PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2 EPAS ID: PAT6903365

SUBMISSION TYPE:	NEW ASSIGNMENT					
NATURE OF CONVEYANCE:	ASSIGNMENT					

CONVEYING PARTY DATA

Name	Execution Date
BRIAN E. BROOKS	03/12/2020
GILLES J. BENOIT	06/10/2020
PETER O. OLSON	03/12/2020
TYLER W. OLSON	03/12/2020
HIMANSHU NAYAR	06/11/2020
FREDERICK J. ARSENAULT	03/12/2020
NICHOLAS A. JOHNSON	06/15/2020
BRETT R. HEMES	06/17/2020
THOMAS J. STREY	03/12/2020
JONATHAN B. ARTHUR	06/10/2020
NATHAN J. HERBST	06/11/2020
AARON K. NIENABER	03/17/2020
SARAH M. MULLINS	03/12/2020
MARK W. ORLANDO	03/13/2020
CORY D. SAUER	03/23/2020
TIMOTHY J. CLEMENS	03/13/2020
SCOTT L. BARNETT	03/13/2020
ZACHARY M. SCHAEFFER	03/12/2020
PATRICK G. ZIMMERMAN	03/18/2020
GREGORY P. MORIARTY	03/12/2020
JEFFREY P. ADOLF	03/19/2020
STEVEN P. FLOEDER	03/20/2020
ANDREAS BACKES	03/18/2020
PETER J. SCHNEIDER	03/18/2020
MAUREEN A. KAVANAGH	07/27/2020
GLENN E. CASNER	03/24/2020
MIAODING DAI	03/17/2020
CHRISTOPHER M. BROWN	03/17/2020
LORI A. SJOLUND	03/17/2020
JON A. KIRSCHHOFFER	03/25/2020
CARTER C. HUGHES	03/17/2020

PATENT

REEL: 057435 FRAME: 0832

RECEIVING PARTY DATA

Name:	3M INNOVATIVE PROPERTIES COMPANY
Street Address:	P.O. BOX 33427
City:	SAINT PAUL
State/Country:	MINNESOTA
Postal Code:	55133-3427

PROPERTY NUMBERS Total: 1

Property Type	Number					
Application Number:	17436886					

CORRESPONDENCE DATA

Fax Number: (651)736-3833

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent

using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 651-733-1500 **Email:** pjbick@mmm.com

Correspondent Name: 3M INNOVATIVE PROPERTIES COMPANY

Address Line 1: P.O. BOX 33427

Address Line 4: SAINT PAUL, MINNESOTA 55133-3427

ATTORNEY DOCKET NUMBER:	82435US004
NAME OF SUBMITTER:	PAULA J. BICK
SIGNATURE:	/Paula J. Bick/
DATE SIGNED:	09/07/2021
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 31

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Case No:

82435US

The specification of which: sattached hereto; was filed on
was filed on as United States Application No. Si is identified as PCT International Application No.
as United States Application No. is identified as PCT International Application No. filed on October 3, 2019 The above-identified application was made or authorized to be made by me. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than 5 years, or both. In addition, for good and valuable consideration, receipt of which is acknowledged, I have agreed to assign and trans and do hereby assign and transfer unto the 3M INNOVATIVE PROPERTIES COMPANY, a wholly-owned subsidiary 3M COMPANY, and a corporation of Delaware, having its principal office at Saint Paul, Minnesota, its successors an assigns, the entire right, title, and interest in and to the said invention and application, and in and to any division or continuation (in whole or in part) of said application, and in and to any and all improvements in the said invention maby me or made jointly with others (provided any such improvement is made during, or within one year after the termination of, my employment with 3M COMPANY and any of its existing or future subsidiaries), and in and to any all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries fore thereto (including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in foreign countries in own name and to claim any priority rights for such foreign applications to which such applications are entitled under international conventions, treaties, or otherwise), which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon the said invention or improvements thereon, to be held and enjoyed as fully and exclusively as they would have been by me had this assignment and transfer not been made;
The above-identified application was made or authorized to be made by me. I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than 5 years, or both. In addition, for good and valuable consideration, receipt of which is acknowledged, I have agreed to assign and trans and do hereby assign and transfer unto the 3M INNOVATIVE PROPERTIES COMPANY, a wholly-owned subsidiary 3M COMPANY, and a corporation of Delaware, having its principal office at Saint Paul, Minnesota, its successors an assigns, the entire right, title, and interest in and to the said invention and application, and in and to any division or continuation (in whole or in part) of said application, and in and to any and all improvements in the said invention may me or made jointly with others (provided any such improvement is made during, or within one year after the termination of, my employment with 3M COMPANY and any of its existing or future subsidiaries), and in and to any all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries for hereto (including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in foreign countries in i own name and to claim any priority rights for such foreign applications to which such applications are entitled under international conventions, treaties, or otherwise), which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon the said invention or improvements thereon, to be held and enjoyed as fully and exclusively as they would have been by me had this assignment and transfer not been made; I do further agree for myself and for my heirs, executors, and administrators, to execute and deliver without further
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and do hereby assign and transfer unto the 3M INNOVATIVE PROPERTIES COMPANY, a wholly-owned subsidiary 3M COMPANY, and a corporation of Delaware, having its principal office at Saint Paul, Minnesota, its successors an assigns, the entire right, title, and interest in and to the said invention and application, and in and to any division or continuation (in whole or in part) of said application, and in and to any and all improvements in the said invention may be me or made jointly with others (provided any such improvement is made during, or within one year after the termination of, my employment with 3M COMPANY and any of its existing or future subsidiaries), and in and to any all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries fore thereto (including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in foreign countries in i own name and to claim any priority rights for such foreign applications to which such applications are entitled under international conventions, treaties, or otherwise), which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon the said invention or improvements thereon, to be held and enjoyed as fully and exclusively as they would have been by me had this assignment and transfer not been made;
consideration any further applications, assignments, and documents, and to perform such other acts as I lawfully ma
that may be deemed necessary by said Company, its successors, assigns, and nominees, fully to secure its right, titl and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and countries; and
I do hereby authorize and request the Commissioner of Patents to issue any and all Letters Patent which may be granted upon any of the said applications, to said 3M Innovative Properties Company, as the assignee of the entire r title, and interest therein.
Legal Name of Inventor:
Brian E. Brooks
Inventor's Signature: Date: 3/12/2026

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:

	Causal Models	
The specification of whic	ch:	
is attached hereto	· ,	
was filed on]
as United States A	Application No.	
☑ is identified as PCT International Application No.		PCT/IB2019/058428
filed on	October 3, 2019	

The above-identified application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than 5 years, or both.

