5,349,798

Fig.1.


DE 20 2007 009 654 U1 2008.12.18

Anhängende Zeichnungen

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Component Manufacturing

Component Manufacturing

- Truly manufacturing focused
- Just in time manufacturing
- The technology is in the equipment

Component Manufacturing

WHAT DO YOU NEED TO MAKE A TRUSS?

Component Manufacturing

WHAT DO YOU NEED TO MAKE A TRUSS?

Lumber

Component Manufacturing

WHAT DO YOU NEED TO MAKE A TRUSS?

Lumber
Saw

Component Manufacturing

WHAT DO YOU NEED TO MAKE A TRUSS?

Lumber
Saw
Assembly

Component Manufacturing

Wood Picking

Component Manufacturing

Automated Saws

Component Manufacturing

Assembly

Component Manufacturing

Component Manufacturing

Material Handling
Material Delivery
Saws
Material Receiving
Arrangement – puck tables/laser tables
Presses

Component Manufacturing

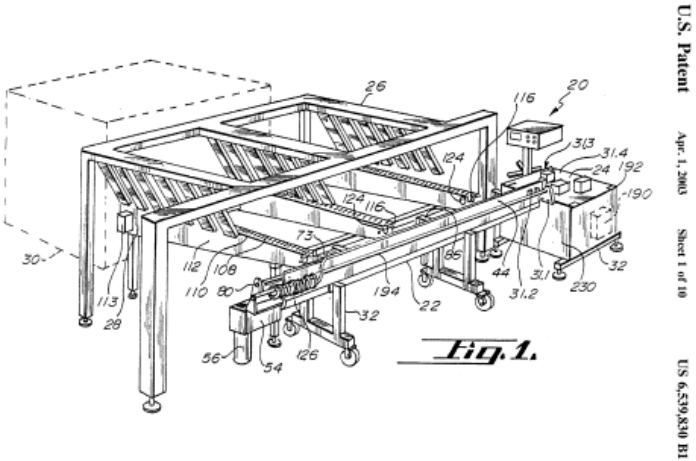

Fig. 1.

Component Manufacturing

Patents in this space focused on machinery and equipment for manufacturing

- a truss is a truss
- a wall is a wall

Technology almost solely in the manufacturing

Component Manufacturing

Other industries within an Industry

- Windows – Pella, Marvin, Anderson
- Plumbing – Sharkbite, etc.
- Electrical – Honeywell, Emerson, Siemens
- Concrete – World of Concrete
- But there is more to each product here

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Wood Connectors

Wood Connectors

- Joist Hangers
- Post bases
- Roof truss clips
- Lateral Force Resisting Systems for Wood
- Etc.

Wood Connectors – Simpson Strong-Tie

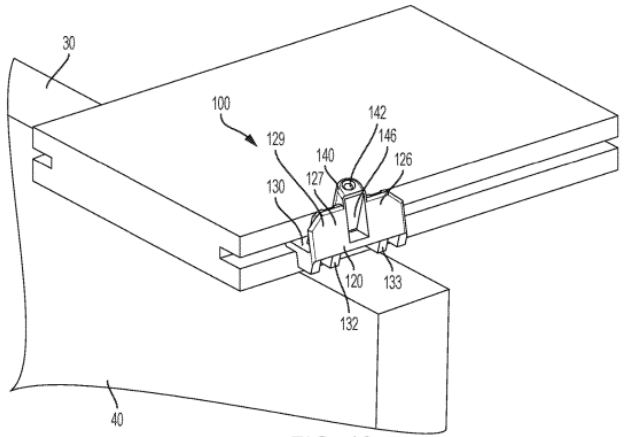


FIG. 13

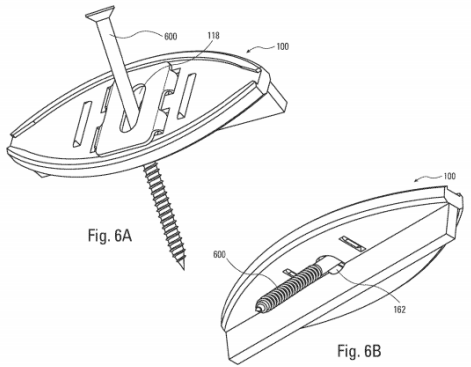


Fig. 6A

Fig. 6B

Patent Application Publication Apr. 18, 2019 Sheet 9 of 10 US 2019/0112802 A1

Wood Connectors?

