

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DELTA POWER EQUIPMENT
CORPORATION; LOWE'S HOME CENTERS,
LLC; HOME DEPOT U.S.A., INC.
Petitioners,

v.

P & F BROTHER INDUSTRIAL CORPORATION,
Patent Owner.

IPR2024-00347
U.S. Patent No. 7,475,622 to Chang et al.
Issue Date: January 13, 2009
Title: Supporting Device for Mounting a Protective Cover to Shield a Cutting
Blade of a Cutting Machine

DECLARATION OF BRUCE MAIN

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	BACKGROUND AND QUALIFICATIONS	2
III.	DOCUMENTS CONSIDERED IN FORMULATING MY OPINION	3
IV.	CLAIM CONSTRUCTION	3
V.	LEGAL STANDARDS	6
A.	Anticipation	7
B.	Obviousness.....	8
C.	Burden of Proof.....	11
VI.	BACKGROUND KNOWLEDGE THAT A PERSON HAVING ORDINARY SKILL IN THE ART WILL UNDERSTAND	11
A.	The Lexicon: Riving Knives, Spreaders, and Splitters	13
B.	Riving Knives and Blade Guards Have Long Been Important Safety Devices	16
C.	Technical Literature	17
VII.	STATE OF THE ART	18
A.	Applicant Admitted Prior Art (“AAPA”)	18
i.	Status as Prior Art	18
ii.	Overview of AAPA.....	19
B.	Garcia	20
i.	Status as Prior Art	20
ii.	Overview of Garcia.....	20
C.	Gass	30
i.	Status as Prior Art	30
ii.	Overview of Gass.....	31
D.	Burke	40
i.	Status as Prior Art	40
ii.	Overview of Burke.....	41
E.	Bennett.....	47
i.	Status as Prior Art	47
ii.	Overview of Bennett.....	48
F.	Huang	50
i.	Status as Prior Art	50
ii.	Overview of Huang.....	50
G.	Liu.....	51
i.	Status as Prior Art	51
ii.	Overview of Liu	51
H.	ANSI.....	54
I.	Safety Devices in 2000s	57
i.	Grizzly Industrial	57

ii.	Powermatic 1999.....	63
VIII.	PERSON HAVING ORDINARY SKILL IN THE ART	70
IX.	OVERVIEW OF THE '622 PATENT	71
X.	PROSECUTION HISTORY OF THE '622 PATENT.....	74
XI.	SUMMARY OF OPINIONS.....	78
XII.	THE CHALLENGED CLAIMS OF THE '622 PATENT ARE INVALID.....	79
A.	Ground 1: Claims 1, 2, 5, and 9 are unpatentable as obvious under 35 U. S. C. § 103 over Gass in view of Applicant Admitted Prior Art (AAPA).....	79
i.	Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:	79
ii.	Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;.....	80
iv.	Limitation 1.3: a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis,.....	85
v.	Limitation 1.4: and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end;.....	88
vi.	Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal,.....	90
vii.	Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut	

	against said proximate tightening surface, and.....	91
viii.	Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that are respectively proximate to and distal from said distal tightening surface along the tightening axis;	93
ix.	Limitation 1.8: a cam actuating member including an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening axis such that, ...	96
x.	Limitation 1.9: said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position,”	100
xi.	Limitation 1.10: and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and.....	101
xii.	Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and	105
xiii.	Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that,.....	106
xiv.	Limitation 1.13: as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the	

	tightening position.	107
xv.	Claim 2. The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable munt having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.	110
xvi.	Claim 5. The supporting device according to claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member being a coil spring which is disposed to surround said shank and between said major abutment wall and said screw nut so as to acquire the increment of the biasing force.	114
xvii.	Claim 9. The supporting device according to claim 1, further comprising a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.	116
xviii.	Motivation to Combine	118
B.	Ground 2: Claims 1, 2, 5, and 9 are unpatentable as obvious under 35 U. S. C. § 103 over Burke in view of Gass	122
i.	Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:	122
ii.	Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;	123
iii.	Limitation 1.2: a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed	

	between said front and rear ends;.....	125
iv.	Limitation 1.3: a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis, ...	126
v.	Limitation 1.4: and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end;	129
vi.	Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal, ...	131
vii.	Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and	132
viii.	Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that are respectively proximate to and distal from said distal tightening surface along the tightening axis;	134
ix.	Limitation 1.8: a cam actuating member including an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening axis such that, ...	135
x.	Limitation 1.9: said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to	

	mate with said cam follower surface in a loosened position,.....	137
xi.	Limitation 1.10: and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and.....	138
xii.	Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and	138
xiii.	Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that,.....	139
xiv.	Limitation 1.13: as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the tightening position.	139
xv.	Claim 2: The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable mount having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.	140
xvi.	Claim 5: The supporting device according to claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member being a coil spring which is disposed to surround said shank and between said major abutment wall and said screw nut so as to acquire the increment of the biasing force.	141
xvii.	Claim 9: The supporting device according to claim 1, further comprising a retaining unit which is disposed	

	between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.....	142
xviii.	Motivation to Combine	144
C.	Ground 3: Claims 1, 2, 5, and 9 are unpatentable as obvious under 35 U. S. C. § 103 over AAPA in view of Gass.....	147
i.	Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:	147
ii.	Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;.....	147
iii.	Limitation 1.2: a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed between said front and rear ends;.....	149
iv.	Limitation 1.3: a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis,.....	151
v.	Limitation 1.4: and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end;.....	152
vi.	Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal,.....	152

vii.	Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and.....	153
viii.	Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that are respectively proximate to and distal from said distal tightening surface along the tightening axis;	154
ix.	Limitation 1.8: a cam actuating member including an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing pots which are angularly displaced from each other about the tightening axis such that,.....	157
x.	Limitation 1.9: said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position,.....	159
xi.	Limitation 1.10: and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and.....	159
xii.	Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and.....	161
xiii.	Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that,.....	162
xiv.	Limitation 1.13: as a result of displacement of said actuating body to the tightening position, said biasing	

	member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the tightening position.	163
xv.	Claim 2. The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable munt having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.	163
xvi.	Claim 5. The supporting device according to claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member being a coil spring which is disposed to surround said shank and between said major abutment wall and said screw nut so as to acquire the increment of the biasing force.	165
xvii.	Claim 9. The supporting device according to claim 1, further comprising a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.	165
xviii.	Motivation to Combine	166
D.	Ground 4: Claims 1-2, 5, and 9 are unpatentable as obvious under 35 U.S.C. §103 over Gass in view of Burke	168
i.	Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:	168
ii.	Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;	168

- iii. Limitation 1.2: a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed between said front and rear ends;.....169
- iv. Limitation 1.3: a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis, ...169
- v. Limitation 1.4: “and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end; 169
- vi. Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal, ...170
- vii. Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and 170
- viii. Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that are respectively proximate to and distal from said distal tightening surface along the tightening axis; 170
- ix. Limitation 1.8: a cam actuating member including an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening

	axis such that, ...	170
x.	Limitation 1.9: said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position, ...	171
xi.	Limitation 1.10: and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and.....	171
xii.	Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and	171
xiii.	Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that, ...	172
xiv.	Limitation 1.13: as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the tightening position.	172
xv.	Claim 2. The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable mount having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.	172
xvi.	Claim 5. The supporting device according to claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member being a coil spring which is disposed to surround said shank and between said major abutment	

	wall and said screw nut so as to acquire the increment of the biasing force.	173
xvii.	Claim 9. The supporting device according to claim 1, further comprising a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.	173
xviii.	Motivation to Combine	173
E.	Ground 5: Claims 1, 2, 5, and 9 are Obvious Under 35 U.S.C. 103(a) Over Gass in view of Garcia.....	175
i.	Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:	175
ii.	Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;	175
iii.	Limitation 1.2: a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed between said front and rear ends;	176
iv.	Limitation 1.3: a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis, ...	176
v.	Limitation 1.4: and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where	

	said shank is closer to said upper end;.....	176
vi.	Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal,.....	178
vii.	Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and.....	178
viii.	Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that are respectively proximate to and distal from said distal tightening surface along the tightening axis;	179
ix.	Limitation 1.8: a cam actuating member including an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening axis such that,.....	179
x.	Limitation 1.9: said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position,.....	179
xi.	Limitation 1.10: and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and.....	180
xii.	Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and.....	180

xiii.	Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that,.....	180
xiv.	Limitation 1.13: as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the tightening position.”	180
xv.	Claim 2. The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable mount having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.	181
xvi.	Claim 9. The supporting device according to claim 1, further comprising a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.	181
xvii.	Motivation to Combine	182
XIII.	CONCLUSION.....	184

I, Bruce Main, hereby declare as follows.

I. INTRODUCTION

1. I am over the age of eighteen (18) and otherwise competent to make this declaration.

2. I have been retained as an expert witness on behalf of Delta Power Equipment Corporation, Lowe's Home Centers, LLC and Home Depot U.S.A., Inc. (collectively, "Petitioners") for the above-captioned *inter partes* review ("IPR"). I am being compensated for my time in connection with this IPR at my standard consulting rate, which is \$350 per hour. I understand that the Petition involves U.S. Patent No. 7,475,622 ("the '622 patent").

3. I understand from counsel that the '622 patent is assigned to P & F Brother Industrial Corporation ("Patent Owner").

4. I understand from counsel that, in this proceeding, Petitioners filed a Petition to institute a review of claims 1, 2, 5, and 9 (the "Challenged Claims") of the '622 patent.

5. I understand from counsel that the priority date of the '622 patent is October 26, 2007.

6. I have been asked to provide an independent analysis of the '622 patent in view of the prior art cited in the Petition and certain other documents and to provide my positions regarding the invalidity of the '622 patent.

7. I am not, and have never been, an employee of any Petitioner. I am not receiving compensation for this declaration beyond my normal hourly fees (\$350/hour) based on my time actually spent analyzing and documenting my opinions herein on the '622 patent, the asserted prior art cited in the Petition, and the issues related thereto. My compensation is not related to the outcome of this proceeding, and I will not receive additional compensation based on the outcome of any IPR or other proceeding involving the '622 patent.

II. BACKGROUND AND QUALIFICATIONS

8. I am a professional engineer and certified safety professional. I hold mechanical engineering degrees from MIT (Bachelor's) and the University of Michigan (Master's). I am a member and/or chair of several national and international industry committees on risk assessment and safety of machinery, including ANSI B11.0 *Safety of machinery* and ISO 12100 *Safety of machinery*. I am also a member of ANSI B11.10 for metal cutting saws.

9. I am a member of several professional engineering organizations having authored numerous articles, papers, and books. I am a frequent lecturer to industry and educational institutions.

10. I have been an active member of the B11 machine tool community since 1996. I have been a member of the Standards Development Committee for almost 20 years. I have chaired several B11 standards development committees including

the ANSI B11.0 since 2006. In 2017, my contributions to the B11 series of standards was recognized with my induction into the *B11 Hall of Fame*.

11. I am the founder of design safety engineering, inc., an engineering consulting firm that assists manufacturers of machinery and equipment since 1995.

12. I have also been awarded two patents in areas unrelated to table saws. Details of my professional qualifications and publications are listed in my current curriculum vitae in EX1005.

III. DOCUMENTS CONSIDERED IN FORMULATING MY OPINION

30. I have reviewed the '622 patent, including the Challenged Claims, and its prosecution history.

31. I have also relied on my own education, knowledge, and experience in the relevant art.

32. I have also considered the viewpoint of a person of ordinary skill in the art ("POSA"), prior to the priority date of October 26, 2007.

33. In particular, in formulating my opinions, I have considered any documents cited in this declaration, specifically including the documents listed in Petitioners' List of Exhibits.

IV. CLAIM CONSTRUCTION

34. I have been informed by counsel that U.S. law requires that the claims of a patent particularly point out and distinctly claim the subject matter of the

invention such that a POSA would understand the bounds of the claim when read in light of the written description. I understand that the purpose of this requirement is to provide the public with clear notice of what is claimed.

35. I have also been informed by counsel that a patent claim, viewed in light of the specification and prosecution history, must inform a POSA about the scope of the invention with reasonable certainty. Specifically, I understand that patent claims, when read in light of the specification and the prosecution history, must provide objective boundaries for those of skill in the art. I have been informed by counsel that while claims do not need to provide absolute precision, they nevertheless must provide sufficient clarity to a POSA about the boundaries of what is claimed. I further understand that a claim is indefinite if a POSA would understand the claim language to have several alternative meanings and no informed and confident choice is available among the alternative meanings or if no meaning can be ascertained at all.

36. I understand that the Challenged Claims are construed in accordance with the ordinary and customary meaning of the claims as understood by a POSA and the relevant prosecution history. I understand that this is the same standard applied in Federal District Court patent proceedings.

37. In considering the words of a claim, I understand that the preferred construction is one that gives meaning to all the claim terms. I understand that the

Federal Circuit has held that “[c]onstruing a claim term to include features of that term already recited in the claims would make those expressly recited features redundant.” *Apple, Inc. v. Ameranth, Inc.*, 842 F.3d 1229, 1237 (Fed. Cir. 2016)

38. I understand that Petitioners have applied the plain and ordinary meaning of the relevant claims and cited references.

39. I understand from counsel that patent claim terms are to be considered in the context of the patent in which they appear, including the claims and the specification, as well as the prosecution history of the asserted patent. This is referred to as “intrinsic evidence.” I am further told that the claim terms are to be read as a whole rather than in isolation or out of context.

40. I further understand that, unless there is an explicit statement to the contrary by the patentee in the specification or an explicit disclaimer during prosecution, a patent claim term has its full scope and is not limited to a specific example disclosed in the specification as referring to a preferred embodiment.

41. I am informed by counsel that “extrinsic evidence” may also be considered. I am further told by counsel that extrinsic evidence includes scientific references, textbooks in the relevant art, dictionary definitions in the art, and testimony of experts. I understand from counsel that expert testimony and opinion is a particularly relevant aid in understanding the meaning of technical or scientific terms as of the priority date of a patent. I also understand from counsel that general

dictionaries include definitions of a term as used not in a particular field of art, but in many different settings and, therefore, do not necessarily reflect the meaning understood by a POSA.

42. I understand that a claim in independent format stands on its own and ordinarily has a broader scope than a claim that depends from it.

43. I further understand that a claim in dependent format is a claim that incorporates by reference all elements of another claim. Therefore, the scope of the dependent claim is narrower than that of the claim from which it depends. Accordingly, I understand that terms in the independent and corresponding dependent claims should be construed to have the effect that each dependent claim is narrower in scope than the claim from which it depends. In addition, the terms in a claim should be construed such that no term is rendered meaningless or superfluous.

V. LEGAL STANDARDS

44. While I am not an attorney, I have been advised of the following legal principles, which I have applied in preparing this declaration. I do not offer opinions of law in this declaration.

45. There are two statutes that govern patent claim invalidity: 35 U.S.C. §§ 102 and 103 (referred to, respectively, as “102” and “103”). I have reviewed the text of each statute.

A. Anticipation

46. 102 is directed to “novelty” of the claimed invention, and the statute is invoked when an “anticipation” analysis is done in order to determine whether the claimed invention is invalid. An invention that is anticipated by the prior art is not patentable.

47. A patent claim is invalid as anticipated when a single prior art reference discloses each and every element of the claimed invention. I understand that an anticipation analysis involves two steps. First, the patent claims are construed to ascertain their scope. Second, each construed asserted claim is compared to the prior art reference on an element-by-element basis. If the prior art reference discloses or contains each and every element of the claimed invention, either expressly or inherently, then it anticipates the claim.

48. In an anticipation analysis, I understand that the dispositive question is whether a POSA would reasonably understand or infer from a prior art reference that each and every element of the claimed invention is disclosed in that single reference.