In addition, for good and valuable consideration, receipt of which is acknowledged, I have agreed to assign and transfer and do hereby assign and transfer unto the 3M INNOVATIVE PROPERTIES COMPANY, a wholly-owned subsidiary of 3M COMPANY, and a corporation of Delaware, having its principal office at Saint Paul, Minnesota, its successors and assigns, the entire right, title, and interest in and to the said invention and application, and in and to any division or continuation (in whole or in part) of said application, and in and to any and all improvements in the said invention made by me or made jointly with others (provided any such improvement is made during, or within one year after the termination of, my employment with 3M COMPANY and any of its existing or future subsidiaries), and in and to any and all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries foreign thereto (including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in foreign countries in its own name and to claim any priority rights for such foreign applications to which such applications are entitled under international conventions, treaties, or otherwise), which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon the said invention or improvements thereon, to be held and enjoyed as fully and exclusively as they would have been by me had this assignment and transfer not been made;

I do further agree for myself and for my heirs, executors, and administrators, to execute and deliver without further consideration any further applications, assignments, and documents, and to perform such other acts as I lawfully may, that may be deemed necessary by said Company, its successors, assigns, and nominees, fully to secure its right, title, and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all countries; and

Legal Name of Inventor:			
Gilles J. Benoit			
Inventor's Signature:	Date:	10 -	2020

countries; and

Case No:

82435US

application and for which a patent is sought on the invention entitled:	iginal joint inventor of a claimed invention in the
Manufacturing a Product Using (Causal Models
The specification of which:	
is attached hereto;	
was filed on as United States Application No.	
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428
The above-identified application was made or authorized to be made by	me.
I hereby acknowledge that any willful false statement made in this decla fine or imprisonment of not more than 5 years, or both.	ration is punishable under 18 U.S.C. 1001 by
In addition, for good and valuable consideration, receipt of which is acknown and do hereby assign and transfer unto the 3M INNOVATIVE PROPER 3M COMPANY, and a corporation of Delaware, having its principal office assigns, the entire right, title, and interest in and to the said invention an continuation (in whole or in part) of said application, and in and to any at by me or made jointly with others (provided any such improvement is matermination of, my employment with 3M COMPANY and any of its existing all Letters Patent, reexaminations, reissues, or extensions thereof, of the thereto (including the right to apply for Letters Patent, Utility Models, or I own name and to claim any priority rights for such foreign applications to international conventions, treaties, or otherwise), which have been or material upon the said invention or improvements thereon, to be held and enhave been by me had this assignment and transfer not been made;	TIES COMPANY, a wholly-owned subsidiary of e at Saint Paul, Minnesota, its successors and ad application, and in and to any division or all improvements in the said invention made ade during, or within one year after the ag or future subsidiaries), and in and to any and a United States of America and countries foreign Inventors' Certificates in foreign countries in its owhich such applications are entitled under ay be granted thereon or on any divisional, her or further application based in whole or in anjoyed as fully and exclusively as they would
I do further agree for myself and for my heirs, executors, and administra consideration any further applications, assignments, and documents, an that may be deemed necessary by said Company, its successors, assig	nd to perform such other acts as I lawfully may,

granted upon any of the said applications, to said 3M Innovative Properties Company, as the assignee of the entire right, title, and interest therein.

and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all

I do hereby authorize and request the Commissioner of Patents to issue any and all Letters Patent which may be

Legal Name of Inventor:	
Peter O. Olson	
Inventor's Signature:	Date:
Von	3/12/2020

Case No:

82435US

As a	below	named	inventor,	I believe I	l am an	original	inventor	or an	original	joint	inventor	of a c	laimed	invention	in the
				atent is so						-					

Manufacturing a Produc	ct Using Causal Models
The specification of which:	
is attached hereto;	
was filed on as United States Application No.	
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428
The above-identified application was made or authorized to	be made by me.
hereby acknowledge that any willful false statement made fine or imprisonment of not more than 5 years, or both.	in this declaration is punishable under 18 U.S.C. 1001 by
and do hereby assign and transfer unto the 3M INNOVATIV 3M COMPANY, and a corporation of Delaware, having its pressigns, the entire right, title, and interest in and to the said continuation (in whole or in part) of said application, and in a coy me or made jointly with others (provided any such improvementation of, my employment with 3M COMPANY and any all Letters Patent, reexaminations, reissues, or extensions the thereto (including the right to apply for Letters Patent, Utility own name and to claim any priority rights for such foreign and international conventions, treaties, or otherwise), which have continuation (in whole or in part), renewal, reexamination, repart upon the said invention or improvements thereon, to be have been by me had this assignment and transfer not been	rincipal office at Saint Paul, Minnesota, its successors and invention and application, and in and to any division or and to any and all improvements in the said invention made vement is made during, or within one year after the y of its existing or future subsidiaries), and in and to any and hereof, of the United States of America and countries foreign Models, or Inventors' Certificates in foreign countries in its pplications to which such applications are entitled under e been or may be granted thereon or on any divisional, eissue, or other or further application based in whole or in the held and enjoyed as fully and exclusively as they would
do further agree for myself and for my heirs, executors, and consideration any further applications, assignments, and do that may be deemed necessary by said Company, its succe and interest as aforesaid and to obtain or maintain Letters Popularies; and	cuments, and to perform such other acts as I lawfully may,
do hereby authorize and request the Commissioner of Pate granted upon any of the said applications, to said 3M Innova title, and interest therein.	
Legal Name of Inventor: Tyler W. Olson	
Inventor's Signature:	Date:
7222	3/12/20