Simpson Strong-Tie Appears to be branching out

Wood Connectors? – Simpson Strong-Tie

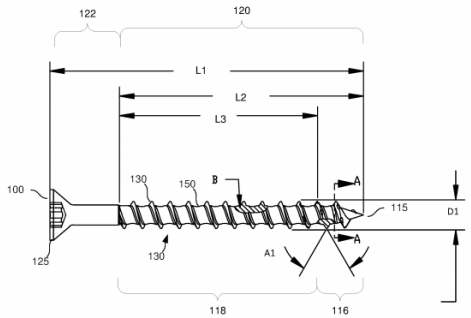


FIG. 1

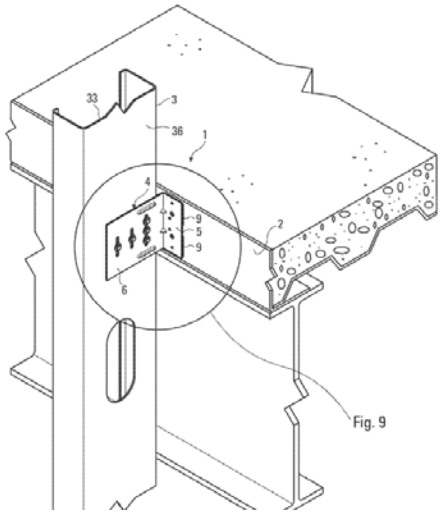
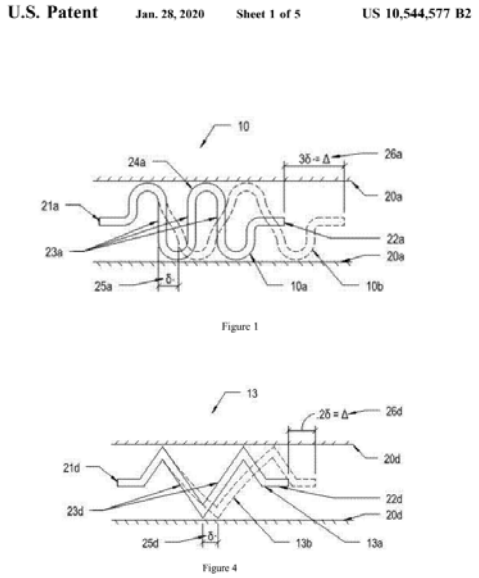
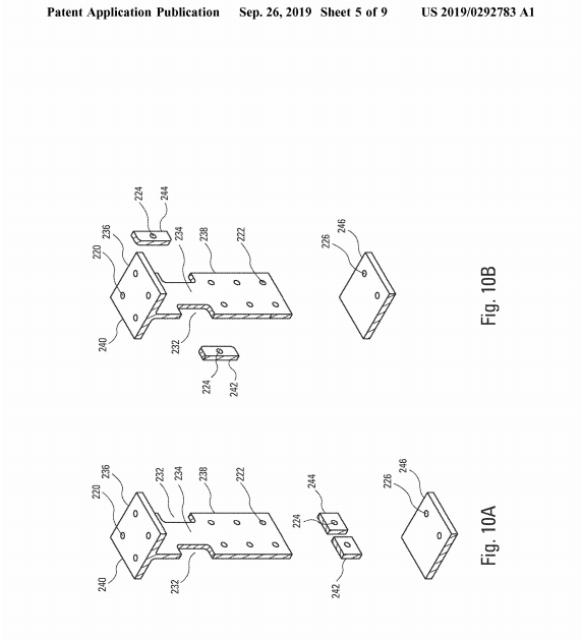
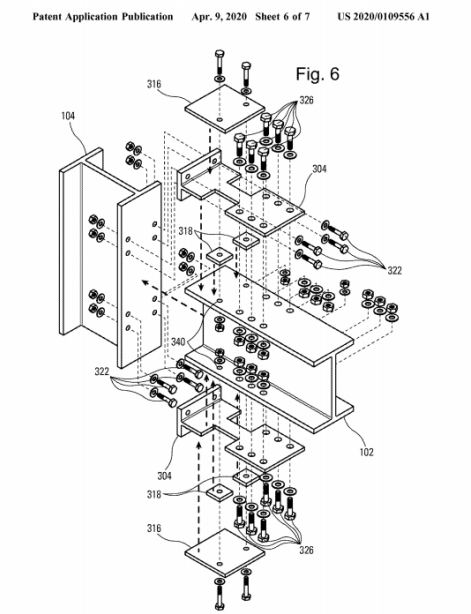


Fig. 9

Wood Connectors? – Simpson Strong-Tie







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Inspection

Inspection

Non-contacting monitor for bridges and civil structures
RDI Tech, Inc. 9704266 and 10521098