49. I understand that a claim is invalid under 102 if the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public, before the effective filing date of the claimed invention.

B. Obviousness

50. 103 is directed to “obviousness” of the claimed invention, and the statute is invoked when an “obviousness” analysis is done in order to determine whether the claimed invention is invalid. An invention that would have been obvious to a POSA as of the effective filing date of the claimed invention is not patentable.

51. To determine whether a claimed invention is obvious, one determines the scope and content of the prior art, ascertains the differences between the claimed invention and the prior art, and resolves the level of ordinary skill in the prior art.

52. A patent claim composed of several elements is not proven obvious by merely demonstrating that each of its elements was independently known in the prior art. For a claim to be invalid as obvious, I understand that it must be shown that a POSA would have known or have been motivated to combine or modify the prior art reference, or a combination of the prior art references, to achieve the claimed invention with a reasonable expectation of success. For example, if a technique has been used to improve one product or method, and a POSA would recognize that it would improve similar products or methods in the same way, using the technique may be obvious, unless its actual application is beyond his or her skill.

53. A determination of obviousness may take into account whether there was some teaching, suggestion, or motivation that would have led a POSA to modify

the prior art reference or to combine prior art reference teachings to arrive at the claimed invention. Teachings, suggestions, and motivations may be found in written references, including the prior art itself. However, teachings, suggestions, and motivations may also be found within the knowledge of a POSA, including inferences and creative steps that a POSA would employ. Additionally, teachings, suggestions, and motivations may be found in the nature of the problem solved by the claimed invention.

54. A claimed invention is invalid as obvious to try when the problem is known, the possible approaches to solving the problem are known and finite, and the solution is predictable through use of a known option or options. The prior art, however, need only provide a reasonable expectation of success. No absolute predictability of success is required.

55. Other rationales that may support a conclusion of obviousness include combining prior art elements according to known methods to yield predictable results; the common sense of a POSA; simple substitution of one known element for another to obtain predictable results; use of a known technique to improve similar devices, methods, or products in the same way; applying a known technique to a known device, method, or product ready for improvement to yield predictable results; and design incentives and other market forces.

56. Further, known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to a POSA.

57. Petitioners bear the burden of identifying a motivation to combine elements found in the prior art. This requires that Petitioners provide an analysis that looks to interrelated teachings of multiple patents, the effects of demands known to the design community or otherwise present in the marketplace, and the background knowledge possessed by a POSA. A patent cannot be proven obvious by mere conclusory statements: the analysis should be made explicit. An expert must make sufficient showing through his own analysis rather than simply drawing unsubstantiated conclusions.

58. I understand that one must be careful not to determine obviousness using hindsight because many inventions might seem obvious after the fact. A determination of obviousness should be based on the position of a POSA in the field of the invention as of the effective filing date of the claimed invention. The teachings of the '622 patent are not to be used as a guide through the maze of available references, combining selected references so as to achieve a result approximating those of the Challenged Claims.

59. I understand that objective evidence relevant to the issue of obviousness must also be considered. Such evidence may include evidence of commercial

success, long-felt but unsolved need, failure of others, licenses, skepticism, and unexpected results. I understand that such evidence may be included in the specification as filed, accompany the application on filing, or be provided in a timely manner at some other point during the prosecution of the asserted patent. In addition, I understand that such objective evidence may be raised for the first time during litigation. I reserve the right to address any issues related to objective evidence should Patent Owner or its expert(s) assert them as evidence of obviousness.

60. In this declaration, I am interpreting the claim terms based on my understanding as a POSA. My opinions regarding the knowledge and qualifications of a POSA are set forth below. I understand that none of the claim terms have been construed by a court or in any prior administrative proceeding.

C. Burden of Proof

61. It is my understanding that it is Petitioners' burden to prove unpatentability by a preponderance of the evidence.

**VI. BACKGROUND KNOWLEDGE THAT A PERSON HAVING
ORDINARY SKILL IN THE ART WILL UNDERSTAND**

62. Table saws are useful woodworking tools for making accurate cuts in stock. There are many models of table saws available on the market—both consumer grade and professional grade. However, all of these table saws have the same basic anatomy. All table saws have a table (where the workpiece rests) that sits on a base;

rails and a rip fence (to guide the workpiece); a circular rotating blade to cut the workpiece; and a motor, trunnions and arbor assembly (the primary mechanical components).

63. A table saw has an exposed rotating blade that a user pushes a workpiece through to cut it. That exposed rotating blade can severely injure the operator or those around the operator. More detail on this is provided below.

64. Table saws can be made safer by adding certain devices like a blade guard and a riving knife. These will be discussed in more detail below.

65. Adding a blade guard, a component to cover the blade, is one such safety device and has been known in the art for at least a century. EX1006, 1:8-9. A riving knife can also be added to further protect the user by holding the blade guard and by guiding the workpiece through the machine. Riving knives are safety devices that have been known in the art for decades. I first encountered riving knives in the 1980s. Riving knives/splitters, examples of “support frames” of the ’622 patent, help prevent kickback, which occurs when the rotating blade launches a workpiece toward the user.

66. However, it has been a known problem in the art that there is resistance to using riving knives and blade guard assemblies because of the difficulty of installation, removal, and use. A POSA would be well aware of the specific

challenges associated with these safety devices and would be motivated to find a solution that would increase the use of the devices to improve operator safety.

A. The Lexicon: Riving Knives, Spreaders, and Splitters

67. The above terms appear in the prior art, and all would be familiar to a POSA. As an initial matter, a POSA would understand that all three of these devices are support frames as claimed by the '622 patent. Each one of these devices could hold a protective cover (blade guard).

68. A POSA would understand that splitters and spreaders, also known in the art for decades, are meant to achieve the same objective as the riving knife: to reduce the occurrence of kickback. A POSA would understand that a splitter/spreader can be used in place of a riving knife. As described by Gass, “[s]ome table saws include a spreader or splitter instead of a riving knife.” EX1003, 1:59-60.

69. According to an explanatory note in the 2004 publication of American National Standards Institute’s safety standard, “[t]he term splitter is synonymous with spreader and a ‘riving’ knife is a spreader that remains in a fixed relationship to the blade . . .” EX1007, 35 (E3.19.5). Further, the three devices share a definition as depicted below in “3.19.5 spreader/splitter/riving knife.”

3.19.5 spreader/splitter/riving knife

A flat metal device slightly narrower than the saw kerf designed to prevent the saw blade kerf in the workpiece from closing on the sides of the blade during a sawing operation.

E3.19.5 spreader/splitter/riving knife

The term *splitter* is synonymous with *spreader* and a “*riving*” knife is a spreader that remains in a fixed relationship to the blade regardless of its height above the table. See illustration 23.

3.19.5 of ANSI O.1.1

70. ANSI O1.1 shows examples of a blade guard and splitter with the splitter supporting the blade guard. The splitter and riving knife are designated in light blue in Illustrations 23A and B. Illustration 7E shows that the splitter and the riving knife would be positioned slightly differently on the saw.

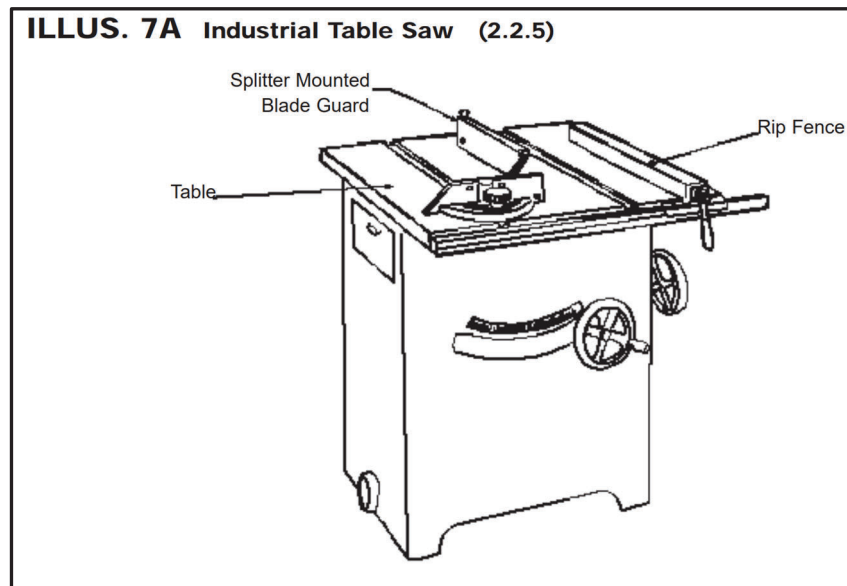


Illustration 7A of ANSI O.1.1

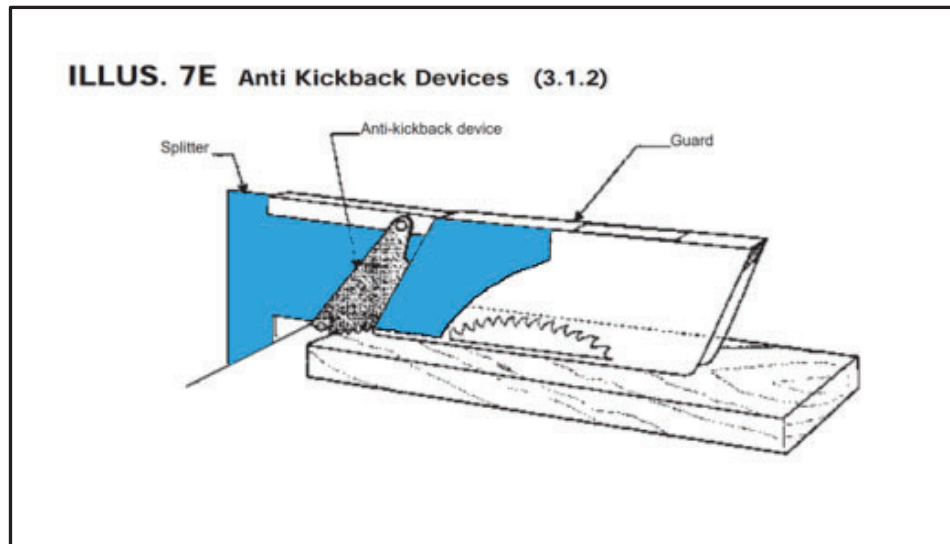
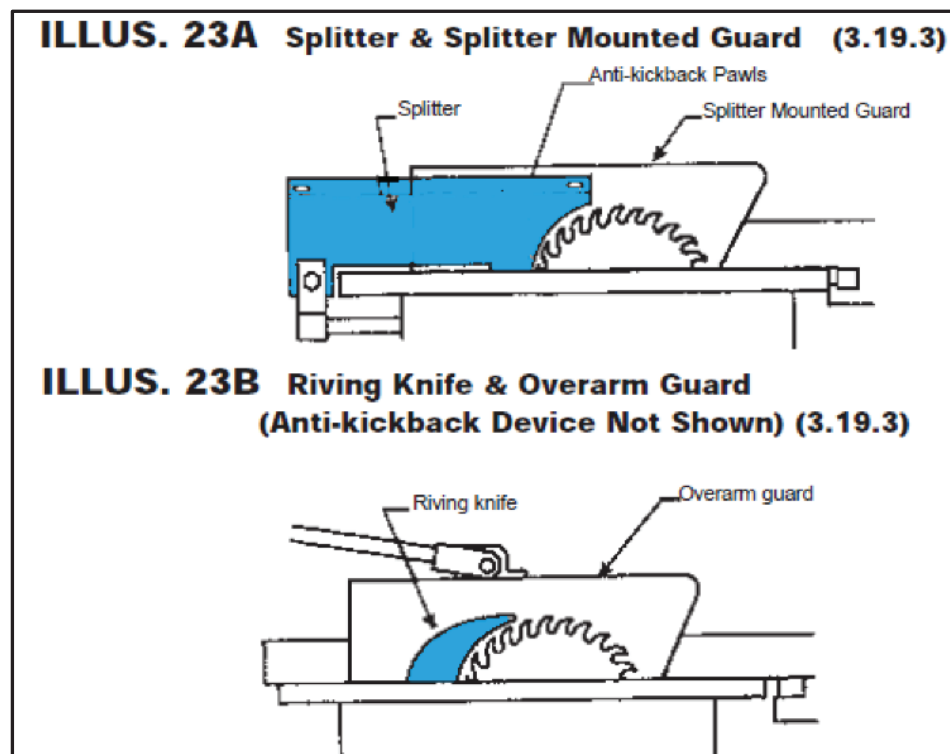


Illustration 7E of ANSI O.1.1



Illustrations 23A & 23B of ANSI O.1.1

71. Given the similarities in structure and purpose, a POSA would understand that any prior art directed to splitters/spreaders would equally apply to riving knives. Further, any modifications that would be obvious to a POSA to apply

to a splitter/spreader would be equally as obvious to apply to a riving knife. Accordingly, for the purposes of the limitations of the Challenged Claims, a POSA would understand a splitter/spreader to be interchangeable with a riving knife.

B. Riving Knives and Blade Guards Have Long Been Important Safety Devices

72. A riving knife is an important safety element of a table saw, as is a blade guard. However, as stated above, there is resistance to using these safety devices because of the difficulty of installation, removal, and use. As such, a POSA, a cabinet maker, a carpenter, a contractor, or any regular user of a table saw would be keenly aware of the need for an improved design for the riving knife/blade guard assembly.

73. In particular, a POSA, a cabinet maker, a carpenter, a contractor, or any regular user of a table saw would have been aware of the specific challenges associated with, and in using, a riving knife/blade guard assembly, including, but not limited to:

- misalignment of the saw blade and the riving knife/blade guard assembly;
- difficulty in removing and reinstalling the riving knife;
- inability or decreased ability to see the cut due to the blade guard assembly blocking a user's line of sight;
- interference with the workpiece, requiring removal or repositioning of the riving assembly; and

- hazards of misalignment and resulting damage to the work piece.

C. Technical Literature

74. The technical literature is replete with information related to table saw injuries. Safety devices for table saws and similar cutting tools are so important that the U.S. Consumer Product and Safety Commission began to take notice. One study, conducted at the time of the claimed priority date of the '622 patent, determined the following:

- Injuries to operators were due to contacting the blade in 88.0 percent of the cases, and when blade contact caused the injury, the blade was contacted above the top of the cutting surface in 56.9 percent of the cases.

- At the time of the injury, the saw did not have a safety switch in 78.7 percent of the cases, and the saw blade was not protected by a blade guard in 65.7 percent of the cases. In most cases, the blade guard was removed (75.0 percent) for operational convenience. A riving knife was attached to the saw in 20.4 percent of the cases, and an anti-kickback pawl or spreader assembly was attached to the saw in 24.4 percent of the cases.

- Overall, the stock kicked back or jumped in 40.5 percent of the cases. In 93.7 percent of the cases in which the stock kicked back or jumped, the operator thought that the blade contact was due to the stock kickback. When the stock kickback caused the injury, the operator's hand was pulled into the saw in 65.2 percent of the cases.

Annotated Pages 3-4 of Chowdhury

EX1008, 3-4.

75. Moreover, this study, and others, document that table saw operators are injured using table saws, particularly when safety devices, such as riving knives and

blade guards, are not used. The hazards of using table saws without guards or other safety devices is well known in industry.