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:

Manufacturing a Product Using Causal Models				
he specification of which:				
is attached hereto;				
was filed on as United States Application No.				
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428			

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I do further agree for myself and for my heirs, executors, and administrators, to execute and deliver without further consideration any further applications, assignments, and documents, and to perform such other acts as I lawfully may, that may be deemed necessary by said Company, its successors, assigns, and nominees, fully to secure its right, title, and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all countries; and

Legal Name of Inventor:	
Himanshu Nayar	
Inventor's Signature: /Himanshu Nayar/	Date: 6/11/2020

Case No:

82435US

As	a below	named	inventor,	I believe	l am an	original	inventor	or an	original	joint	inventor	of a claimed	l invention	in the
				atent is so						•				

Manufacturing a Product Using Causal Models					
The specification of which: is attached hereto;					
was filed on as United States Application No.					
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428				

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I do hereby authorize and request the Commissioner of Patents to issue any and all Letters Patent which may be granted upon any of the said applications, to said 3M Innovative Properties Company, as the assignee of the entire right, title, and interest therein.

Legal Name of Inventor:	
Frederick J. Arsenault	
Inventor's Signature:	3-12-2020

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:

Manufacturing a Product Using C	ausal Models
The specification of which: is attached hereto;	
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Legal Name of Inventor:	
Nicholas A. Johnson	
Inventor's Signature:	Date:
for in for	6/15/2020

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:

Manufacturing a Product U	sing Causal Models
The specification of which:	
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is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428

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Legal Name of Inventor:		
Brett R. Hemes		
Inventor's Signature:	Date:	-
	06/14/202	

Case No:

82435US

8	Manufacturing a Produc	ct Using Causal Models
The specification of which:		
is attached hereto;		
☐ was filed onas United States Applica	tion No.	
is identified as PCT Interfiled on Octo	national Application No. iber 3, 2019	PCT/IB2019/058428
The above-identified applicatio	n was made or authorized to	be made by ms.
I hereby acknowledge that any fine or imprisonment of not mo		in this declaration is punishable under 18 U.S.C. 1001 by
and do hereby assign and trans 3M COMPANY, and a corporat assigns, the entire right, title, a continuation (in whole or in par by me or made jointly with othe termination of, my employment all Letters Patent, reexamination thereto (including the right to allow name and to claim any printernational conventions, treat continuation (in whole or in par	sfer unto the 3M INNOVATIVI tion of Delaware, having its pr nd interest in and to the said i t) of said application, and in a ers (provided any such improv i with 3M COMPANY and any ons, reissues, or extensions th pply for Letters Patent, Utility ority rights for such foreign ap ies, or otherwise), which have t), renewal, reexamination, re improvements thereon, to be	which is acknowledged. I have agreed to assign and transfer /E PROPERTIES COMPANY, a wholly-owned subsidiary of rincipal office at Saint Paul, Minnesota, its successors and invention and application, and in and to any division or and to any and all improvements in the said invention made vement is made during, or within one year after the y of its existing or future subsidiaries), and in and to any and hereof, of the United States of America and countries foreign Models, or Inventors' Certificates in foreign countries in its pplications to which such applications are entitled under e been or may be granted thereon or on any divisional, aissue, or other or further application based in whole or in a held and enjoyed as fully and exclusively as they would in made;
consideration any further applic that may be deemed necessar	cations, assignments, and doo y by said Company, its succe	ed administrators, to execute and deliver without further scuments, and to perform such other acts as I lawfully may, assors, assigns, and nominees, fully to secure its right, title, Patent, Utility Models, or Inventors' Certificates in any and all
		ents to issue any and all Letters Patent which may be ative Properties Company, as the assignee of the entire right
Legal Name of Inventor:		
Thomas J. Strey		
Inventor's Signature:		Date: 3/12/20

Inventor's Signature:

/Jonathan Bement Arthur/

Case No:	82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:

Manufacturing a Product Using Causal Models		
The specification of whic	ch:	
is attached here	eto;	was filed on as
☐ United States		was med on as
Application No.		
is identified as PCT International	October 3, 2019	PCT/IB2019/058428
Application No. filed on	00.000.0, 20.0	
The above-identified applic	cation was made or authorized to be made by me.	
l hereby acknowledge that imprisonment of not more t	any willful false statement made in this declaration is $\mathfrak p$ than 5 years, or both.	ounishable under 18 U.S.C. 1001 by fine or
hereby assign and transfer corporation of Delaware, hinterest in and to the said in and in and to any and all in its made during, or within or subsidiaries), and in and to America and countries fore countries in its own name a international conventions, twhole or in part), renewal,	aluable consideration, receipt of which is acknowledged runto the 3M INNOVATIVE PROPERTIES COMPANY aving its principal office at Saint Paul, Minnesota, its sunvention and application, and in and to any division or improvements in the said invention made by me or mad ne year after the termination of, my employment with 3 or any and all Letters Patent, reexaminations, reissues, eign thereto (including the right to apply for Letters Patent to claim any priority rights for such foreign application and to claim any priority rights for such foreign application are reexamination, reissue, or other or further application are held and enjoyed as fully and exclusively as they we	i, a wholly-owned subsidiary of 3M COMPANY, and a uccessors and assigns, the entire right, title, and continuation (in whole or in part) of said application, e jointly with others (provided any such improvemen M COMPANY and any of its existing or future or extensions thereof, of the United States of ent, Utility Models, or Inventors' Certificates in foreignions to which such applications are entitled under need thereon or on any divisional, continuation (in passed in whole or in part upon the said invention or
further applications, assign by said Company, its succ	If and for my heirs, executors, and administrators, to examents, and documents, and to perform such other actessors, assigns, and nominees, fully to secure its right, tility Models, or Inventors' Certificates in any and all controls.	s as I lawfully may, that may be deemed necessary title, and interest as aforesaid and to obtain or
-	request the Commissioner of Patents to issue any and aid 3M Innovative Properties Company, as the assigned	
Legal Name of Inventor:		
Jonathan B. Arthur		

Date:

06/10/20

Case No:

82435US

application and for which a patent is sought on the inventio	
	ıct Using Causal Models
The specification of which:	
is attached hereto;	
was filed on	
as United States Application No.	
is identified as PCT International Application No.	PCT/IB2019/058428
filed on October 3, 2019	
The above-identified application was made or authorized to	be made by me.
I hereby acknowledge that any willful false statement made fine or imprisonment of not more than 5 years, or both.	in this declaration is punishable under 18 U.S.C. 1001 by
and do hereby assign and transfer unto the 3M INNOVATIV 3M COMPANY, and a corporation of Delaware, having its passigns, the entire right, title, and interest in and to the said continuation (in whole or in part) of said application, and in by me or made jointly with others (provided any such improtermination of, my employment with 3M COMPANY and an all Letters Patent, reexaminations, reissues, or extensions thereto (including the right to apply for Letters Patent, Utility own name and to claim any priority rights for such foreign a international conventions, treaties, or otherwise), which have continuation (in whole or in part), renewal, reexamination, repart upon the said invention or improvements thereon, to be have been by me had this assignment and transfer not bee.	and to any and all improvements in the said invention made vement is made during, or within one year after the y of its existing or future subsidiaries), and in and to any and thereof, of the United States of America and countries foreign Models, or Inventors' Certificates in foreign countries in its pplications to which such applications are entitled under the been or may be granted thereon or on any divisional, elissue, or other or further application based in whole or in the held and enjoyed as fully and exclusively as they would no made;
consideration any further applications, assignments, and do that may be deemed necessary by said Company, its succe	cuments, and to perform such other acts as I lawfully may
I do hereby authorize and request the Commissioner of Pat granted upon any of the said applications, to said 3M Innovititle, and interest therein.	ents to issue any and all Letters Patent which may be ative Properties Company, as the assignee of the entire right,
Legal Name of Inventor:	
Nathan J. Herbst	
Inventor's Signature:	Date:
	Jue 11, 2020

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:	
Manufacturing a Product Using Causal Models	
The specification of which:	
is attached hereto;	
was filed on as United States Application No.	
⊠ is identified as PCT International Application No.	PCT/IB2019/058428

The above-identified application was made or authorized to be made by me.

October 3, 2019

filed on

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than 5 years, or both.

In addition, for good and valuable consideration, receipt of which is acknowledged, I have agreed to assign and transfer and do hereby assign and transfer unto the 3M INNOVATIVE PROPERTIES COMPANY, a wholly-owned subsidiary of 3M COMPANY, and a corporation of Delaware, having its principal office at Saint Paul, Minnesota, its successors and assigns, the entire right, title, and interest in and to the said invention and application, and in and to any division or continuation (in whole or in part) of said application, and in and to any and all improvements in the said invention made by me or made jointly with others (provided any such improvement is made during, or within one year after the termination of, my employment with 3M COMPANY and any of its existing or future subsidiaries), and in and to any and all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries foreign thereto (including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in foreign countries in its own name and to claim any priority rights for such foreign applications to which such applications are entitled under international conventions, treaties, or otherwise), which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon the said invention or improvements thereon, to be held and enjoyed as fully and exclusively as they would have been by me had this assignment and transfer not been made;

I do further agree for myself and for my heirs, executors, and administrators, to execute and deliver without further consideration any further applications, assignments, and documents, and to perform such other acts as I lawfully may, that may be deemed necessary by said Company, its successors, assigns, and nominees, fully to secure its right, title, and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all countries; and

Legal Name of Inventor:	
Aaron K. Nienaber	
Inventor's Signature:	Date: 3/17/2020

Case No:

82435US

Manufacturing a Product Using Causal Models		
The specification of which:		
is attached hereto;		
was filed on as United States Application No.		
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428	
The above-identified application was made or authorized	to be made by me.	
I hereby acknowledge that any willful false statement ma fine or imprisonment of not more than 5 years, or both.	de in this declaration is punishable under 18 U.S.C. 1001 by	
	of which is acknowledged, I have agreed to assign and transfer	

3M COMPANY, and a corporation of Delaware, having its principal office at Saint Paul, Minnesota, its successors and assigns, the entire right, title, and interest in and to the said invention and application, and in and to any division or continuation (in whole or in part) of said application, and in and to any and all improvements in the said invention made by me or made jointly with others (provided any such improvement is made during, or within one year after the termination of, my employment with 3M COMPANY and any of its existing or future subsidiaries), and in and to any and all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries foreign thereto (including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in foreign countries in its own name and to claim any priority rights for such foreign applications to which such applications are entitled under international conventions, treaties, or otherwise), which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon the said invention or improvements thereon, to be held and enjoyed as fully and exclusively as they would have been by me had this assignment and transfer not been made;

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I do hereby authorize and request the Commissioner of Patents to issue any and all Letters Patent which may be granted upon any of the said applications, to said 3M Innovative Properties Company, as the assignee of the entire right, title, and interest therein.

Legal Name of Inventor:	
Sarah M. Mullins	
Inventor's Signature:	Date:
Saval Unla	& March 12, 2020

Case No:

82435US

As a below named inventor, I believe I am an original inventor or	an original joint inventor of a claimed invention in the
application and for which a patent is sought on the invention entitl	ed:

Manufacturing a Product Using Causal Models		
The specification of which:		
is attached hereto;		
was filed on as United States Application No.		
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428	

The above-identified application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than 5 years, or both.

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I do further agree for myself and for my heirs, executors, and administrators, to execute and deliver without further consideration any further applications, assignments, and documents, and to perform such other acts as I lawfully may, that may be deemed necessary by said Company, its successors, assigns, and nominees, fully to secure its right, title, and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all countries; and

I do hereby authorize and request the Commissioner of Patents to issue any and all Letters Patent which may be granted upon any of the said applications, to said 3M Innovative Properties Company, as the assignee of the entire right, title, and interest therein.