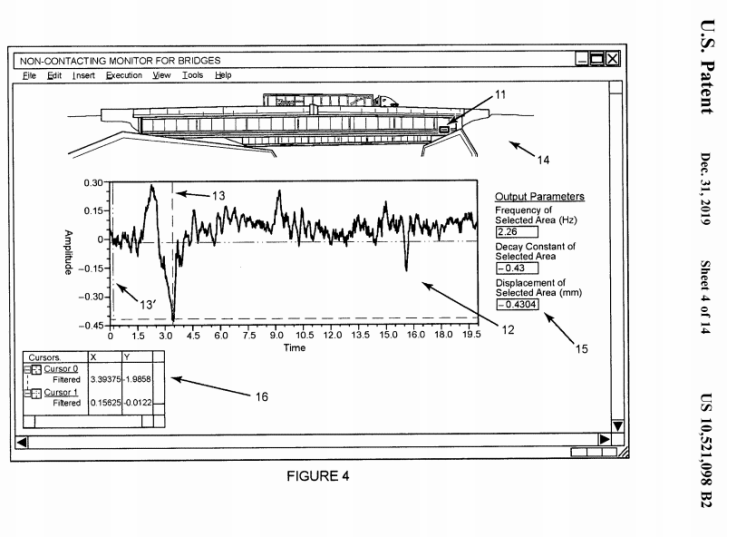


FIGURE 4

U.S. Patent Dec. 31, 2019 Sheet 4 of 14 US 10,521,098 B2

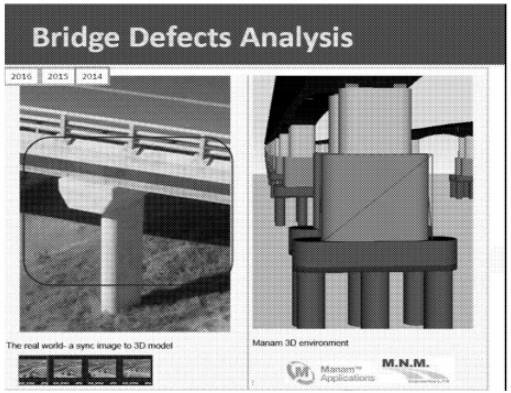


Fig. 8

Patent Application Publication Mar. 5, 2020 Sheet 8 of 12 US 2020/0074730 A1

Inspection
Pipe Inspections
Redzone Robotics, Inc. 9784599

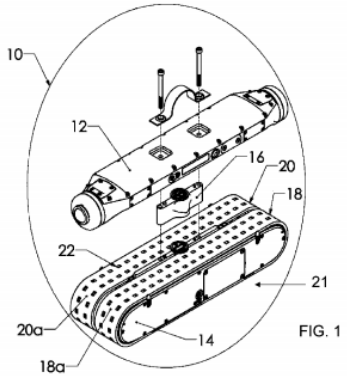


FIG. 1

U.S. Patent Oct. 10, 2017 Sheet 1 of 8 US 9,784,599 B1

Inspection

State Farm Insurance Co. – Litany of patents on structure inspection (laser scan, electromagnetic radiation, chemical detection,

Infrastructure Inspection
Panasonic, Inc.

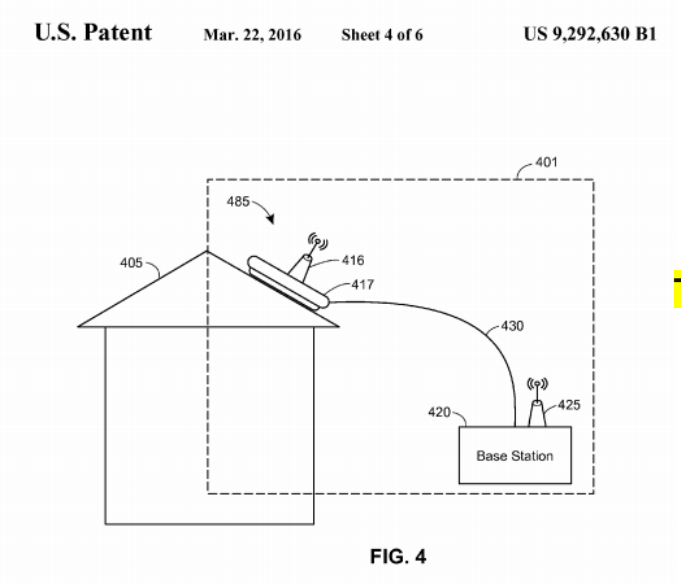
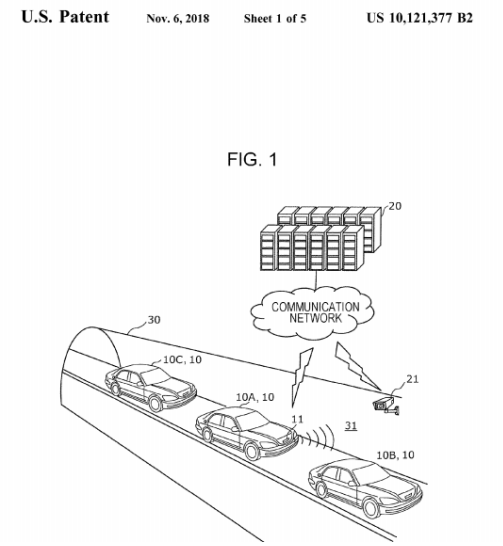