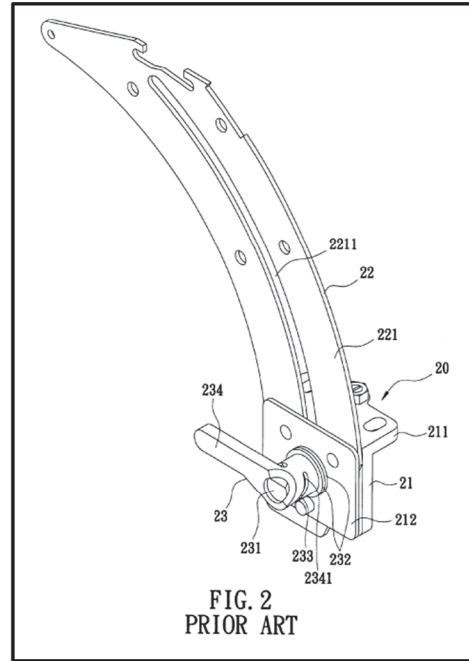
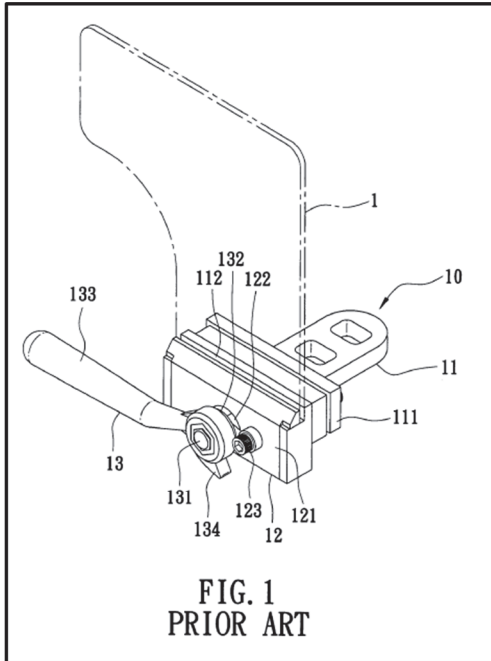
VII. STATE OF THE ART

76. The following section describes the state of the art for the design of table saws, including table saw riving knives, clamps, saw guards, and related arts as of the priority date and before. The prior art references, and the discussions of what was known to a POSA, provide the factual support for the general description of the state of the art at the time of the purported invention. The interpretation of the prior art references provides the basis for the motivation to modify or combine them. This analysis will show that all the elements of the purported invention of the '622 patent are described in the prior art.

A. Applicant Admitted Prior Art (“AAPA”)

i. Status as Prior Art

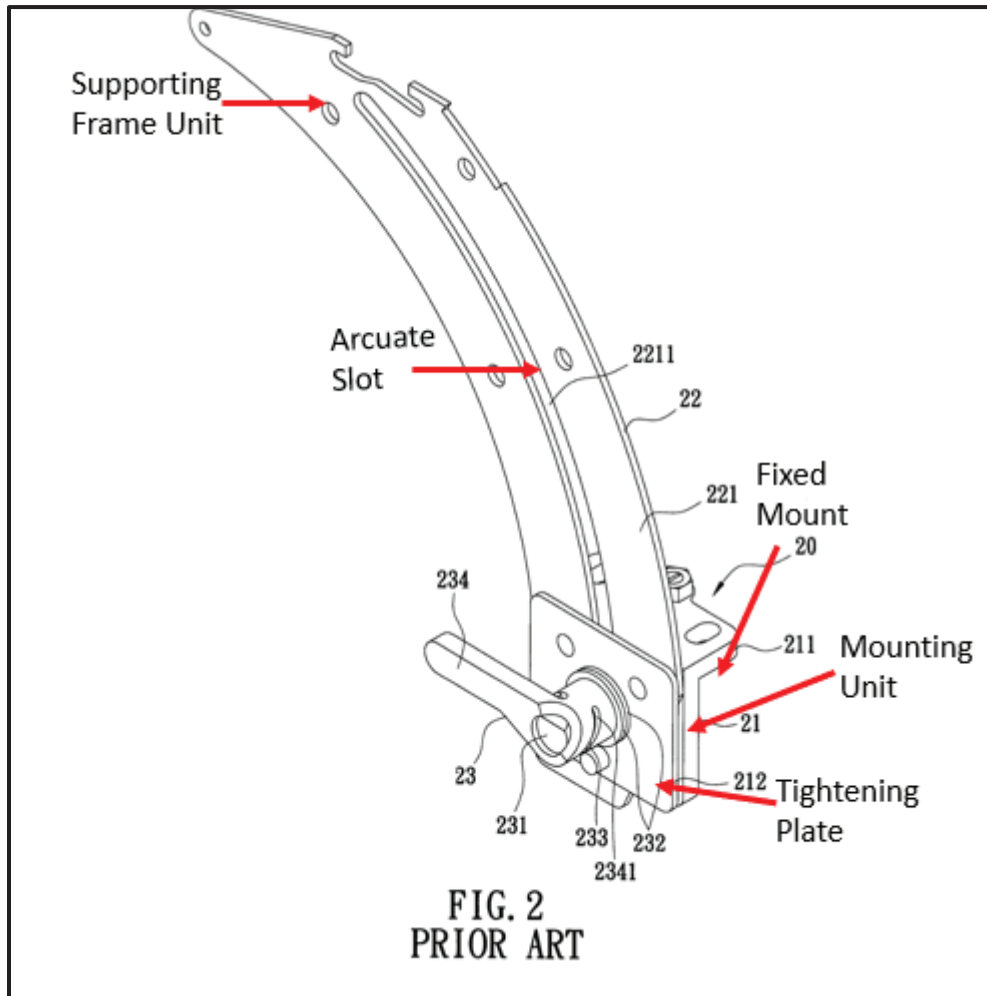
77. I have been informed by counsel that Figures 1 and 2 and the related narrative disclosure in the '622 patent is admitted by the Applicant to be prior art (referred to herein as “AAPA”). I note that Figures 1 and 2 of the '622 patent are labeled “prior art” and the narrative disclosure describing those figures refers to them as a “conventional table cutting machine.” EX1001, 1:14-20. A POSA would be able to make the device claimed by the '622 patent based on AAPA.



ii. Overview of AAPA

78. The '622 patent describes an embodiment of a supporting frame having a “fixed mount unit 11” with a “fixed mount 111;” “a tightening mount unit 12,” “a supporting frame 1,” which is “adapted to hold a protective cover” that is clamped and positioned by “operat[ion of a] handgrip 133 to rotate the cam piece 132” and press the “cam follower piece 122” “toward the fixed mount 111.” *Id.*, 1:14-26, 39-44, Figs. 1 & 2.

79. The '622 patent further describes a second embodiment with a “mounting unit 21,” “fixed mount 211,” “supporting frame unit 22,” “arcuate slot 2211,” and “tightening plate 212” of Figure 2 are already within the scope of the prior art. *Id.*, 1:50-56, Fig. 2.



Annotated Fig. 2 of AAPA

B. Garcia

i. Status as Prior Art

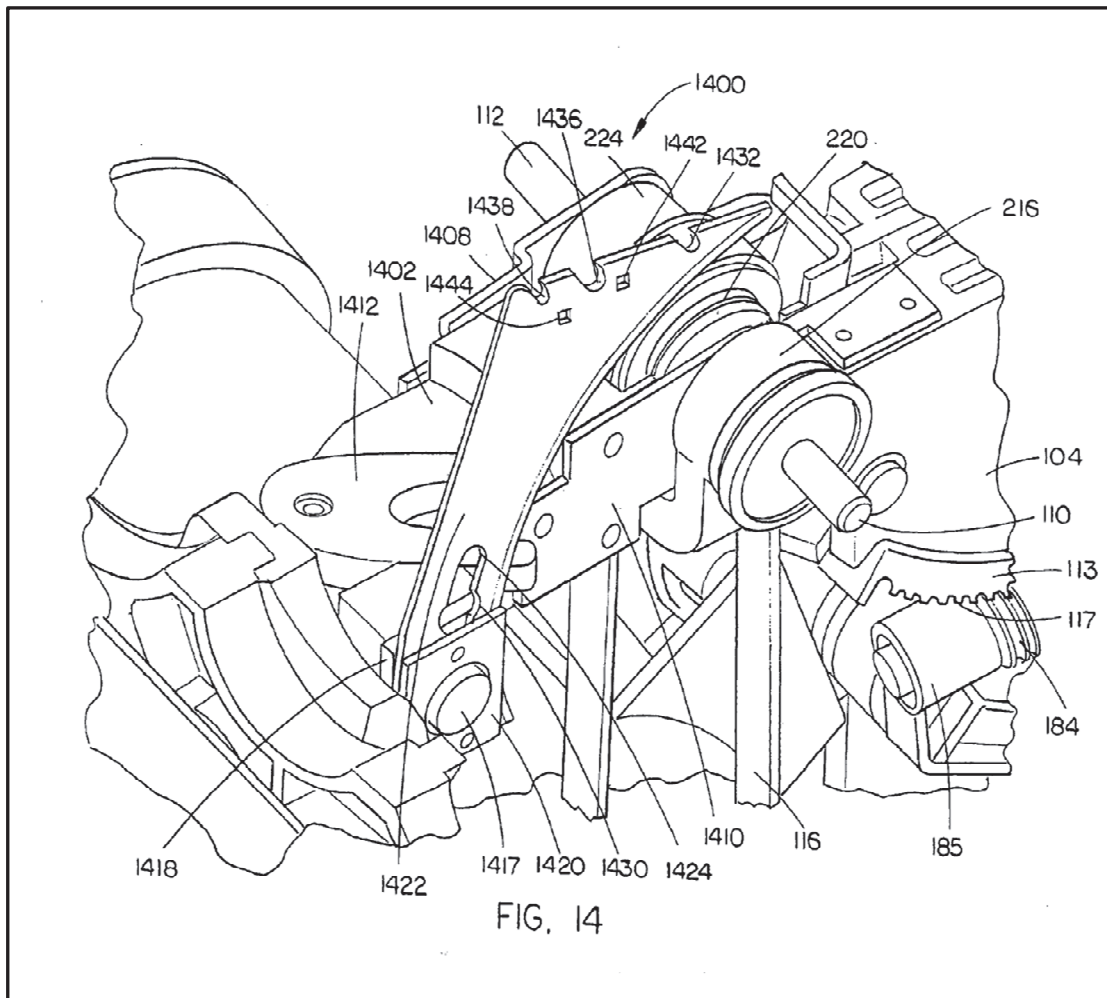
80. The application for U.S. Patent Publication No. 2005/0160895 entitled “Dual Bevel Table Saw” (“Garcia”) was filed on October 19, 2004 and was published on July 28, 2005. Thus, it is my understanding that Garcia qualifies as prior art to the ’622 patent (EX1001).

ii. Overview of Garcia

81. The object of Garcia is to provide a table saw with a blade and component parts that can be adjusted to fit the user's specific needs. EX1009, ¶0007.

82. Garcia is directed to "the field of table saws" and improvements thereto. *Id.*, ¶0002. Specifically, Garcia teaches "[a] dual bevel table saw [is] a table saw enabled with a dual sided arbor assembly and a bi-directional bevel assembly" wherein the "dual sided arbor assembly coupled with the bevel assembly further provides for the positioning of a motor and a saw blade to allow for the full range of angular adjustment to be enabled without having to sacrifice any of the cutting features of the saw blade such as depth of cut." *Id.*, Abstract. Garcia further teaches that the dual bevel table saw may "further include a companion saw assembly to provide increased functionality provided by the dual bevel table saw." *Id.*

83. Garcia further teaches a riving knife assembly 1400, which may be coupled with the dual bevel table saw as shown, e.g., in Figure 14 below and which can be adjusted vertically in relation to any height adjustment made to the saw blade:



Garcia Fig. 14

Id., ¶0102, Fig. 14.

84. Garcia further teaches that riving knife assembly 1400 may further include a riving knife guard assembly which may be removably coupled with the riving knife assembly. The guard assembly is pictured below.

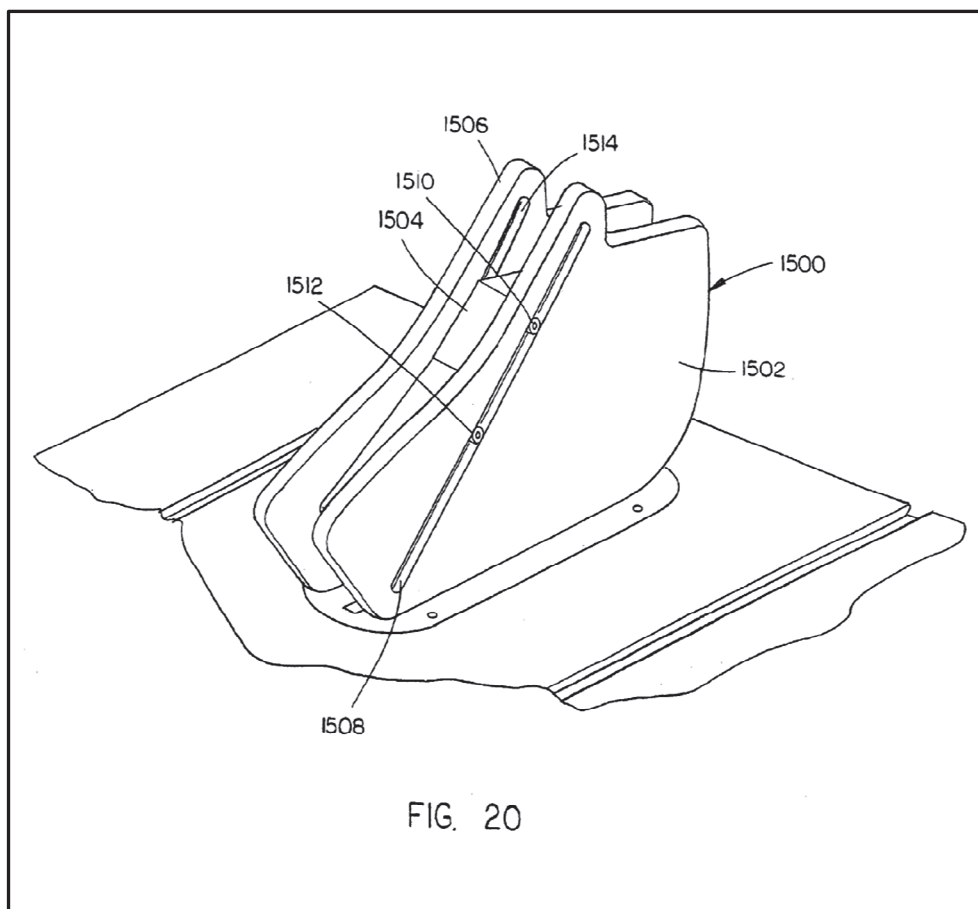
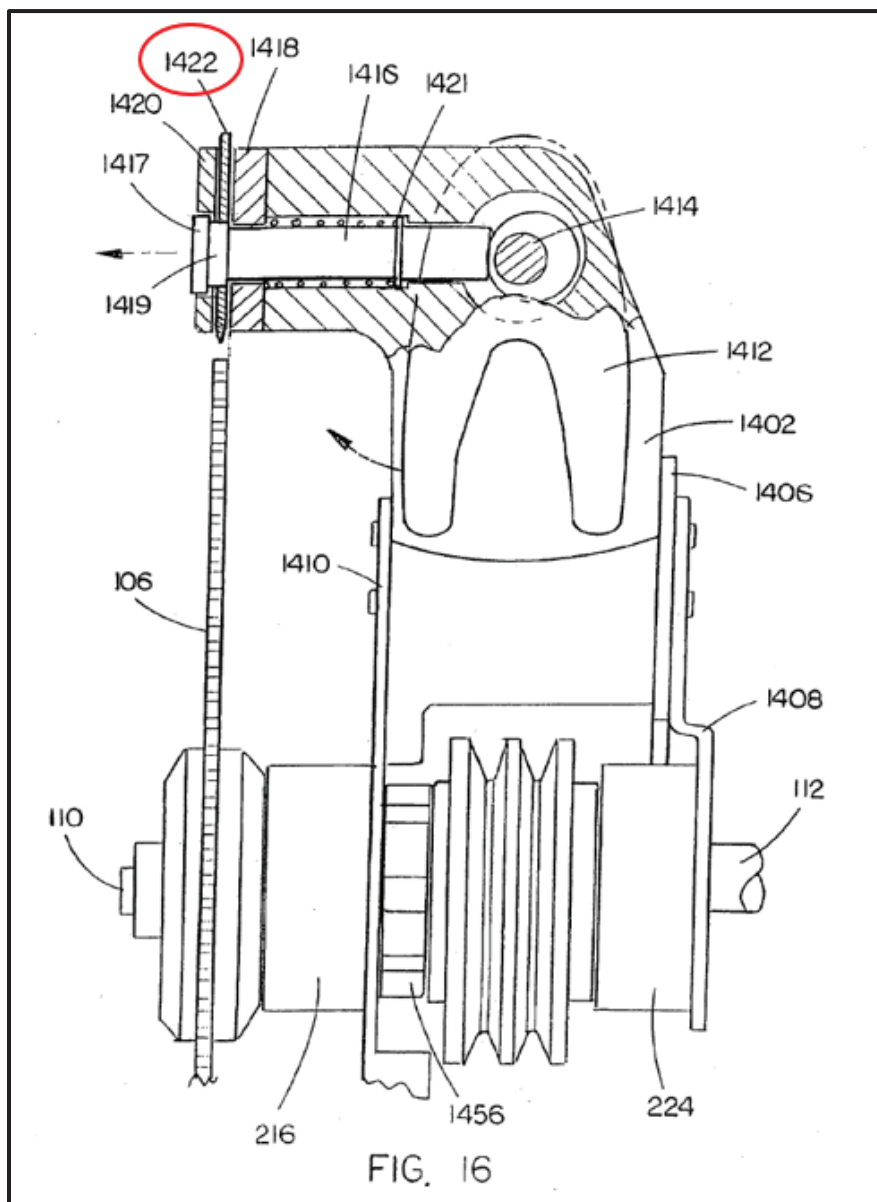


FIG. 20

Garcia Fig. 20

Id., ¶0115, Fig. 20.