Legal Name of Inventor:	
Mark W. Orlando	•
Inventor's Signature:	Date:
mas W. Oramos	3/13/2020

PATENT

REEL: 057435 FRAME: 0848

Case No:

82435US

As a below named inventor, I believe I am an original inventor	or an original joint inventor of a claimed invention in the
application and for which a patent is sought on the invention er	titled:

Manufacturing a Product Using Causal Models		
The specification of	which:	
is attached he	ereto;	
was filed on as United Sta	ites Application No.	
is identified a	s PCT International Application No. October 3, 2019	PCT/IB2019/058428

The above-identified application was made or authorized to be made by me.

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In addition, for good and valuable consideration, receipt of which is acknowledged, I have agreed to assign and transfer and do hereby assign and transfer unto the 3M INNOVATIVE PROPERTIES COMPANY, a wholly-owned subsidiary of 3M COMPANY, and a corporation of Delaware, having its principal office at Saint Paul, Minnesota, its successors and assigns, the entire right, title, and interest in and to the said invention and application, and in and to any division or continuation (in whole or in part) of said application, and in and to any and all improvements in the said invention made by me or made jointly with others (provided any such improvement is made during, or within one year after the termination of, my employment with 3M COMPANY and any of its existing or future subsidiaries), and in and to any and all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries foreign thereto (including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in foreign countries in its own name and to claim any priority rights for such foreign applications to which such applications are entitled under international conventions, treaties, or otherwise), which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon the said invention or improvements thereon, to be held and enjoyed as fully and exclusively as they would have been by me had this assignment and transfer not been made;

I do further agree for myself and for my heirs, executors, and administrators, to execute and deliver without further consideration any further applications, assignments, and documents, and to perform such other acts as I lawfully may, that may be deemed necessary by said Company, its successors, assigns, and nominees, fully to secure its right, title, and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all countries; and

I do hereby authorize and request the Commissioner of Patents to issue any and all Letters Patent which may be granted upon any of the said applications, to said 3M Innovative Properties Company, as the assignee of the entire right, title, and interest therein.

Legal Name of Inventor:	
Cory D. Sauer	
Inventor's Signature:	Date:
My Sen	March 23, 2020.

REEL: 057435 FRAME: 0849

Case No:

82435US

	Manufacturing a Produc	t Using Causal Models
The specification of whi	ch;	
is attached hereto	о;	
was filed on as United States	Application No.	
is identified as PC filed on	October 3, 2019	PCT/IB2019/058428
The above-identified ap	plication was made or authorized to	be made by me.
	nat any willful false statement made i not more than 5 years, or both.	n this declaration is punishable under 18 U.S.C. 1001 by
and do hereby assign at 3M COMPANY, and a classigns, the entire right, continuation (in whole oby me or made jointly watermination of, my empleall Letters Patent, reexathereto (including the rigown name and to claim international convention continuation (in whole opart upon the said inventional street in the result of the rigown name and to claim international convention continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in the rigorous continuation (in whole opart upon the said inventional street in th	nd transfer unto the 3M INNOVATIVE corporation of Delaware, having its properation of Delaware, having its properation, and interest in and to the said in in part) of said application, and in a lith others (provided any such improve owner with 3M COMPANY and any minations, reissues, or extensions the part of the properation of the properation of the properation of the part, utility any priority rights for such foreign apply for the part, which have in part, renewal, reexamination, re	which is acknowledged, I have agreed to assign and transfer PROPERTIES COMPANY, a wholly-owned subsidiary of incipal office at Saint Paul, Minnesota, its successors and invention and application, and in and to any division or and to any and all improvements in the said invention made ement is made during, or within one year after the of its existing or future subsidiaries), and in and to any and hereof, of the United States of America and countries foreign Models, or Inventors' Certificates in foreign countries in its applications to which such applications are entitled under to been or may be granted thereon or on any divisional, issue, or other or further application based in whole or in held and enjoyed as fully and exclusively as they would made;
consideration any further that may be deemed ne	er applications, assignments, and doc cessary by said Company, its succes	d administrators, to execute and deliver without further curnents, and to perform such other acts as I lawfully may, asors, assigns, and nominees, fully to secure its right, title, atent, Utility Models, or Inventors' Certificates in any and al
I do hereby authorize ar granted upon any of the title, and interest therein	said applications, to said 3M Innova	ents to issue any and all Letters Patent which may be tive Properties Company, as the assignee of the entire righ
Legal Name of Invent	tor:	
Timothy J. Clem		
Inventor's Signature:	^	Date:
- L- C	(10.	3/13/2020

Case No:

82435US

As a below named inventor	r, I believe I am an	original inventor	or an original	joint inventor of	f a claimed inver	ition in the
application and for which a				,		• •

Manufacturing a Product Usi	ng Causal Models
The specification of which:	
is attached hereto;	
was filed on as United States Application No.	
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428

The above-identified application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than 5 years, or both,

In addition, for good and valuable consideration, receipt of which is acknowledged. I have agreed to assign and transfer and do hereby assign and transfer unto the 3M INNOVATIVE PROPERTIES COMPANY, a wholly-owned subsidiary of 3M COMPANY, and a corporation of Delaware, having its principal office at Saint Paul, Minnesota, its successors and assigns, the entire right, title, and interest in and to the said invention and application, and in and to any division or continuation (in whole or in part) of said application, and in and to any and all improvements in the said invention made by me or made jointly with others (provided any such improvement is made during, or within one year after the termination of, my employment with 3M COMPANY and any of its existing or future subsidiaries), and in and to any and all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries foreign thereto (including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in foreign countries in its own name and to claim any priority rights for such foreign applications to which such applications are entitled under international conventions, treaties, or otherwise), which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon the said invention or improvements thereon, to be held and enjoyed as fully and exclusively as they would have been by me had this assignment and transfer not been made;

I do further agree for myself and for my heirs, executors, and administrators, to execute and deliver without further consideration any further applications, assignments, and documents, and to perform such other acts as I lawfully may, that may be deemed necessary by said Company, its successors, assigns, and nominees, fully to secure its right, title, and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all countries; and

I do hereby authorize and request the Commissioner of Patents to issue any and all Letters Patent which may be granted upon any of the said applications, to said 3M innovative Properties Company, as the assignee of the entire right, title, and interest therein.