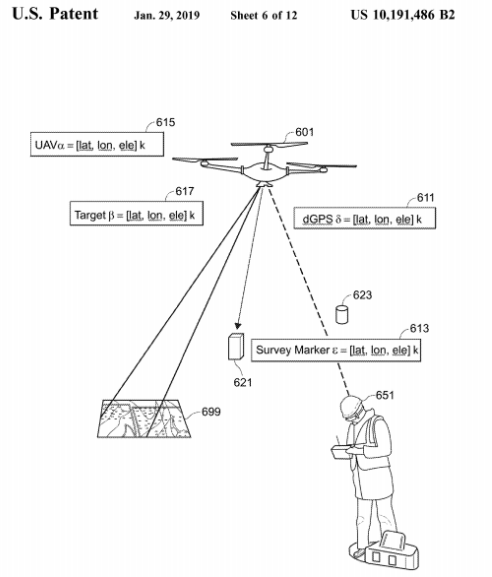
FIG. 4

Tethered or UAV

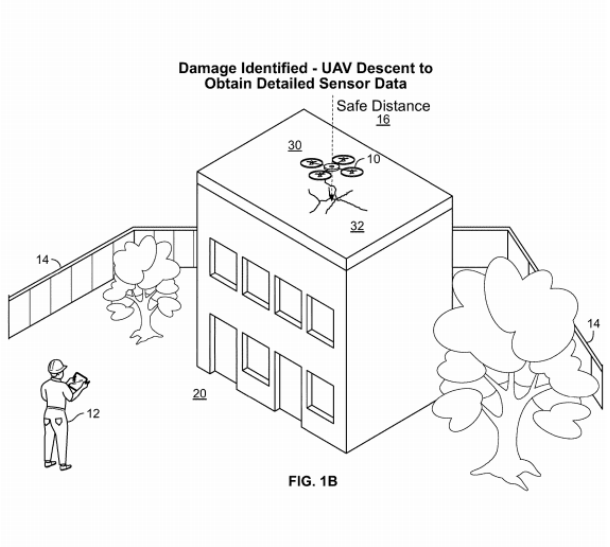


Inspection-UAV's

Unmanned Surveyor



Unmanned Aerial Vehicle Inspections
Unmanned Innovation, Inc.
UAV Rooftop Inspection System
9618940
9915946
10061470
9881213
9609288
10083616
9613538
9513635
9740200



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- Modular Construction
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- Wood Connectors
- Inspection
- Integration of Other Tech
- DIY

Integration of Other Tech

- UAV's
- Additive Manufacturing
- Virtual Reality

Integration of Other Tech - UAV's

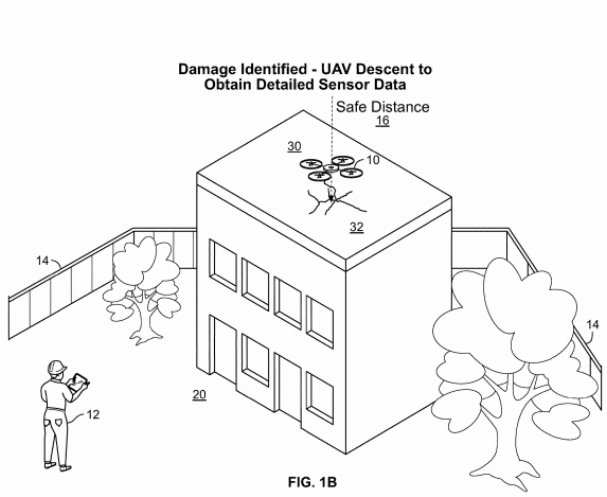


FIG. 1B

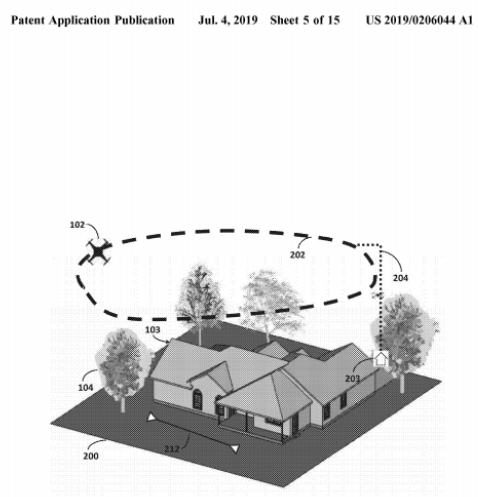
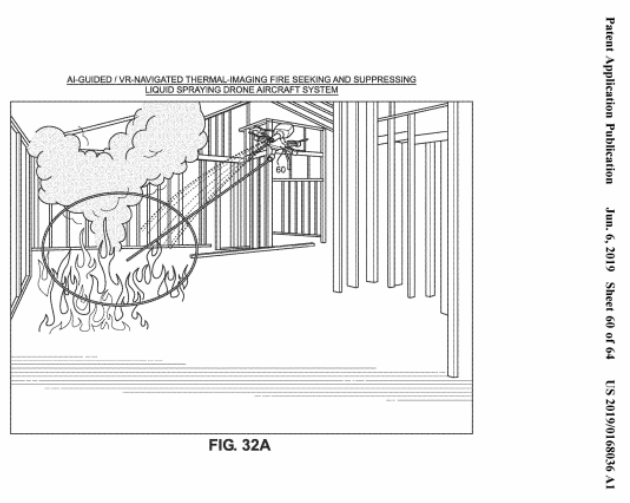
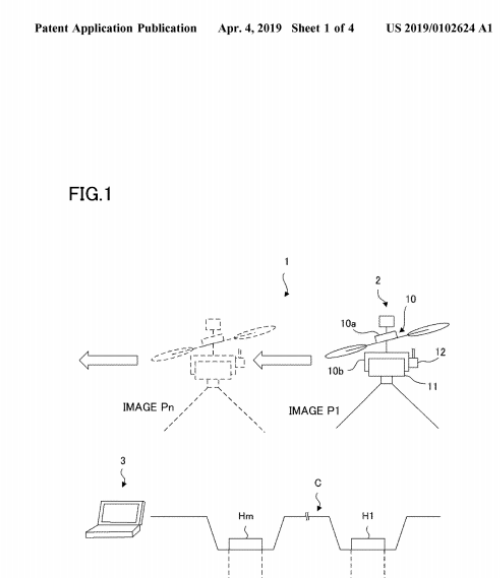