85. Garcia teaches a “guard assembly which may be removably coupled with the riving knife assembly.” *Id.*, ¶ 0115. The guard assembly may be mounted on the second end of the riving knife 1422, distal to the table top. *Id.*



Annotated Garcia Fig. 16

Id., ¶0104, Fig. 16.

86. Garcia further discloses that its invention allows the operator to determine the height of the riving knife and secure it in position via a slot:

The locking pin 1415, second mounting member 1418, and the sheathing member 1420, are configured to engage the riving knife 1422. The riving knife 1422 includes an engagement assembly 1424 extending at least partially along the length of the

riving knife 1422. In the preferred embodiment, the engagement assembly 1424 is a slot defining a recess within the riving knife 1422, beginning at a first end 1426 of the riving knife 1422. The slot of engagement assembly 1424 further defines a first locking assembly 1428 and a second locking assembly 1430. In the current embodiment, the first and second locking assemblies are circular apertures which allow the circular engagement member 1419 of the locking pin 1415 to engage in preset locations and securely establish the position of the riving knife 1422.

Id., ¶0105.

87. Further to this, Garcia states that the “slot” allows the “locking pin 1415 to slidably engage within.” *Id.*, ¶0107. This allows the user to determine “the desired setting of the riving knife 1422 using the first and second locking assemblies.” *Id.* Once the user has chosen their setting, they “engage[] the circular engagement member 1419 within one of the cut outs of the first and second locking assemblies, by adjusting the quick release handle 1412 into the locked position.” *Id.* The eccentric shaft is disengaged, allowing the “spring to return to its original position which forces the head member 1417, circular engagement member 1419, and the sheathing member 1420 against the riving knife 1422.” *Id.* Just like the ’622 patent, Garcia teaches that “[t]he force of the compression spring translated through the head member 1417, circular engagement member 1419, and the sheathing member 1420 may securely affix the position of the riving knife 1422 relative to the saw blade 106.” *Id.*

88. Garcia further discloses the use of a compression spring on the tightening member of the disclosed riving knife clamp, teaching that the biasing force imparted by the spring is an important part of the device:

In the preferred embodiment, the spring loaded assembly comprises a compression spring disposed within the locking pin body 1416 and engaging on one end with a retaining member 1421 and on the other end with the head member 1417. The compression spring is biased to an original position which maintains the head member 1417 in the locked position.

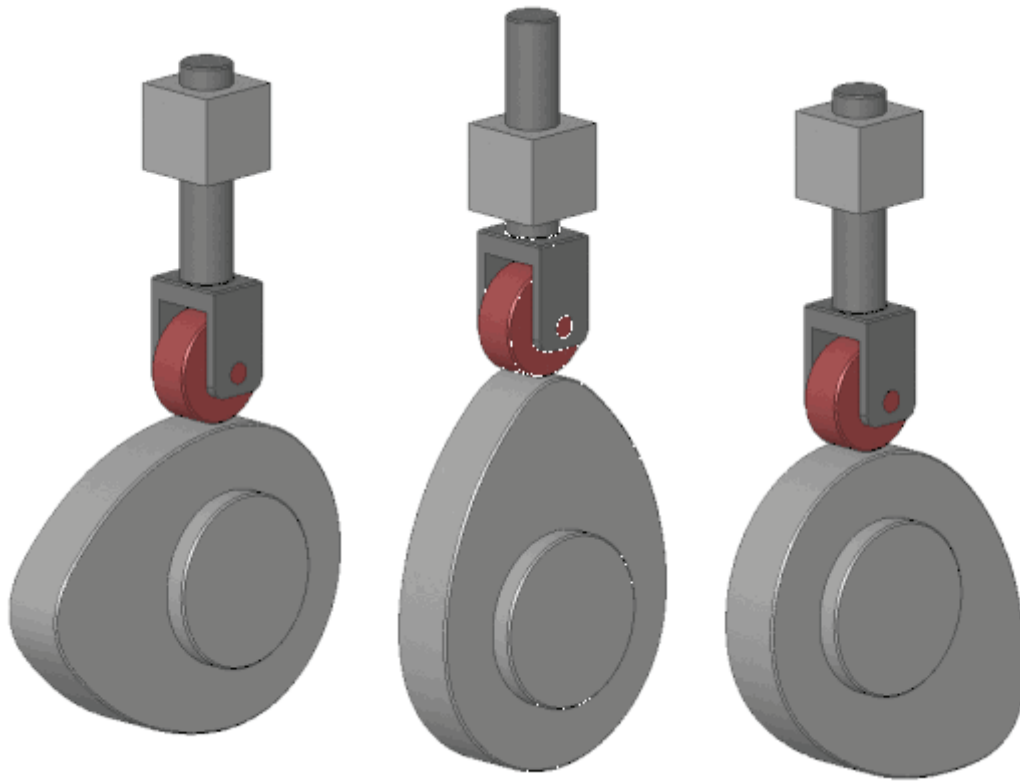
Id., ¶0104, Fig. 16.

89. A POSA would be very familiar with the use of compression springs in tools: compression springs are commonly used to apply a biasing force in a limited area. A classic compression spring is a helical spring with an open coil made of one of several metal material options. A POSA would know that the purpose of a compression spring is to absorb energy as it is displaced/compressed, and release the energy when the compressing force is released. A POSA would know that a compression spring can be used in power tools, like table saws, in a variety of applications that require an axially-applied compressive force. A POSA would know that as the compression spring is compressed to a shorter height, it provides a returning force to spring back to its normal height. Springs can come in various body sizes, diameters and pitches depending on the application. One of the primary functions of a compression spring is to maintain a contact force between two static

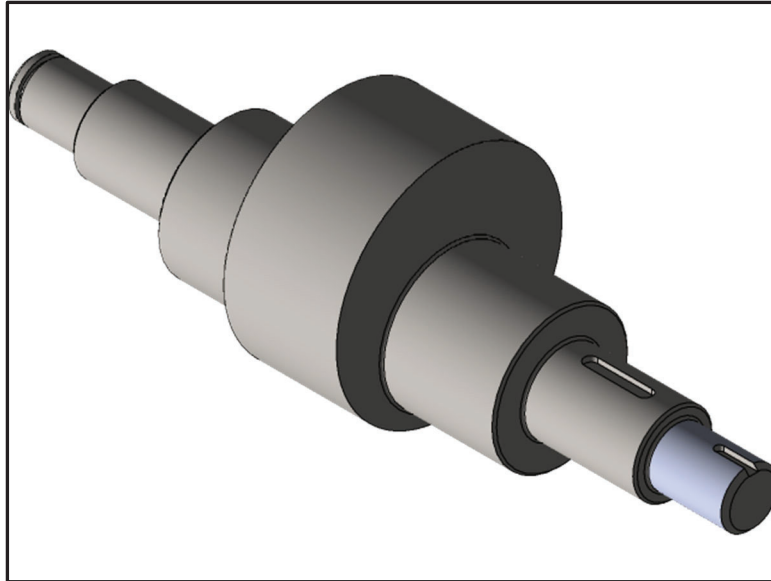
or dynamic members. Compression springs are commonly used for this purpose in both radial and axial cams.

90. Garcia further discloses an “eccentric shaft 1414,” which is a type of cam, and a “quick release handle 1412.” *See id.*, ¶0104.

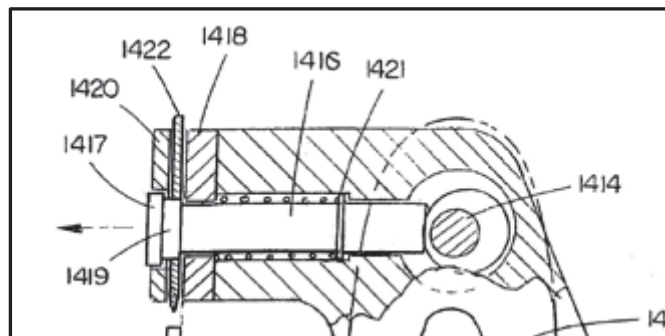
91. Cams in general allow for the translation of a rotary force/motion to a linear force/motion, and can provide mechanical advantage, all in a relatively compact space. Cams are further classified by the direction of the linear motion in relation to the axis of rotation: axial cams generate linear motion parallel to the axis of rotation whereas radial cams generate motion perpendicular (radial) to the axis of motion. An informative animation of this is available at <wiki.dtonline.org/index.php/Category:Cams>. Three still shots of the animation showing the rotary motion of the cam appear below.



92. Eccentric cams with a circular (versus lobed) profile provide the features of radial cams, combined with simplicity and ease of manufacture. Eccentric cams facilitate linear displacement of a following member using a rotating shaft. This allows for improved space usage and also imparts the force from a location at a distance from the point of operation. As the shaft rotates, the following member linearly displaces according to the path of the eccentricity. An example of a standard eccentric shaft is reproduced below.



93. In the Garcia embodiment shown in Figure 16, a portion of which is reproduced below, as the shaft 1414 is rotated, the eccentric disc imparts or releases a linear force to the compression spring assembly of 1416.



Reproduction of a Portion of Garcia's Fig. 16

94. Cams can also be further classified by shape of the component parts. For example, the Garcia embodiment teaches a cam mechanism that comprises an eccentric shaft and a locking pin that contacts the shaft at a right angle ("Garcia cam"). The Gass embodiment, described in further detail below, teaches a cam

mechanism that comprises two discs with sloped faces moving against one another (“Gass cam”).

95. A POSA would know that each of these approaches is a design choice to achieve the identical result of translating angular displacement by imparting forces to linearly displace the follower member. The above-referenced cams share common use in many machine design applications and a POSA might choose between them based on the desired physical arrangement of the components for access/ease of use. A POSA might choose to use the Gass cam over the Garcia cam in certain applications because the Gass cam occupies less space with component parts that are easier to align and may be less expensive to manufacture (because it may use less material than the Garcia cam).

96. The linear displacement of a compression spring using the Garcia cam could also be achieved using the Gass cam design. When rotated, the Gass cam increases or decreases the displacement based on the cam design (angle of inclination, amount of rotation, etc.). The resultant compressive force on the spring would increase or decrease based on the rotation of the cam as it follows the face along the angular incline of the cam.

C. Gass

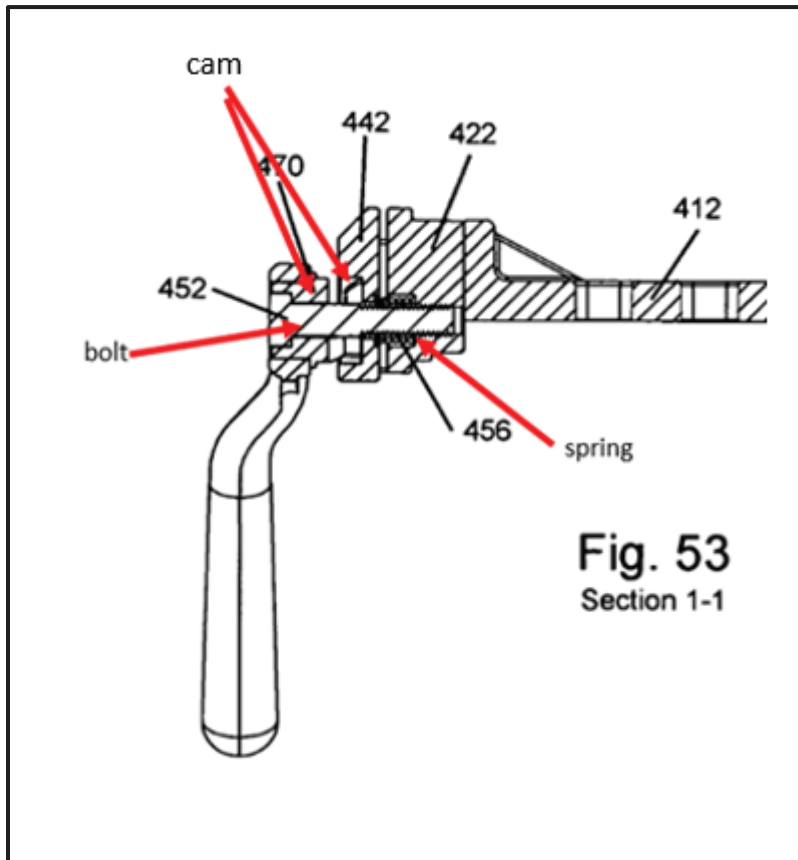
i. Status as Prior Art

97. U.S. Patent No. 7,827,890 to Gass et al. entitled “Table Saws With Safety Systems and Systems to Mount and Index Attachments” (“Gass”) was filed on January 28, 2005 and issued on November 9, 2010. Thus, it is my understanding that Gass qualifies as prior art to the ’622 patent (EX1001).

ii. Overview of Gass

98. Gass is directed to “[t]able saws having a mounting system configured to hold a riving knife or splitter adjacent a blade.” EX1003, Abstract.

99. Gass also discloses, among other features, a “riving knife” or “splitter” (support frame) with a “blade guard” (protective cover) and held by a clamp (*id.*, 18:41-47, 24:47-52, 27:37-45); and a spring sleeved on a bolt (*id.*, 20:55-62, 21:59-65, Fig. 53). Some of these components, which are also taught in the ’622 patent, are labelled in annotated Figure 3 of Gass below.