Legal Name of Inventor:	
Scott L. Barnett	
Inventor's Signature:	Date:
Sulf benut	MAR 13, 2020

PATENT

REEL: 057435 FRAME: 0851

countries; and

Case No:

82435US

	Manufacturing a Product Using Ca	ausal Models
The specification of w	nich:	
is attached here	to;	
was filed on as United State	s Application No.	
is identified as F filed on	PCT International Application No. October 3, 2019	PCT/IB2019/058428
The above-identified a	pplication was made or authorized to be made by m	ne.
I hereby acknowledge fine or imprisonment o	that any willful false statement made in this declara f not more than 5 years, or both.	tion is punishable under 18 U.S.C. 1001 by
and do hereby assign 3M COMPANY, and a assigns, the entire right continuation (in whole by me or made jointly termination of, my emall Letters Patent, reexthereto (including the own name and to clair international convention continuation (in whole part upon the said inverse.)	and valuable consideration, receipt of which is acknown and transfer unto the 3M INNOVATIVE PROPERTIL corporation of Delaware, having its principal office and title, and interest in and to the said invention and or in part) of said application, and in and to any and with others (provided any such improvement is made allowed by the said application, and in any of its existing caminations, reissues, or extensions thereof, of the leading to apply for Letters Patent, Utility Models, or lower any priority rights for such foreign applications to cons, treaties, or otherwise), which have been or may or in part), renewal, reexamination, reissue, or other ention or improvements thereon, to be held and enjoy this assignment and transfer not been made;	ES COMPANY, a wholly-owned subsidiary of at Saint Paul, Minnesota, its successors and application, and in and to any division or all improvements in the said invention made le during, or within one year after the or future subsidiaries), and in and to any and United States of America and countries foreign ventors' Certificates in foreign countries in its which such applications are entitled under the granted thereon or on any divisional, are or further application based in whole or in
	nyself and for my heirs, executors, and administrato ner applications, assignments, and documents, and	

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that may be deemed necessary by said Company, its successors, assigns, and nominees, fully to secure its right, title, and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all

Legal Name of Inventor: Zachary M. Schaeffer	
Inventor's Signature:	Date:
Zachung Schuffer	3/12/20

Case No:

82435US

	Manufacturing a f	Product Using C	ausal Models
The specification of v	hich:		
is attached her	eto;		
was filed on			
as United State	es Application No.		
is identified as filed on	PCT International Application Notober 3, 2019	No.	PCT/IB2019/058428
The above-identified	application was made or author	rized to be made by	me.
I hereby acknowledg fine or imprisonment	e that any willful false statemen of not more than 5 years, or bo	it made in this declar ith.	ation is punishable under 18 U.S.C. 1001 by
and do hereby assign 3M COMPANY, and assigns, the entire rig continuation (in whole by me or made jointly termination of, my er all Letters Patent, recthereto (including the own name and to clainternational conventionation (in whole part upon the said in have been by me have	n and transfer unto the 3M INNO a corporation of Delaware, have ght, title, and interest in and to the e or in part) of said application, y with others (provided any such apployment with 3M COMPANY examinations, reissues, or extent e right to apply for Letters Pater im any priority rights for such for ions, treaties, or otherwise), where or in part), renewal, reexamination or improvements thereof dethis assignment and transfer	OVATIVE PROPERT ing its principal office the said invention and and in and to any and improvement is may and any of its existing and any of its existing its existing the interest of the oreign applications to inch have been or may artion, reissue, or other, to be held and end on the oreign applications to be held and end on the oreign applications.	owledged, I have agreed to assign and transfer TIES COMPANY, a wholly-owned subsidiary of at Saint Paul, Minnesota, its successors and dapplication, and in and to any division or ad all improvements in the said invention made ide during, or within one year after the g or future subsidiaries), and in and to any and united States of America and countries foreign eventors' Certificates in foreign countries in its which such applications are entitled under ay be granted thereon or on any divisional, her or further application based in whole or in joyed as fully and exclusively as they would
consideration any fu	ther applications, assignments necessary by said Company. i	, and documents, an ts successors, assign	tors, to execute and deliver without further d to perform such other acts as I lawfully may, ns, and nominees, fully to secure its right, title, Models, or Inventors' Certificates in any and all
I do hereby authorize granted upon any of title, and interest the	the said applications, to said 3	er of Patents to issue M Innovative Propert	any and all Letters Patent which may be ies Company, as the assignee of the entire right
Legal Name of Inv	ventor:		
Patrick G. Zim	merman		
Inventor's Signature	ire:	Date: 03/.	18/2020

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:

Manufacturing a Product Us	sing Causal Models
The specification of which:	
is attached hereto;	
was filed on as United States Application No.	
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428

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I do further agree for myself and for my heirs, executors, and administrators, to execute and deliver without further consideration any further applications, assignments, and documents, and to perform such other acts as I lawfully may, that may be deemed necessary by said Company, its successors, assigns, and nominees, fully to secure its right, title, and interest as aforesaid and to obtain or maintain Letters Patent, Utility Models, or Inventors' Certificates in any and all countries; and

Legal Name of Inventor:	
Gregory P. Moriarty	
Inventor's Signature:	Date:
anything	03/12/2020

	DI	EC	LA	RA	T	ON	A	ND	A	SS	IG۱	IM	E١	IT	4
			F)R	U	ΓIL	m	0	R	DE	SIC	N			
P	AT	ΓEI	NT	AF	PI	_IC	AT	ПО	N	(37	CF	R	§ 1	1.6	3)

Case No:

82435US

		Manufacturing a	Product Using Ca	ausal Models
The speci	ification of whic	h:		
☐ is a	ittached hereto			
☐ was	s filed on			
as l	United States A	Application No.		
	dentified as PC d on	T International Application October 3, 2019	No.	PCT/IB2019/058428
The above	e-identified app	olication was made or autho	orized to be made by r	ne.
		at any willful false statement not more than 5 years, or bo		ation is punishable under 18 U.S.C. 1001 by
assigns, to continuation termination all Letters thereto (ir cwn name internation continuation part upon have bee	the entire right, ion (in whole or made jointly with the property of the right of the right of the right of the said invention by me had the right of the said invention by me had the right of the said invention by me had the right of the said invention of the said invention by me had the right of the said invention the said invention by me had the right of the said invention the said invent	title, and interest in and to in part) of said application th others (provided any succeptment with 3M COMPANY minations, reissues, or extend to apply for Letters Pate any priority rights for such fis, treaties, or otherwise), we in part), renewal, reexamition or improvements there his assignment and transfer	the said invention and, and in and to any and in and to any and in mprovement is man and any of its existing ensions thereof, of the int, Utility Models, or inforeign applications to hich have been or manation, reissue, or other, to be held and enjoy not been made;	at Saint Paul, Minnesota, its successors and application, and in and to any division or dall improvements in the said invention made de during, or within one year after the g or future subsidiaries), and in and to any and United States of America and countries foreign eventors' Certificates in foreign countries in its which such applications are entitled under y be granted thereon or on any divisional, are or further application based in whole or in oyed as fully and exclusively as they would
considera	ation any furthe be deemed ne est as aforesai	r applications, assignments	s, and documents, and its successors, assign	ors, to execute and deliver without further it to perform such other acts as I lawfully may, is, and nominees, fully to secure its right, title, Models, or Inventors' Certificates in any and all
granted u		said applications, to said 3		any and all Letters Patent which may be es Company, as the assignae of the antire right
1 -	Name of Inven			enter de la companya
	ey P. Adolf		www.com.com.com.com.com.com.com.com.com.com	
	or's Signature:	flolf	Date:	
A TANANCA AND A	chung	your -	5/	19/2020

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:					
	Manufacturing a Product Using Causal Models				
The specification of which:					
is attached hereto;					

The above-identified application was made or authorized to be made by me.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than 5 years, or both.

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Legal Name of Inventor: Steven P. Floeder	:
Inventor's Signature:	Date: 2020

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed	invention	in the
application and for which a patent is sought on the invention entitled:		

As a below named inver application and for which	ntor, I believe I am an original inventor or an orig h a patent is sought on the invention entitled:	linal joint inventor of a claimed invention in the
	Manufacturing a Product Using C	ausal Models
The specification of which		
was filed on as United States	Application No.	
is Identified as PC filed on	October 3, 2019	PCT/IB2019/058428
The above-identified ap	plication was made or authorized to be made by	me.
I hereby acknowledge to	hat any willful false statement made in this declar not more than 5 years, or both.	ration is punishable under 18 U.S.C. 1001 by
In addition, for good and and do hereby assign a	d valuable consideration, receipt of which is ackning transfer unto the 3M INNOVATIVE PROPERT	owledged, I have agreed to assign and transfer FIES COMPANY, a wholly-owned subsidiary of

3M COMPANY, and a corporation of Delaware, having its principal office at Saint Paul, Minnesota, its successors and assigns, the entire right, title, and interest in and to the said invention and application, and in and to any division or continuation (in whole or in part) of said application, and in and to any and all improvements in the said invention made by me or made jointly with others (provided any such improvement is made during, or within one year after the termination of, my employment with 3M COMPANY and any of its existing or future subsidiaries), and in and to any and all Letters Patent, reexaminations, reissues, or extensions thereof, of the United States of America and countries foreign thereto (including the right to apply for Letters Patent, Utility Models, or Inventors' Certificates in foreign countries in its own name and to claim any priority rights for such foreign applications to which such applications are entitled under international conventions, treaties, or otherwise), which have been or may be granted thereon or on any divisional, continuation (in whole or in part), renewal, reexamination, reissue, or other or further application based in whole or in part upon the said invention or improvements thereon, to be held and enjoyed as fully and exclusively as they would have been by me had this assignment and transfer not been made;

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Legal Name of Inventor: Andreas Backes	
Inventor's Signature;	18.03.2020

DECLARATION AND ASSIGNMENT,
FOR UTILITY OR DESIGN
PATENT APPLICATION (37 CFR § 1.63)

Case No:

82435US

		in the
As a below named invent application and for which	a patent is sought on the invention	
	Manufacturing a Produc	t Using Causal Models
The specification of which	n;	
is attached hereto;		
was filed on		
as United States A	pplication No.	
is identified as PC	T International Application No.	PCT/IB2019/058428
filed on	October 3, 2019	
The above-identified app	olication was made or authorized to b	be made by me.
1 hereby acknowledge th	nat any willful false statement made i	n this declaration is punishable under 18 U.S.C. 1001 by
fine or imprisonment of	101 Hibre than 5 years, or bour.	
and do hereby assign a 3M COMPANY, and a cassigns, the entire right continuation (in whole oby me or made jointly watermination of, my emplall Letters Patent, reexathereto (including the rigown name and to claim international convention continuation (in whole opart upon the said inverhave been by me had the	orporation of Delaware, having its priorporation of Delaware, having its prior ititle, and interest in and to the said if ith others (provided any such improvoyment with 3M COMPANY and any iminations, reissues, or extensions the pht to apply for Letters Patent, Utility any priority rights for such foreign apply, treaties, or otherwise), which have in part), renewal, reexamination, renewal, resamination, renewal, assignment and transfer not been	- Individual to execute and deliver without further
consideration any furthe that may be deemed ne and interest as aforesal countries; and	er applications, assignments, and doc cessary by said Company, its succes d and to obtain or maintain Letters Pa	essors, assigns, and nominees, fully to secure its right, title, atent, Utility Models, or Inventors' Certificates in any and all
I do hereby authorize ar granted upon any of the title, and interest therein	said applications, to said sivi initiova	ents to issue any and all Letters Patent which may be tive Properties Company, as the assignee of the entire righ
Legal Name of Invent		
Peter J. Schneide	er	5-4-
Inventor's Signature:		Date:
1 125		March 18, 2020

Case No:

82435US

		Manufacturing a Product Using	g Causal Models
The s	pecification of wh	ich:	
	is attached heret	o;	
	was filed on as United States	Application No.	
\boxtimes	is identified as Pt filed on	CT International Application No. October 3, 2019	PCT/IB2019/058428
The s	bove-identified ap	plication was made or authorized to be made	by me.
		hat any willful false statement made in this de not more than 5 years, or both.	claration is punishable under 18 U.S.C. 1001 by
	attantino de la compania de la comp	and the state of t	Annual Angelia a aguil in a annua aguil in a annua aguil in a

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Legal Name of Inventor:	
Maureen A. Kavanagh	
Inventor's Signature:	Date:
Maureen akavanage	7/27/2020

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:

	Manufacturing a Product U	sing Causal Models
he specification of which	sh:	
is attached hereto	;	
was filed on as United States /	Application No.	
is identified as PC filed on	T International Application No. October 3, 2019	PCT//B2019/058428

The above-identified application was made or authorized to be made by me.