FIG. 2b

Integration of Other Tech - UAV's

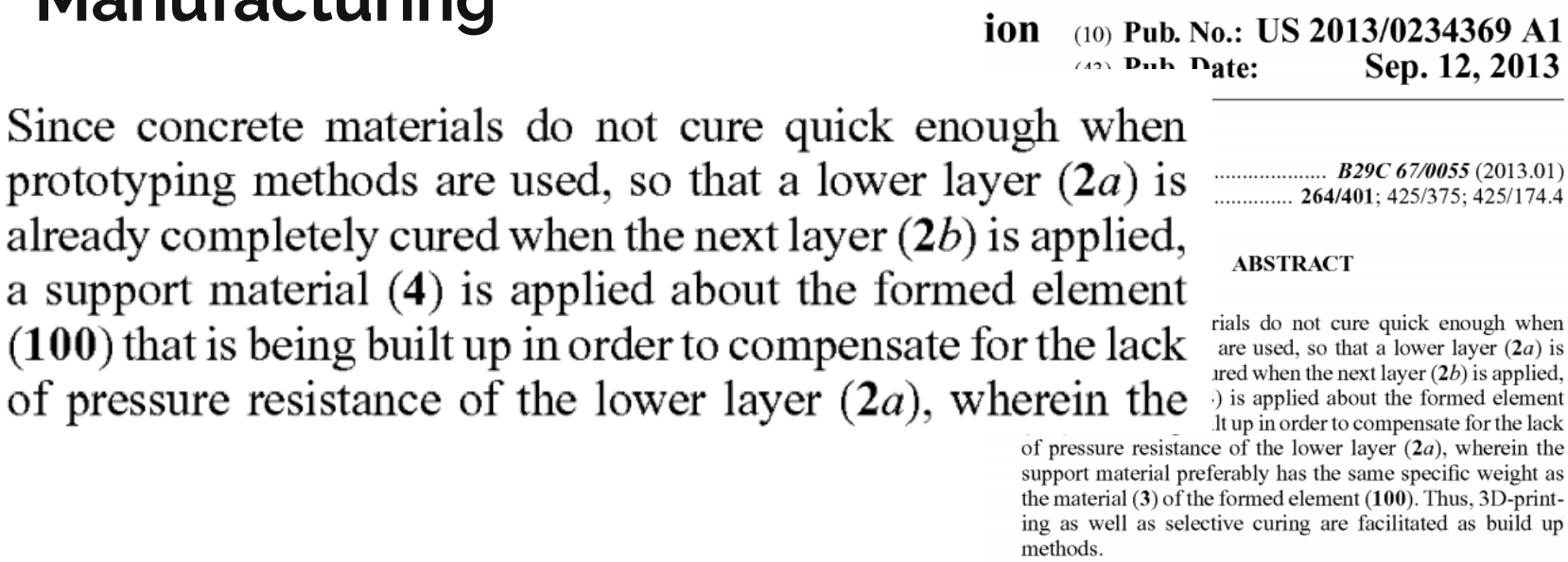




Integration of Other Tech

- UAV's
- Additive Manufacturing
- Virtual Reality

Integration of Other Tech – Additive Manufacturing



ion (10) Pub. No.: US 2013/0234369 A1
(43) Pub. Date: Sep. 12, 2013

..... *B29C 67/0055* (2013.01)
..... **264/401**; 425/375; 425/174.4

ABSTRACT

Since concrete materials do not cure quick enough when prototyping methods are used, so that a lower layer (**2***a*) is already completely cured when the next layer (**2***b*) is applied, a support material (**4**) is applied about the formed element (**100**) that is being built up in order to compensate for the lack of pressure resistance of the lower layer (**2***a*), wherein the support material preferably has the same specific weight as the material (**3**) of the formed element (**100**). Thus, 3D-printing as well as selective curing are facilitated as build up methods.