Annotated Fig. 53 of Gass

100. Gass teaches the importance of various safety systems or features incorporated into table saws and their attachments in order to minimize the risk of injury, including “riving knives, blade guards, splitters and anti-kickback pawls.” *Id.*, 1:29-2:11.

101. Gass teaches that the most common safety feature is a guard that “physically blocks an operator from making contact with the blade,” but that while “guards effectively reduce the risk of injury . . . there are many instances where the nature of the operations to be performed precludes using a guard that completely blocks access to the blade.” *Id.*, 1:41-48.

102. Gass underscores the importance of including a saw guard as it identifies saw guards as “the most common safety feature” that “effectively reduce the risk of injury.” *See id.*, 1:41-48.

103. Gass further teaches that another safety device that can be incorporated into a table saw is a riving knife which “is a fin-like plate positioned adjacent the rear edge of the saw blade and within the projected kerf and top-to-bottom cutting capacity of the blade” which “functions to keep a work piece from shifting sideways and catching on the rear edge of the blade and being kicked back at the user by the blade.” *Id.*, 1:49-55.

104. Gass further teaches that the riving knife is mounted in a table saw so that it remains in a fixed position relative to the blade as the blade tilts and changes elevation. *Id.*, 1:55-58.

105. Gass further teaches that “[s]ome table saws include a spreader or splitter instead of a riving knife” and further discloses that “[a] splitter is a flat plate, similar to a riving knife” *Id.*, 1:59-63, 27:37-57. According to Gass, the “[s]plitters typically tilt with the blade, but do not move up and down with the blade.” *Id.*, 1:66-67.

106. Gass further teaches anti-kickback devices, such as anti-kickback pawls, “which are toothed pawls positioned to oppose a work piece being thrown back toward a user, are often mounted on the splitter.” *Id.*, 1:63-66.

107. Gass teaches that quick and easy removal and placement of a riving knife or splitter is directed to the safety of a table saw user. *See id.*, 1:49-67 (“A riving knife functions to keep a work piece from shifting sideways and catching on the rear edge of the blade and being kicked back at the user by the blade.”).

108. Gass also discloses:

There are some cuts, however, where a riving knife may not be used, such as a plunge cut where the blade is raised up into a workpiece and a cove cut where the workpiece is moved past the blade at an angle relative to the plane of the blade so that the blade removes a groove or cove of material. In both those cuts, the riving knife would be outside the cut produced by the blade and would abut the workpiece. . . . Similarly, dado blades (which are stacks of blades mounted on the saw to cut a groove in a workpiece) are typically smaller in diameter than normal blades so riving knives designed for normal blades would extend above the dado could not be used because they would abut the workpiece. Dados are also substantially thicker than normal blades and therefore a riving knife designed for a single blade might not impede a workpiece from catching the back edge of a dado stack.

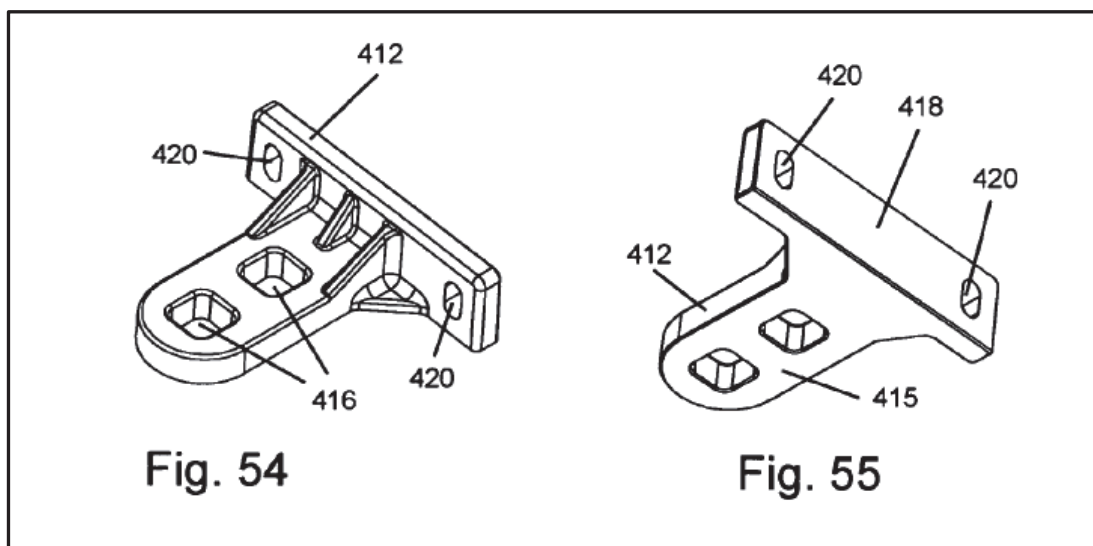
It is desirable for a user to be able to install and remove the riving knife quickly and easily when performing different operations with the saw so that the riving knife is not an inconvenience. For example, if a user needs to make both non-through and dado cuts, then the user will have to remove the riving knife before and re-install it after each dado cut. If it were complicated, difficult or time consuming to remove and reinstall the riving knife between the different cutting operations, then it would be less likely a person would use the riving knife.

Id., 19:37-65 (parenthetical in original; italics emphasis added).

109. Gass explicitly discloses raising and lowering the riving knife. *Id.*, 24:9-12 (disclosing “[t]he elevation or height of the riving knife relative to the blade may be adjusted by loosening bolts 424, moving positioning plate 422 up or down as necessary, and then re-tightening the bolts”).

110. Gass also teaches that the component supporting the riving knife may be adjustable so that it can properly support the riving knife as it is moved into place by the user. *Id.*, 20:19-38.

111. Like the ’622 patent, Gass further discloses mounting plate 412, which includes a flat bottom surface 415 that rests on raised portion 250 of the elevation plate, wherein two holes 416 pass through the mounting plate and bolts 414 extend through those holes and are threaded into corresponding holes on raised portion 250, as shown in Figs. 54 and 55 below.



Figs. 54 & 55 of Gass

Id., 20:3-11.

112. Gass also discloses the use of a spring on the “tightening member” of the disclosed riving knife clamp, teaching that the biasing force imparted by the spring is an important part of the device:

A spring 456, shown in FIG. 53, is placed over bolt 452 and is at least partially contained in a first circular recess 458 in positioning plate 422 and in a second circular recess 460 in clamping plate 444. Spring 456 may be a compression spring, a wave compression spring or some other spring.

Id., 20:55-62; *see also id.*, 21:59-65 & Fig. 53.

113. Gass further discloses that the “[s]pring 456 is sized and selected so that it is at least partially compressed even when the mounting system is in the open position. For example, the spring may be sized and selected so that it applies 5 to 15 pounds of force against the clamping plate in the open position, and more force when compressed.” *Id.*, 22:16-21. A POSA would understand from the disclosure of Gass and the function of a compression spring is that the further the spring is compressed, for example, when the mounting system is in a closed position, the higher the biasing force would be exerted on the clamping plate and cams.

114. Compression springs, like the one of Gass, would have long been known to a POSA. This is described above at paragraph 89.

115. Gass also teaches, in granular detail, a camming method using cam surfaces and cam follower surfaces that are disc shaped with faces having sloped surfaces in contact. *See, e.g., id.*, 20:63-21:8, 22:49-23:30 & Figs. 60 & 61. The

purpose of this is to translate rotational motion of the cam into linear displacement along the shaft of the cam, causing the clamping assembly to compress and release as the cam is rotated. Gass identifies that different rotational cam configurations can achieve a specified linear displacement, and provides specific examples of rotation and cam incline solutions without limiting other combinations applying the same engineering principles described in Gass.

116. Like the Garcia cam, the Gass cam converts rotational motion of a shaft into linear displacement of a following member. However, the Gass cam creates the displacement in line with the rotational shaft. As the Gass cam shaft rotates, the following member of the cam surface displaces according to the path of the cam angle. This is exactly how a POSA would understand camming to work. The Gass cams are simple, compact, and durable given their limited number of parts. In this application, a POSA would understand that when rotated, the Gass cam increases or decreases the displacement and resultant compressive force on the clamping assembly based on the movement of the cam and following face along the angular incline of the cam.

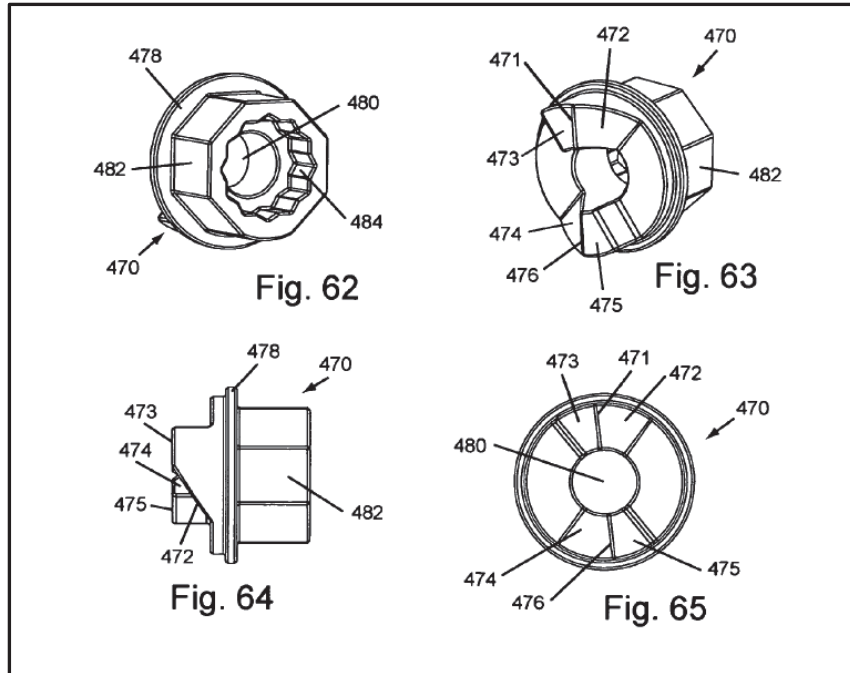
117. Gass discloses that when the handle is “moved down” to clamp the riving knife, this movement “causes cam bushing 470 to turn” and “[w]hen the cam bushing turns, cam surfaces 472 and 474 and/or leading edges 471 and 476 slide up

cam surfaces 462 and 464, respectively, on the clamping plate and push the clamping plate toward the positioning plate.” *Id.*, 22:32-38.

118. Further, Gass teaches that “[w]hen edges 471 and 476 move to the top of cam surfaces 462 and 464, cam surfaces 473 and 475 on the cam bushing will engage cam surfaces 463 and 465 on the clamping plate” and continuing to move the handle downward “will then cause cam surfaces 473 and 475 to slide over cam surfaces 463 and 465.” *Id.*, 22:49-54.

119. Gass also teaches that “the geometry of the cam surfaces prevents vibration or other factors from causing the mounting system to unclamp or open.” *Id.*, 22:57-59. This is noteworthy because the ’622 patent identifies the aforementioned vibrations as a known problem in the art that is solved by the Challenged Claims. However, Gass has already identified and solved this problem.

120. Figures 62-65 shown below show the cam bushings used in the mounting system of Gass.

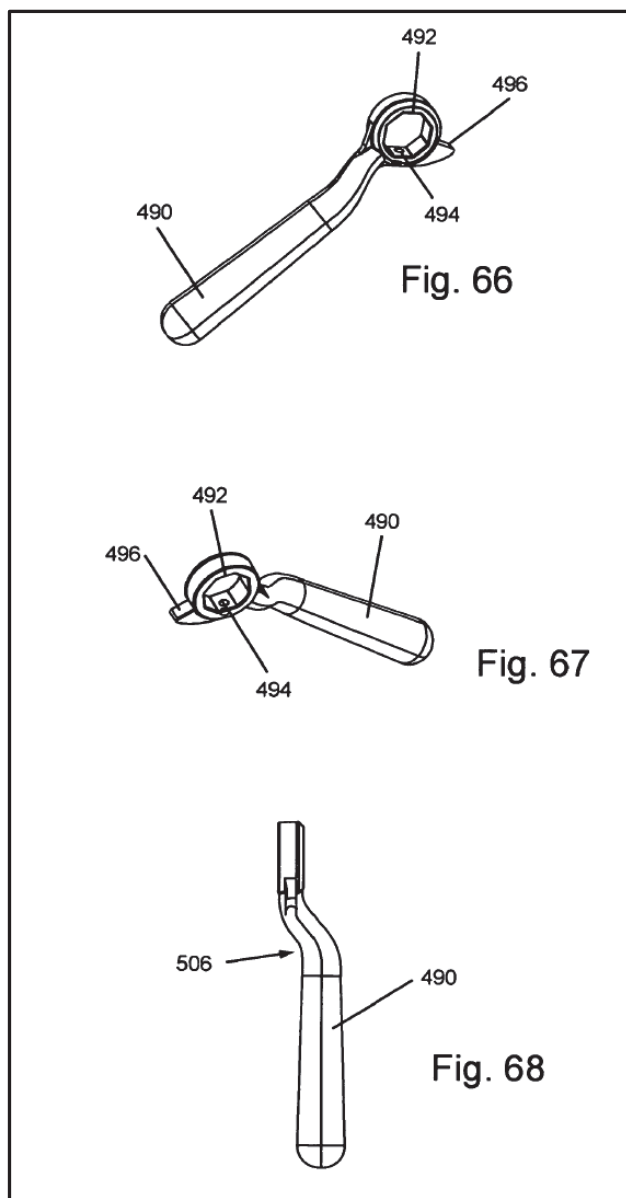


Figs. 62-65 of Gass

Id., 4:3-10, 21:9-29, Figs. 62-65.

121. Gass discloses that, “[w]hen handle 490 is moved up to open the clamp, the handle turns cam bushing 470 so that the cam bushing fits into recess 466 on the clamping plate without engaging the cam surfaces.” *Id.*, 21:59-62.

122. Gass further discloses a handle 490, shown in Figures 66-68 below, which has an elongated body with an 8-facet socket 492 at one end configured to fit over octagon-shaped drive head 482 on cam bushing 470.



Figs. 66-68 of Gass

Id., 21:30-36, 21:46-58; Figs. 66-68.

D. Burke

i. Status as Prior Art

123. U.S. Patent No. 7,437,981 to Burke entitled “Modular Guard System and Apparatus for a Power Saw” (“Burke”) was filed on November 21, 2005 and

issued on October 21, 2008. Thus, it is my understanding that Burke qualifies as prior art to the '622 patent (EX1001).

ii. Overview of Burke

124. Burke is directed to “a modular saw guard system for a power saw of the type which has a table top, and a rotatable circular saw blade” and discloses a “blade guard mechanism that is releasably mounted to the riving knife mechanism.” EX1010, Abstract.

125. Burke discloses the benefits of an adjustable riving knife, teaching that that the riving knife need not be completely removed to make specialty cuts and instead can be “easily adjusted to its extended position where the blade guard mechanism and kickback prevention mechanism can be quickly attached,” and that the adjustable riving knife “maintains [its] alignment relative to the blade and therefore does not have to be realigned when it is adjusted to its extended positions.” *Id.*, 3:41-58 & Claim 3.

126. In particular, Burke discloses that “[s]ince the preferred embodiment of the riving knife mechanism can be adjusted among several positions, one of which is a fully retracted position that is below the table top, there is no need to remove it completely from the table saw.” *Id.*, 4:10-14.