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Legal Name of Inventor:	
Glenn E. Casner	
Inventor's Signature:	Date:
9) 1- 2 Can	3/24/2020

Case No:

82435US

As a below named inventor, I believe I am an original inventor application and for which a patent is sought on the invention of	
Manufacturing a Produc	t Using Causal Models
The specification of which:	
is attached hereto;	
was filed on	
as United States Application No.	
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428
The above-identified application was made or authorized to be	e made by me.
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I do hereby authorize and request the Commissioner of Pate granted upon any of the said applications, to said 3M Innovatile, and interest therein.	nts to issue any and all Letters Patent which may be tive Properties Company, as the assignee of the entire right
Legal Name of Inventor: Miaoding Dai	
Inventor's Signature:	Date:
Mandi JE	Mar 17, 2020

DECLARATION AND ASSIGNMENT,
FOR UTILITY OR DESIGN
PATENT APPLICATION (37 CFR § 1.63)

Case No:

82435US

Manufacturing a Product Using Causal Models			
The specification of which:			
is attached hereto;			
was filed on as United States Application No.			
is identified as PCT International Application No. filed on October 3, 2019	PCT/IB2019/058428		

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the

I hereby acknowledge that any willful false statement made in this declaration is nunishable under 18 U.S.C.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than 5 years, or both.

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Legal Name of Inventor:	
Christopher M. Brown	
Inventor's Signature:	Date:
Chrty M Brown	3-17-20

title, and interest therein.

Case No:

82435US

	ntor, I believe I am an original inventor or an orion h a patent is sought on the invention entitled:	ginal joint inventor of a claimed invention in the	
Manufacturing a Product Using Causal Models			
The specification of which	ch:		
is attached hereto) ;		
was filed on			
as United States	Application No.		
	T International Application No.	PCT/IB2019/058428	
filed on	October 3, 2019		
The above-identified ap	plication was made or authorized to be made by	me.	
fine or imprisonment of In addition, for good and and do hereby assign a 3M COMPANY, and a c assigns, the entire right, continuation (in whole o by me or made jointly w termination of, my empl- all Letters Patent, reexa thereto (including the rig own name and to claim international convention continuation (in whole o part upon the said inver-	nat any willful false statement made in this declar not more than 5 years, or both. d valuable consideration, receipt of which is acknown and transfer unto the 3M INNOVATIVE PROPER corporation of Delaware, having its principal office, title, and interest in and to the said invention and in part) of said application, and in and to any and in part) of said application, and in and to any and interest in any such improvement is many and in the said invention and in part) of said application, and in and to any and interest (provided any such improvement is many of its existing aminations, reissues, or extensions thereof, of the goal of the said invention o	nowledged, I have agreed to assign and transfer TIES COMPANY, a wholly-owned subsidiary of e at Saint Paul, Minnesota, its successors and d application, and in and to any division or and all improvements in the said invention made ade during, or within one year after the ag or future subsidiaries), and in and to any and e United States of America and countries foreign nventors' Certificates in foreign countries in its owhich such applications are entitled under any be granted thereon or on any divisional, her or further application based in whole or in	
consideration any further that may be deemed no	yself and for my heirs, executors, and administra er applications, assignments, and documents, an ecessary by said Company, its successors, assig id and to obtain or maintain Letters Patent, Utility	nd to perform such other acts as I lawfully may, ns, and nominees, fully to secure its right, title,	
I do hereby authorize a granted upon any of the	nd request the Commissioner of Patents to issue e said applications, to said 3M Innovative Proper	e any and all Letters Patent which may be ties Company, as the assignee of the entire right,	

Legal Name of Inventor:

Lori A. Sjolund

Inventor's Signature:

Date:

03/17/20

Case No:

82435US

Manufacturing a Product Using (Causal Models
The specification of which:	
is attached hereto;	
was filed on	
as United States Application No.	
is identified as PCT International Application No.	PCT/IB2019/058428
filed on October 3, 2019	
The above-identified application was made or authorized to be made by	me.
I hereby acknowledge that any willful false statement made in this decla fine or imprisonment of not more than 5 years, or both.	ration is punishable under 18 U.S.C. 1001 by
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I do hereby authorize and request the Commissioner of Patents to issue granted upon any of the said applications, to said 3M Innovative Propertitle, and interest therein.	any and all Letters Patent which may be ties Company, as the assignee of the entire right
Legal Name of Inventor:	
Jon A. Kirschhoffer	
Inventor's Signature: Date:	i
- <i>H</i>	125/20

Case No:

82435US

As a below named inventor, I believe I am an original inventor or an original joint inventor of a claimed invention in the application and for which a patent is sought on the invention entitled:

Manufacturing a Product Using Causal Models			
The specification of	which:		
is attached he	reto;	•	
was filed on as United Stat	es Application No.		
is identified as filed on	PCT International Application No. October 3, 2019	PCT/IB2019/058428	

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I do hereby authorize and request the Commissioner of Patents to issue any and all Letters Patent which may be granted upon any of the said applications, to said 3M Innovative Properties Company, as the assignee of the entire right, and interest therein.

Legal Name of Inventor:	
Carter C. Hughes	
Inventor's Signature:	Date: 3/17/2020

PATENT

REEL: 057435 FRAME: 0865