Integration of Other Tech – Additive Manufacturing

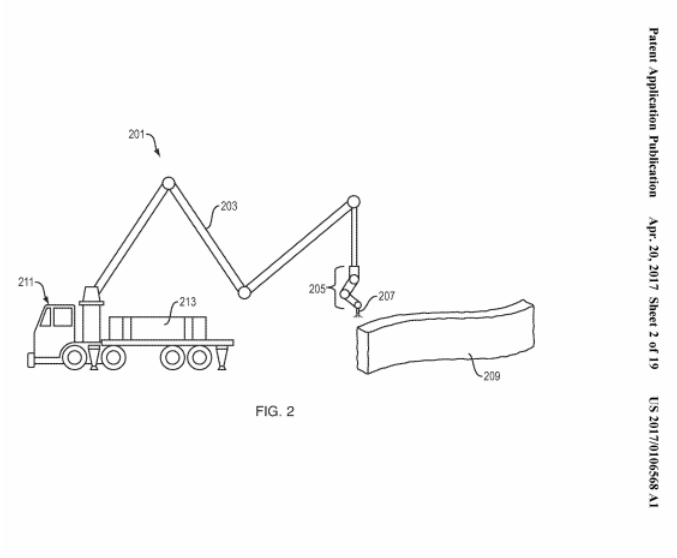


FIG. 2

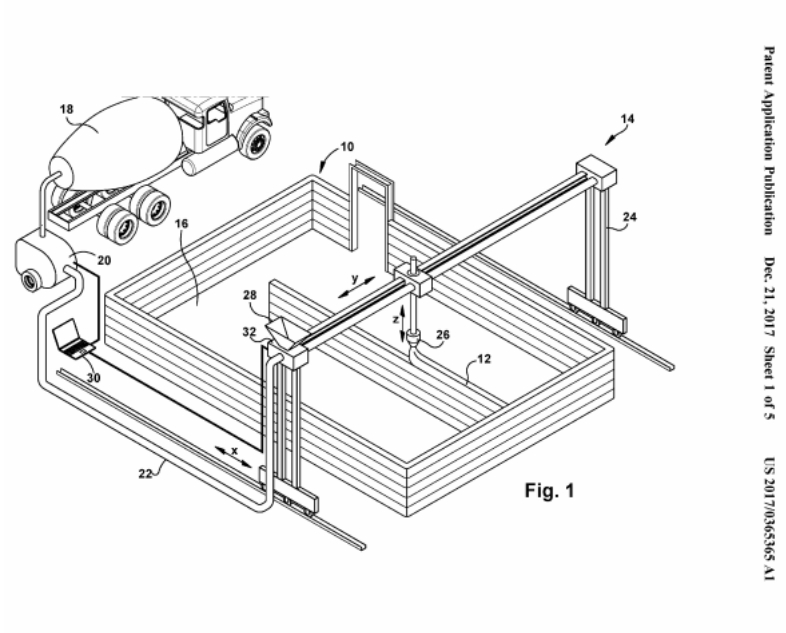


Fig. 1

Integration of Other Tech – Additive Manufacturing

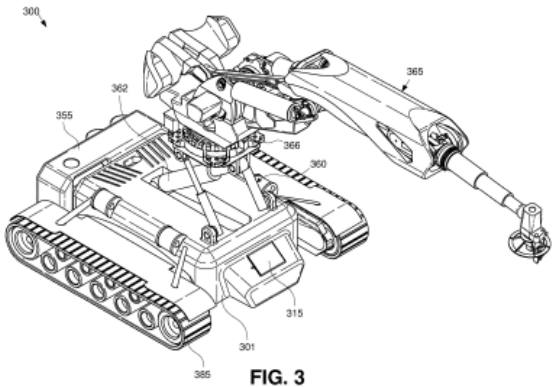


FIG. 3

Patent Application Publication Dec. 6, 2018 Sheet 3 of 10 US 2018/0345533 A1

Integration of Other Tech – Additive Manufacturing

4. The method of claim 3, wherein the 3D printer extrudes the composite material thread alongside a concrete material, the composite material thread remaining in a solid form during printing.