127. Burke recognizes that a simple slot in the riving knife would eliminate, or reduce the impact of, many of the difficulties users have with a riving knife (e.g.,

the knife cannot be used when making certain cuts and that the knife is bothersome to detach and reattach). Burke discloses:

Since the preferred embodiment of the riving knife mechanism can be adjusted among several positions, one of which is a fully retracted position that is below the table top, there is no need to remove it completely from the table saw. When the other mechanisms that are normally mounted to the riving knife mechanism are detached from the saw, the riving knife mechanism can be easily retracted and be completely out of view. This is a desirable feature, because it can be quickly and easily adjusted to one of its extended and intermediate positions. The convenience of this capability encourages the use of these safety features.

Id., 4:10-21.

128. Burke further discloses a blade guard mechanism, as shown in Figure 8 below, which is “releasably mounted to the riving knife mechanism when the riving knife mechanism is at least in its extended position” which generally covers the blade” *Id.*, 1:44-65, Fig. 8:

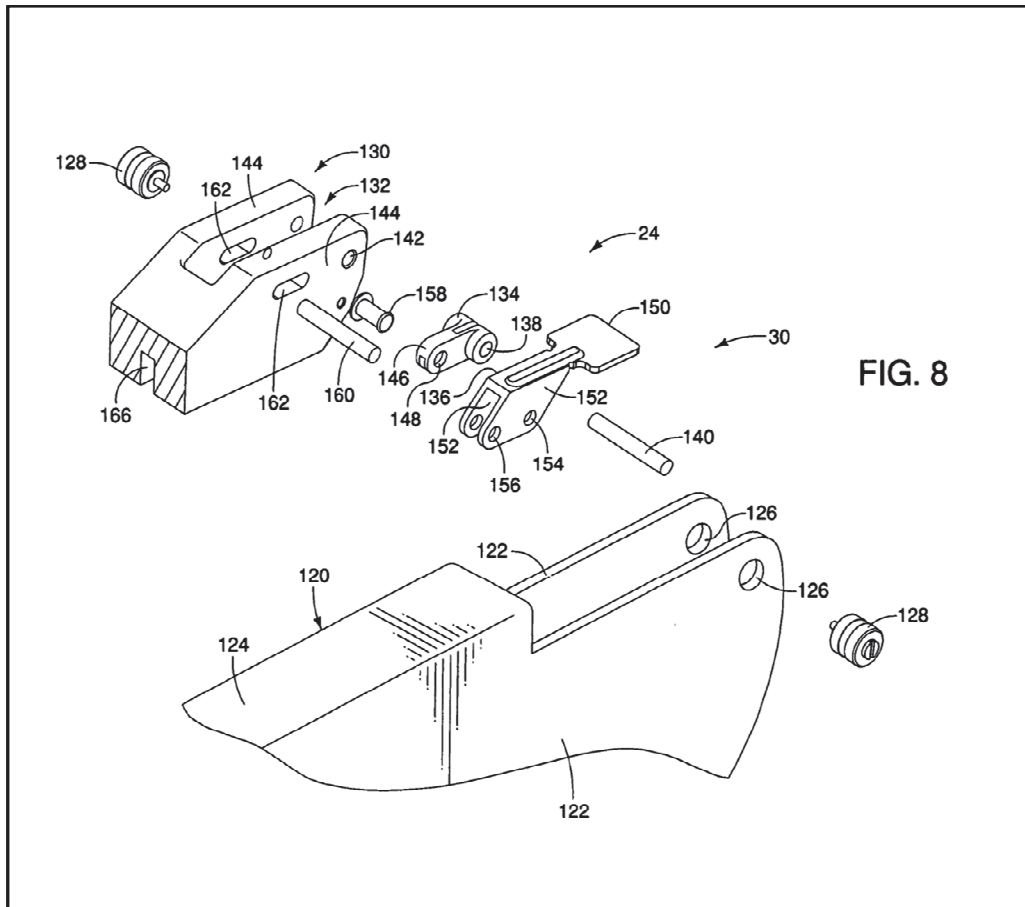


Fig. 8 of Burke

129. According to Burke:

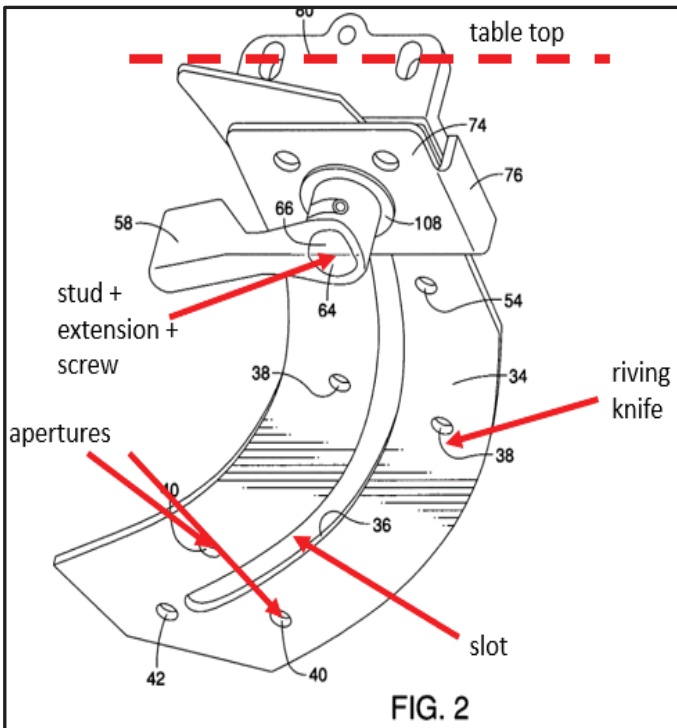
With regard to the blade guard mechanism 24, and referring initially to FIG. 8, it is shown in an exploded perspective which includes the blade guard mechanism quick release assembly 30, as well as a blade guard 120 that is configured to cover the blade of a table saw during operation. In this regard, the blade guard 120 has sidewalls 122 and a top portion 124, with the sidewalls having apertures 126 through which screws and a collar 128 are configured to pivotally mount the blade guard 120 to a mounting portion 130, with the screws 128 being inserted into apertures 142 on opposite sides of the mounting portion. While the blade guard 120 is shown to be a unitary structure, it should be understood that it could be two separate sidewalls and that rather than a top wall 124, the mounting portion 130 could have a forward extension that cooperates with the other components. Such a structure is intended to be within the scope of the present

invention as are other blade guard configurations.

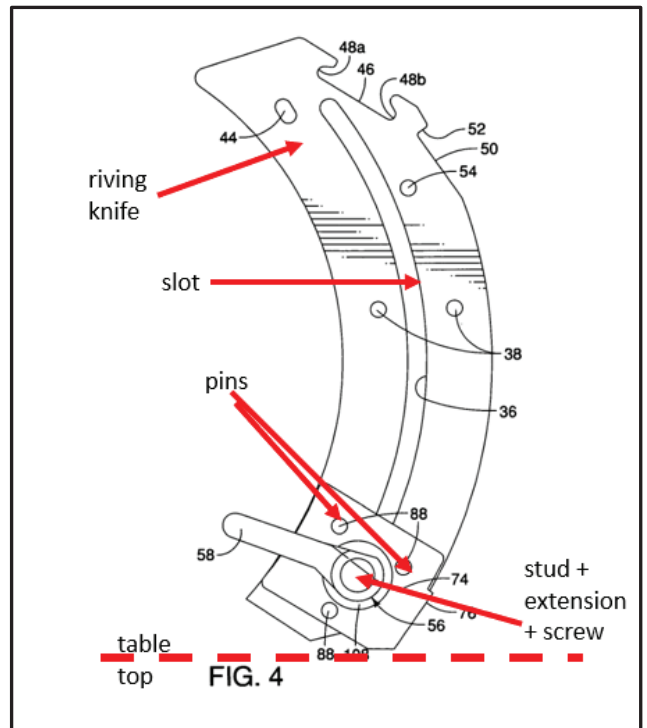
Id., 6:40-56.

130. Burke also discloses the use of cams. *Id.*, 6:19-26 (“This is accomplished by the lever 56 having a cam surface 102 that extends approximately $\frac{1}{4}$ of a rotation between its locked and release position. A pin 104 is located in the cylindrical portion 62 and is sized so that it engages the sidewalls of the cam surfaces 102. While it is possible for a single cam surface to be used, a pair of opposed cam surfaces is preferred and is used to balance the forces that may be applied during operation.”)

131. Burke discloses a “retracted position,” where a “stud” and “screw” (bolt) is proximate to the upper end of the riving knife, and an “extended position” where a “stud” and “screw” (bolt) is remote from the upper end of the riving knife. *Id.*, Figs. 2 & 4. The slot of the riving knife slidably engages with the stud and screw and the riving knife can be secured in place by locking the clamp and aligning the apertures in the riving knife with the pins of the bracket of the clamp. *Id.*, 4:22-54, 5:37-67, Figs. 1 & 2. The retracted and extended positions are shown in annotated Figures 2 and 4 of Burke below:



Annotated Fig. 2 of Burke



Annotated Fig. 4 of Burke

132. According to Figure 5 of Burke, as shown below:

The screw 98 is configured to fit through the aperture 96, the slot 36 of the knife 34, the aperture 72 and into a threaded aperture 100 in the extension 70 of the stud 60. The configuration of the stud extension 70 is slightly smaller than the size of the square apertures 72 and 96 so that the extension 70 will fit within them, but cannot rotate relative to the plate member 74 or the bracket 78. Therefore, the stud 60 is locked in position regardless of whether the quick release assembly 28 is in its locked or unlocked position.

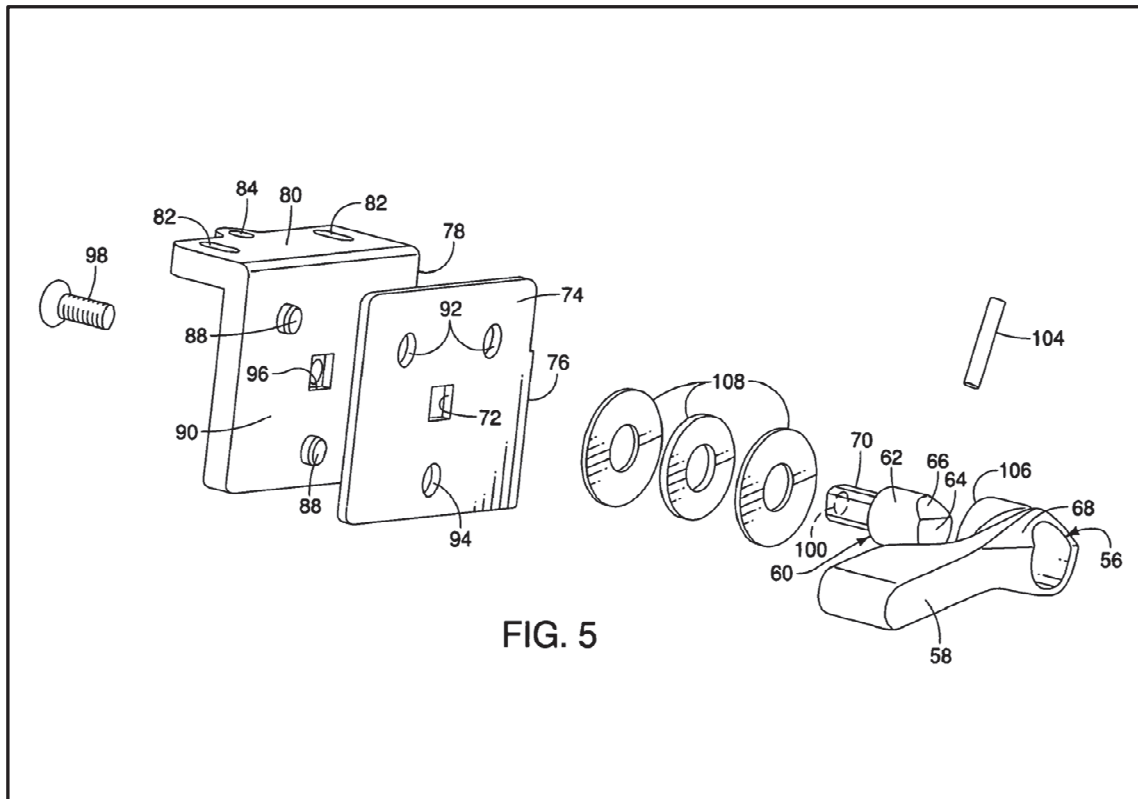


Fig. 5 of Burke

Id. at 6:1-9, Fig. 5.

133. According to Figure 2 of Burke, as shown below:

It should be apparent from FIGS. 2 and 5, that the knife 34 can be positioned in one of three positions, i.e., the lower position where the pattern of pins 88 penetrate the apertures 40 and 42, the mid position where the pins 88 penetrate the apertures 38 and the lower pin rides in the slot 36 and in the upper position where one of pins 88 penetrates the aperture 44 and another seats in the recess 46. The front face 90 of the bracket 78 also has a generally square aperture 96 through which a screw 98 passes.

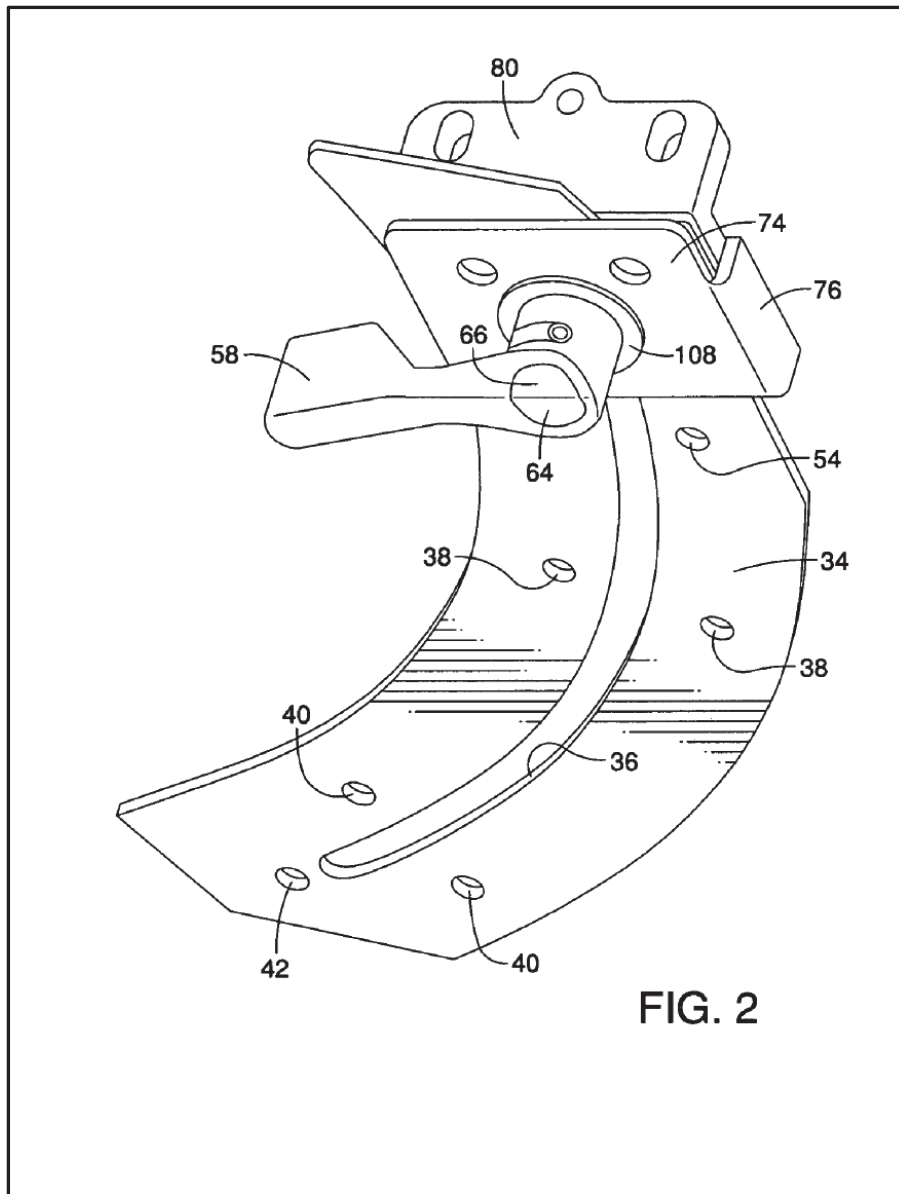


Fig. 2 of Burke

Id., 5:59-67, Fig. 2.