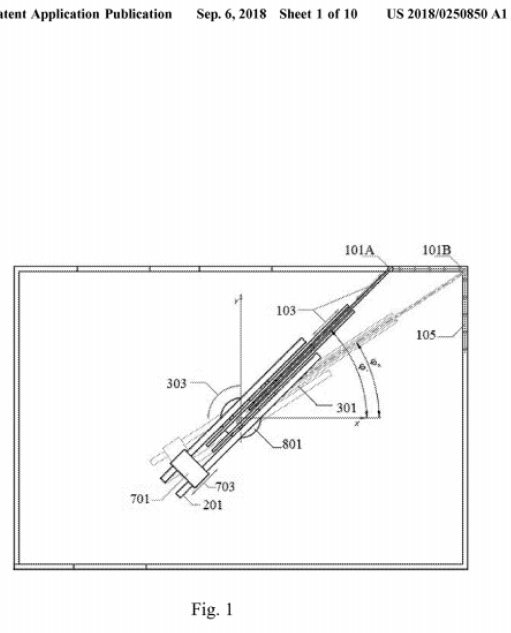


Fig. 1

Integration of Other Tech

- UAV's
- Additive Manufacturing
- Remote Control - Virtual Reality

Integration of Other Tech – Remote Control – Virtual Reality

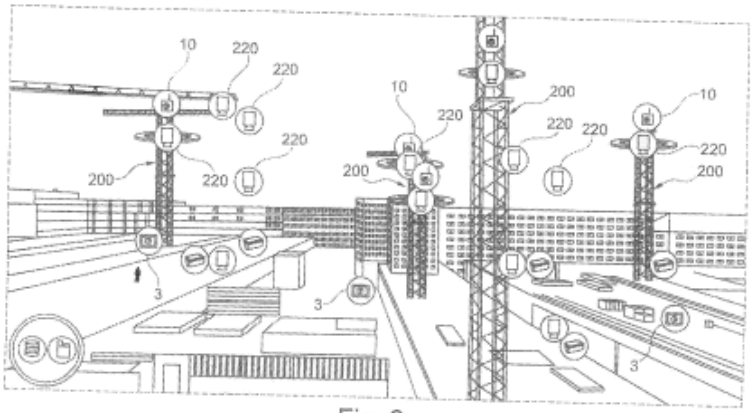


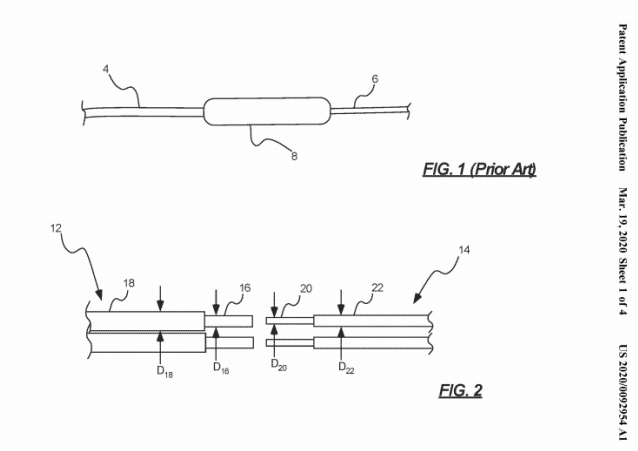
Fig. 6

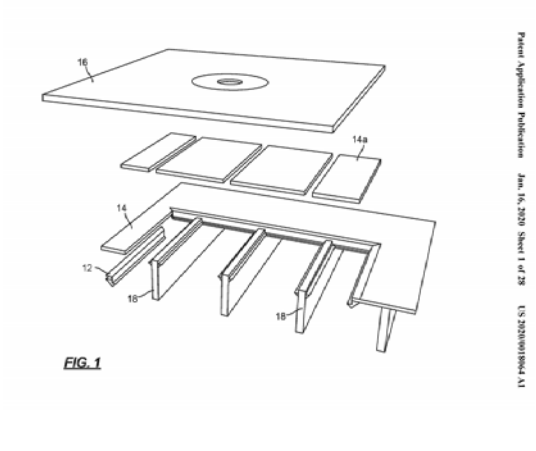
Patent Application Publication Sep. 19, 2019 Sheet 6 of 7 US 2019/0284027 A1

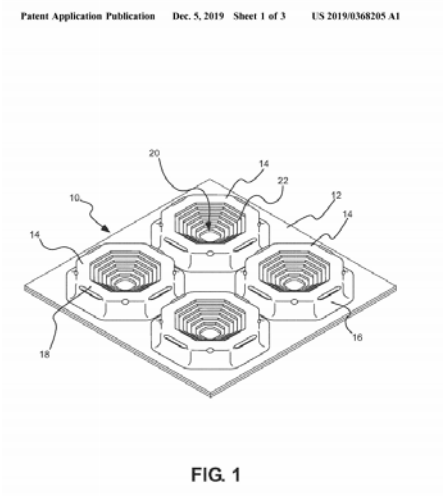
Survey of Patents in Construction

- Modular Construction
  - Retaining Walls
  - ICF
  - Above Grade
- Component Manufacturing
- Wood Connectors
- Inspection
- Integration of Other Tech
- DIY