E. Bennett

i. Status as Prior Art

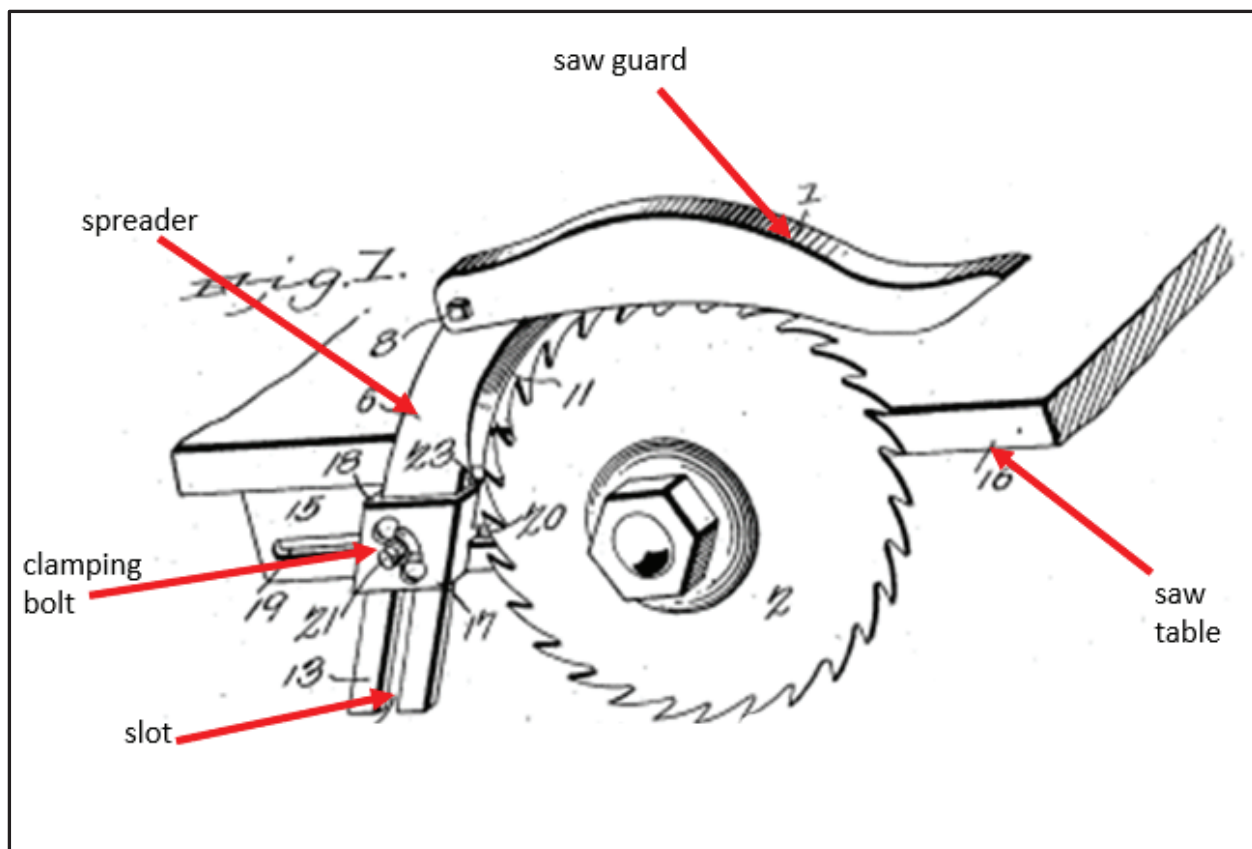
134. U.S. Patent No. 713,196 to Bennett entitled “Saw Guard” (“Bennett”) was filed on May 6, 1902 and issued on November 11, 1902. Thus, it is my understanding that Bennett qualifies as prior art to the ’622 patent (EX1001).

ii. Overview of Bennett

135. A POSA would be aware of the basic principles disclosed in Bennett, but would understand that the technology has changed significantly since the filing date of the reference.

136. Bennett is directed to improving a cutting device with a circular rotating blade residing in a “saw-table” (table saw), and discloses a “saw-guard” (protective cover), a “spreader” (support frame or riving knife), having a “slot or bifurcation” (“longitudinal slot”), a “clamp” and a “clamping bolt” (tightening bolt). EX1006, 1:47-55, 1:93-2:4, Figs. 1 & 2.

137. An annotated version of Figure 1 of Bennett appears below with these components identified.



Annotated Fig. 1 of Bennett

138. Bennett further discloses an adjustable riving knife. *Id.*, 1:93-96 (disclosing “[t]he lower portion 13 of the spreader is provided with a slot or bifurcation 14 and is engaged by a clamp or holder which is adjustably secured to a saw-table 16.”). In operation, a user could raise and lower the spreader by loosening the clamping bolt and sliding the spreader up the slot (where the bolt is closer to the top of the spreader) to a retracted position and sliding the spreader down the slot (where the bolt is further from the top of the spreader) to an extended position ready for use. *Id.*

139. Bennett further discloses, “[t]he object of the present invention is to improve the construction of saw-guards and to provide a simple, inexpensive, and efficient device adapted to be readily applied to a saw and capable of protecting the saw and of preventing the dust from flying into the face and eyes of the operator.” *Id.*, 1:10-16.

140. Bennett further discloses that another objective of the invention is to “increase the strength and durability of saw-guards and to enable the same to be readily adjusted to aline them properly with a saw and to provide simple and efficient means for spreading the material to prevent the same from pinching the saw.” *Id.*, 1:17-23.

141. Bennett also aims to “provide a spreading device . . . which will permit the material to be readily drawn backward without catching upon it or the saw.” *Id.*, 1:24-28.

F. Huang

i. Status as Prior Art

142. U.S. Patent No. 6,840,144 to Huang entitled “Quick-Detachable Blade Guard Mounting Structure” (“Huang”) was filed on July 17, 2002 and issued on January 11, 2005. Thus, it is my understanding that Huang qualifies as prior art to the ’622 patent (EX1001).

ii. Overview of Huang

143. Huang is directed to “a table saw and, more specifically, to a quick-detachable blade guard mounting structure for [a] table saw.” EX1011, 1:8-10. Huang discloses a “mounting frame 10” which “is mounted in the bottom side of the table of the table saw . . .” *Id.*, 2:46-48.

144. Huang further discloses an adjustable blade guard mounted to the mounting frame. *See id.*, 2:46-56.

145. Huang further discloses the use of a spring on the “tightening member” of the disclosed riving knife clamp, teaching that the biasing force imparted by the spring is an important part of the device:

When shifted to the first position P1, the locking member 60 is forced by the spring member 70 to disengage the shank 62 from the mounting hole 81 and to stop the head 61 at the first eyelet stop portion 44, for enabling the user to remove the blade guard holder member 80 from the mounting frame 10.

Id., 4:36-41; *see also id.*, Fig. 2.

G. Liu

i. Status as Prior Art

146. The application for U.S. Patent Publication No. 2008/0168875 to Liu et al. entitled “Splitting Knife Adjustment Structure for Table Saw” (“Liu”) was filed on May 29, 2007 and was published on July 17, 2008. Thus, it is my understanding that Liu qualifies as prior art to the ’622 patent (EX1001).

ii. Overview of Liu

147. Liu is directed to “[a] splitting knife adjustment structure used in a table saw.” EX1012, Abstract.

148. Liu discloses that “[i]t is the main objective of the present invention to provide a splitting knife adjustment structure for [a] table saw, which allows quick alignment of the splitting knife with the saw blade, assuring smooth and safe cutting operation.” *Id.*, ¶0006.

149. Liu discloses a “splitting knife adjustment structure,” which allows for vertical adjustment of a riving knife via a “sliding slot” and a “locating pin.” *Id.*, ¶0043. The locating pin engages with the sliding slot such that the riving knife can be raised and lowered and subsequently locked in place. *Id.*, Figs. 15 & 16. Liu discloses that the riving knife has “two locating holes 191.” *Id.*, ¶0032. Figure 16 of Liu is reproduced below; component 192 is the “sliding slot.”

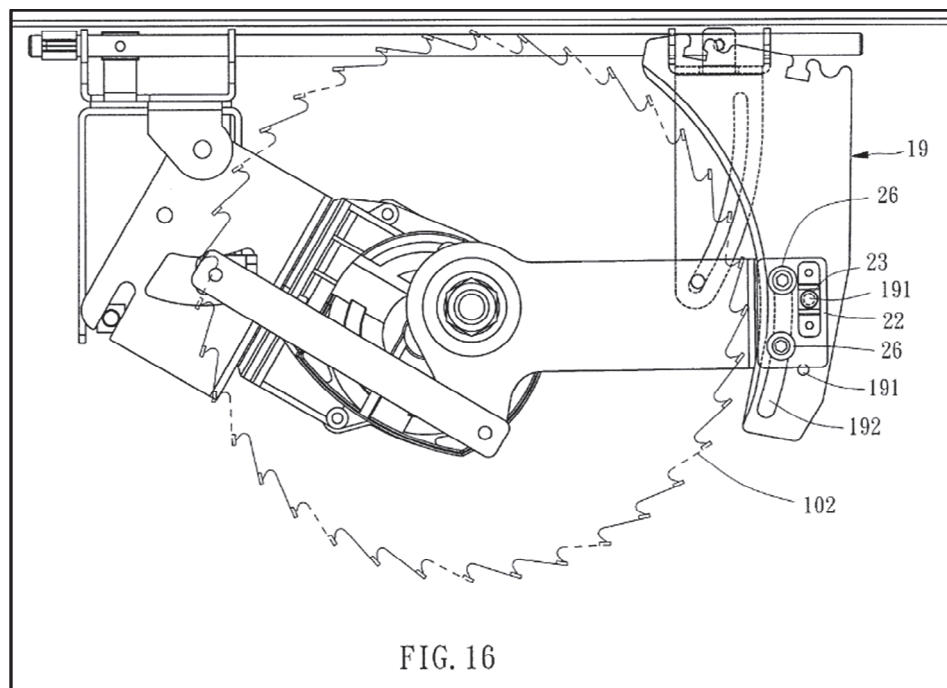


Fig. 16 of Liu

150. Liu further discloses the use of a spring on the “tightening member” of the disclosed riving knife clamp, teaching that the biasing force imparted by the spring tightly secures the riving knife in place:

The spring 25 is sleeved onto the locating pin 23 and stopped between the retainer ring 24 and the top plate 225 to impart a biasing force to the locating pin 23, holding the locating pin 23 in the locating hole 191 of the splitting knife 19 and the positioning hole 161 of the connection plate 16.

Id., ¶0038; *see also id.*, Fig. 13.

151. Liu discloses “vertical displacement of the splitting knife 19 relative to the saw blade”:

With respect to adjustment of vertical displacement of the splitting knife 19 relative to the saw blade 102, please refer to FIGS. 13, 15 and 16. FIG. 15 shows the bottom end of the sliding slot 192 of the splitting knife 19 stopped at one guide member 26, and the locating pin 23 is kept, subject to the spring force of the spring 25, engaged into the lower locating hole 191 of the splitting knife 19 and the positioning hole 161 of the connection plate 16 (see FIG. 13) to lock the splitting knife 19 in the position above the elevation of the saw blade 102, as shown in FIG. 15. When wishing to adjust the position of the splitting knife 19 from the position shown in FIG. 15 to the position below the elevation of the saw blade 102 as shown in FIG. 16, pull the head 231 of the locating pin 23 outwards against the spring force of the spring 25 to disengage the locating pin 23 from the positioning hole 161 of the connection plate 16 and the lower locating hole 191 of the splitting knife 19, and then pull the splitting knife 19 downwards to have the top end of the sliding slot 192 be stopped at the other guide member 26, and then release the head 231 of the locating pin 23 from the hand for enabling the compressed spring 25 to return to its former shape

and to push the locating pin 23 into the upper locating hole 191 of the splitting knife 19 and the positioning hole 161 of the connection plate 16, thereby locking the splitting knife 19 in the adjusted position.

Id., ¶0043.

H. ANSI

152. Approved American National Standard (“ANSI”) O1.1 - 2004 for Woodworking Machinery, Safety Requirements is the industry standard containing the requirements and best practices for such equipment. According to ANSI O1.1, table saw manufacturers have responsibilities to provide protection from workpiece ejection hazards, including kickback as shown below:

4.3.14.3 Warning labels

Warning labels are acceptable as a substitute for awareness barriers only when no other practical alternative is available.

4.3.15 Hazards from Workpiece Ejection

E4.3.15

The manufacturer, where practical, shall provide means to reduce the risk of workpieces being forcefully ejected from machines. These means shall address the possibility of wrong way feed and may include other means.

Positive means for preventing wrong way feed should be used where practical. Some machines such as manual fed spindle shapers do not lend themselves to such devices, in which case warnings and instructions should be used.

4.3.15.1 Kickback

E4.3.15.1

Resistance of a rotating abrasive or cutting tool contacting the workpiece applies force tangential to the direction of rotation of the tool. When this force is in the direction opposite the feed direction of the workpiece and it is unchecked or uncontrolled, a potential of kickback exists. The potential for kickback occurs when a cutting tool binds in the workpiece and can be caused by a variety or combination of factors, including, but not limited to, poorly maintained cutters or blades, improperly aligned guide fences, irregularities in workpieces, excessive feed rates, wrong way feed, and/or operator inattention.

The hazard created may be either the thrown workpiece or the exposed work processing means such as a saw, cutter, or abrasive head or belt.

Page 38 of ANSI

EX1007, 38.

5.2.1.2 Blade guard Each saw shall be provided with a self-adjusting or fixed/manually adjusted hood-type guard that covers the blade above the workpiece. If fixed or manually adjusted, its clearance over the workpiece shall not exceed .25 in. (6.4mm) in use. A self-adjusting guard shall not offer excessive resistance to manually feeding a workpiece. For operations where a blade guard increases the risk of injury or is impractical to use, the employer shall furnish and supervise the use of a safeguarding means that provides equal protection. 5.2.1.2.1 Design A positive means shall be provided that shall limit the maximum diameter blade that can be mounted on the arbor by the manufacturer. 5.2.1.2.2 Mounting The blade guard hood shall be so mounted to ensure that its operation will be positive, reliable and in alignment with the saw blade. The mounting shall be adequate to resist reasonable forces encountered in normal operations which may tend to throw it out of alignment. *** 5.2.1.5 Anti-kickback device An anti-kickback device(s) shall be provided which minimizes the possibility of the unexpected backward movement of the workpiece causing injury to an operator or bystander. It shall be operable for all stock thicknesses up to the full through-cutting capacity of the saw. On an operation where an anti-kickback device(s) cannot be used, the employer shall provide other equally effective means to reduce the possibility of the unexpected backward movement of the workpiece.	5.2.1.4 Spreader Each saw shall be furnished with a spreader. 5.2.1.4.1 Design The spreader thickness shall be less than the saw blade kerf of the narrowest width of the maximum diameter standard blade(s) designed to be used on the table saw and of sufficient length and width to resist reasonable side forces encountered in normal operation that tend to throw the spreader out of line with the saw blade and minimize the possibility of kickback as a result of heeling or pinching of the blade. The manufacturer shall state the spreader thickness in the operating instructions. 5.2.1.4.2 Mounting The mounting means shall be designed to allow the spreader to be properly aligned with the saw blade for all operating positions of the saw blade or table. 5.2.1.4.3 Location The spreader shall be located so that the edge closest to the blade shall not be more than .5 in. (12.7mm) from the blade when: a) a blade of maximum recommended diameter is installed; b) and, the blade is in its maximum up position. When a blade is used, smaller than the maximum possible, the employer shall provide and supervise the use of a means that performs similar functions to the spreader.
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Pages 54-56 ANSI

Id., 54-56.