DIY – Schluter Systems







DIY – Sharkbite – Push On Plumbing

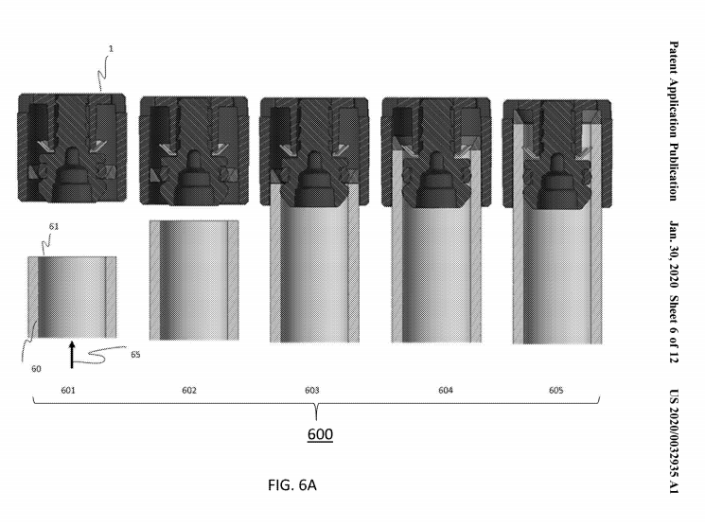


FIG. 6A

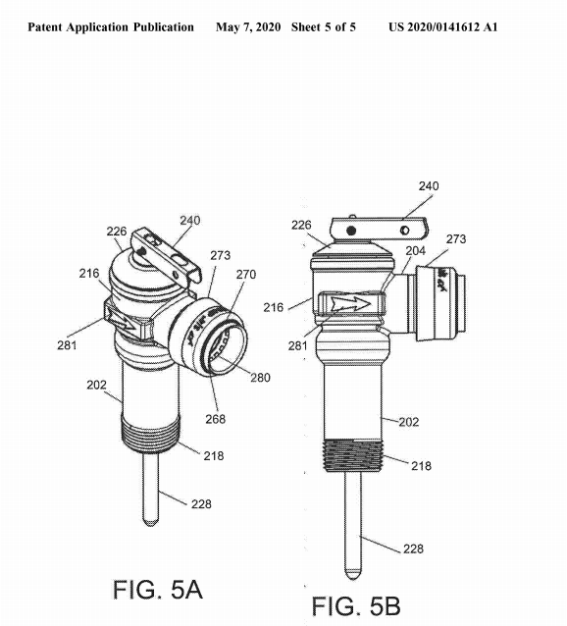


FIG. 5A FIG. 5B

DIY – Sharkbite – Push On Plumbing

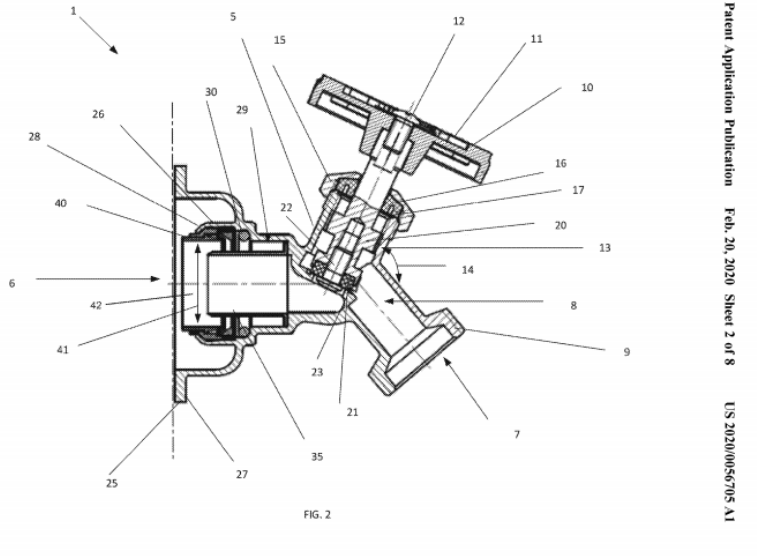


FIG. 2

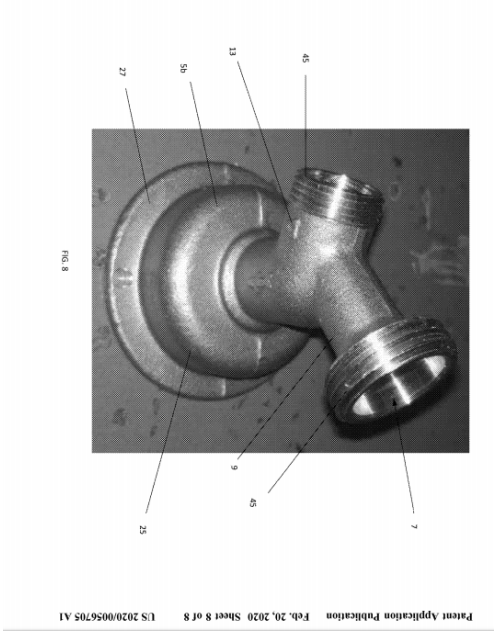


FIG. 8

Opportunities for Disruption

Opportunities for Disruption

Examples

Schluter Systems
Shark Bite

Opportunities for Disruption

Framing

Opportunities for Disruption

Drywall/Taping/Texturing

Opportunities for Disruption

Electrical Connections

Opportunities for Disruption

Air Conditioning

Opportunities for Disruption

Wall Color and/or Patterns

Thank You!

Thank you for your interest.

Questions?

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