153. In particular, ASNI 5.2.1.2 requires “[e]ach saw blade shall be provided with a self-adjusting or fixed/manually adjusted hood-type guard that covers the blade above the workpiece.” Further, ASNI 5.2.1.4 requires that “[e]ach saw shall be furnished with a spreader.” Although a riving knife is not exactly identical to a

spreader in configuration, they both accomplish the same objective —preventing kickback. Further, ANSI 5.2.1.5 requires the inclusion of an “anti-kickback device” or “devices.” As stated, a riving knife is a type of anti-kickback device.

I. Safety Devices in 2000s

154. At the time of the '622 patent, manufacturers of table saws were regularly providing riving knife and blade guard assemblies. The manufacturers were also instructing on the proper installation and use of the riving knife and blade guard assemblies and were including prominent safety warnings urging the user to use these safety devices.

155. The manufacturers of table saws in the years preceding 2007 offered safety devices including guards, riving knives, and splitters, separately or in combination. Examples from some of these owner's manuals are shown below.

i. Grizzly Industrial



Cover of Grizzly Industrial

156. The below warnings are conspicuous and clear: “ALWAYS use blade guard, splitter, and anti-kickback fingers.”

WARNING

Additional Safety Instructions For Table Saws

1. **ALWAYS** use blade guard, splitter and anti-kickback fingers on all "through-sawing" operations. Through-sawing operations are those when the blade cuts completely through the workpiece as in ripping or crosscutting.
2. **AVOID KICKBACKS.** Kickback is a condition in which a piece of wood is thrown back towards an operator at a high rate of speed. If you do not have a complete understanding of how kickback occurs, or how to prevent it, **DO NOT** operate this table saw.
3. **NEVER** reach behind or over the blade with either hand for any reason.
4. **ALWAYS** use a push-stick for ripping narrow stock.
5. **NEVER** perform any operation using only your hands to support or guide the workpiece. Always use either the fence or the miter gauge to position and guide the work.
6. **NEVER** stand or have any part of your body in line with the path of the saw blade.
7. **USE GREAT CARE WHEN CUTTING WITH A DADO BLADE.** There is a high degree of risk involved with any dado operation. Slight movement of the stock away from the fence will cause kickback. Never make a through cut using a dado blade.
8. **MOVE** the rip fence out of the way when crosscutting.
9. **NEVER** use the miter gauge and rip fence at the same time.
10. **ALWAYS** keep the work firmly against the miter gauge or fence while holding the work down against the table.
11. **NEVER** attempt to free a stalled saw blade without first turning the saw OFF.
12. **PROVIDE** adequate support to the rear and sides of the saw table for wide or long workpieces.
13. **AVOID** awkward operations and hand positions where a sudden slip could cause your hand to move into the blade.
14. **ALWAYS LOWER OR REMOVE SAW BLADE WHEN NOT IN USE.**
15. **NEVER USE A DAMAGED SAW BLADE OR ONE THAT HAS BEEN DROPPED.**
16. **IF AT ANY TIME YOU ARE EXPERIENCING DIFFICULTIES** performing the intended operation, stop using the machine! Then contact our service department or ask a qualified expert how the operation should be performed.

Annotated Page 4 of Grizzly Industrial

EX1013, 4.

157. Additional warnings, similar to those above, appear in other places in the instruction manuals. An example is below.

WARNING

Statistics prove that most common accidents among table saw users can be linked to kickback. Kickback is typically defined as the high-speed expulsion of stock from the table saw toward its operator. In addition to the danger of the operator or others in the area being struck by the flying stock, the operator's hands may be forced into the blade during the kickback. The following can help minimize kickbacks.

1. Use your blade guard and splitter.
2. Never for any reason place your hand behind the blade. Should kickback occur, your hand will be pulled into the blade.
3. Make sure the splitter and the blade are aligned.
4. Never use the fence as a guide for crosscutting.
5. Always use either the fence or the miter gauge to position and guide the work.
6. Use a pushstick or featherboard to maintain control of your workpiece.
7. Feed cuts through to completion.
8. Stand to the side when ripping.
9. Ensure your fence and miter slot are parallel to the blade.

If you do not clearly understand kickback and how it occurs, do not operate this table saw.

Page 5 of Grizzly Industrial

Id., 5.

158. The instructions for installing and aligning the “Blade Guard/Splitter” are shown below. The red arrow annotation included in the last figure identifies the slotted splitter connection shape and the fasteners needed to mount the splitter. The imprecise slotted connection yields variability that requires additional fine adjustments to properly align the splitter with the blade.

Blade Guard/Splitter

1. Disconnect the table saw from the power source.
2. Slip the blade guard/splitter over the mounting bolt as shown in **Figure 14**. The washer should be between the bolt head and the slot. Tighten the bolt to secure the blade guard/splitter.

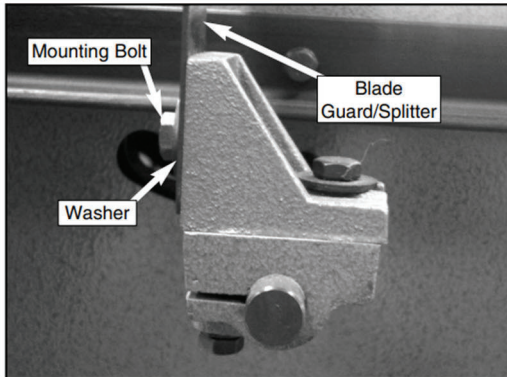


Figure 14. Blade guard and splitter in place.

2. Set a machinist's square against the face of the blade guard/splitter. Slightly rotate the rear bracket to adjust the face of the blade guard perpendicular to the table top as shown in **Figure 15**.

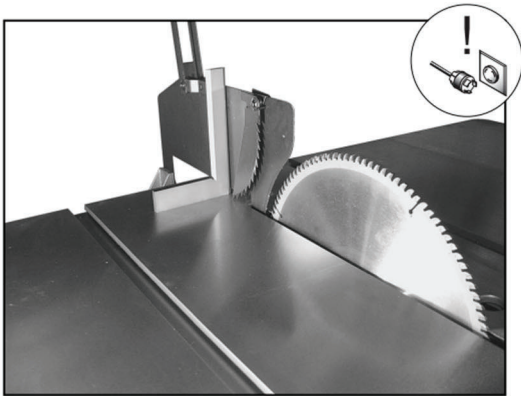


Figure 15. Guard assembly square to table.

!WARNING

The saw blade is extremely sharp. Use extra care when handling the blade or working near it. Serious injury is possible.

3. Place a straightedge against the face of the saw blade and the blade guard/splitter as shown in **Figure 16**. If the blade guard/splitter is properly aligned, please skip ahead to **Section 5: Adjustments**; otherwise, continue with the next step.

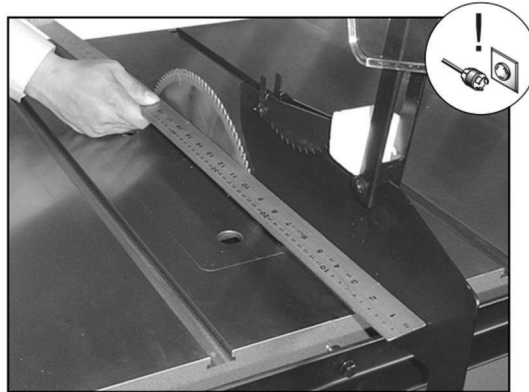


Figure 16. Guard aligned with blade.

4. If the blade guard/splitter is to the left of the blade as shown in **Figure 17**, simply add washers between the splitter and front mounting bracket, and adjust the rear splitter support as shown in **Figure 18**.

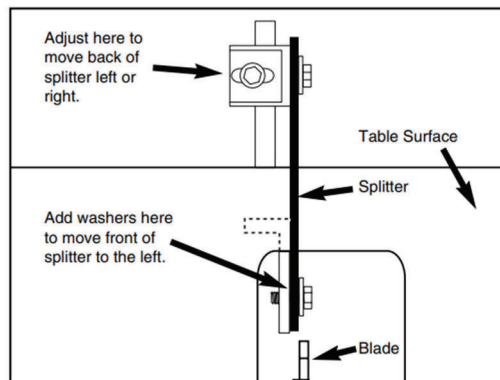


Figure 17. Improper splitter/blade alignment.

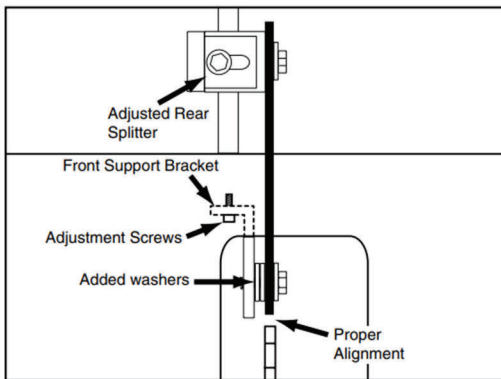


Figure 18. Proper splitter/blade alignment.

5. Recheck guard alignment to the blade and to the table top. Adjust as necessary and tighten all the bolts before use. If the blade guard is properly aligned, please skip ahead to **Section 5: Adjustments**; otherwise, continue with the next step.
6. If the splitter is positioned to the right of the blade, alignment cannot be achieved by washer placement. The front support bracket indicated in **Figure 18** must be moved to the left. Loosen the (2) cap screws and adjust.
7. If this adjustment does not allow enough movement of the splitter, remove the table and wings, and set them to one side.



8. To adjust the arbor bracket and motor pulley loosen the cap screw and the setscrew shown in **Figure 19** and slowly slide the arbor bracket towards the end of the shaft. Only move the arbor bracket a distance equal to the amount of misalignment between the blade and splitter, or a little more. You can always adjust the splitter back to the left with washers. Tighten the cap screw and setscrew securely.

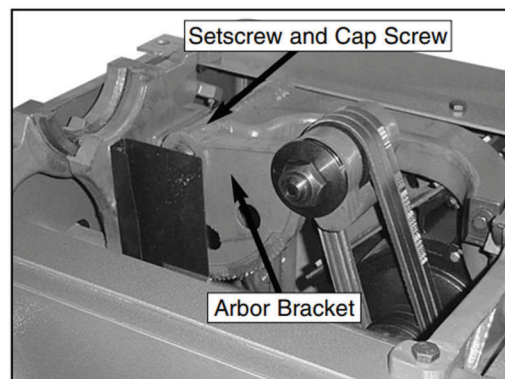
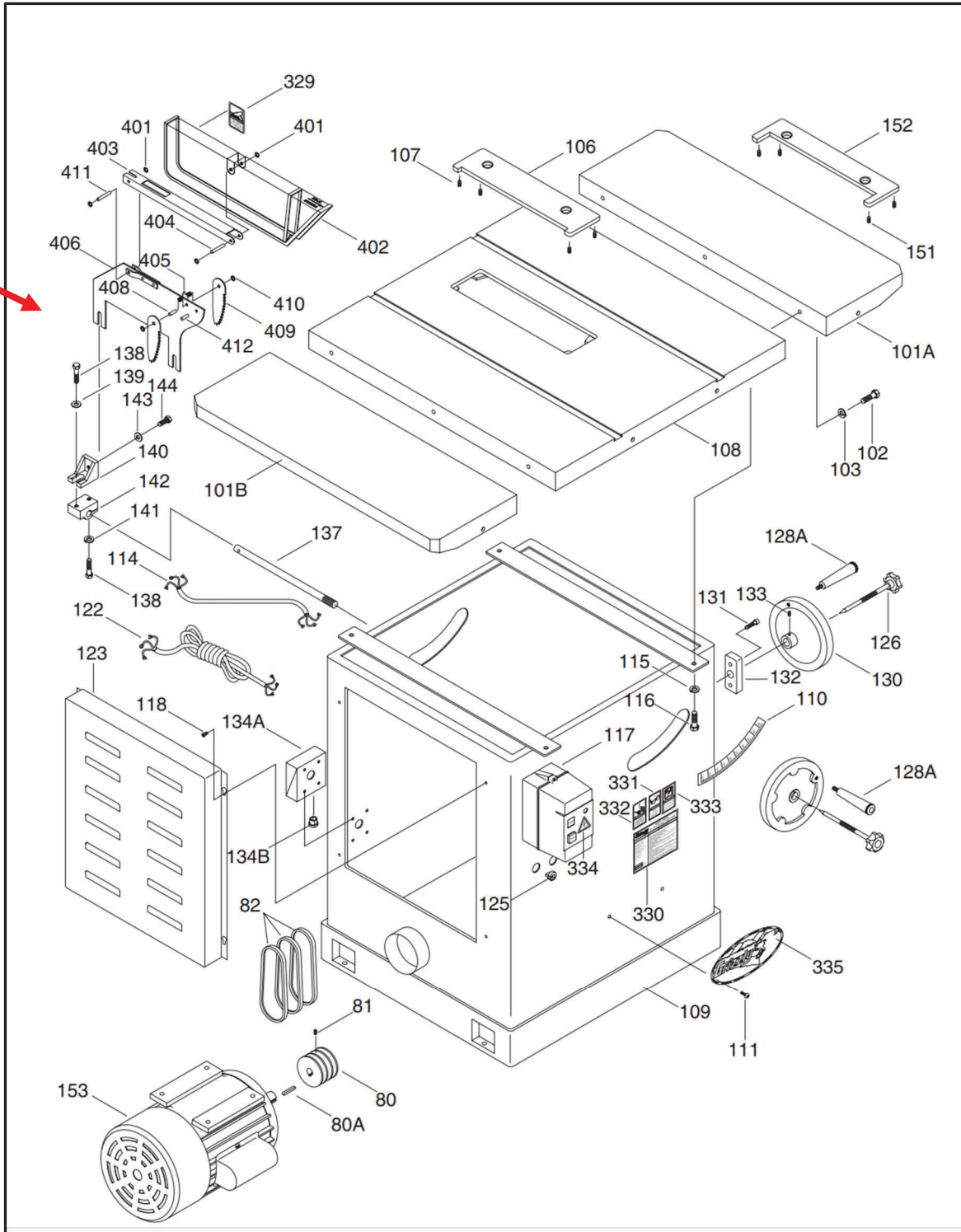


Figure 19.

9. Moving the arbor bracket moves the V-belts and pulleys out of alignment, so adjustment of the motor pulley is required. Simply loosen the setscrew and slowly slide the pulley toward the end of the motor shaft. Once the V-belts are back into alignment, tighten the setscrew securely.
10. Recheck guard alignment to the blade and to the table top. Adjust as necessary and tighten down all the bolts before use. If the blade guard is properly aligned, re-attach the table, making sure there is adequate blade clearance through all blade adjustments.
11. Adjust the blade to 45° and raise and lower it through the full range. Re-adjust the blade to 90° and raise and lower it through the full range. There should be no contact between the base and the table insert or any other part of the saw. If there is, repeat **Steps 7-9**.





Annotated Page 37 of Grizzly Industrial

Id., 17-18, 37.

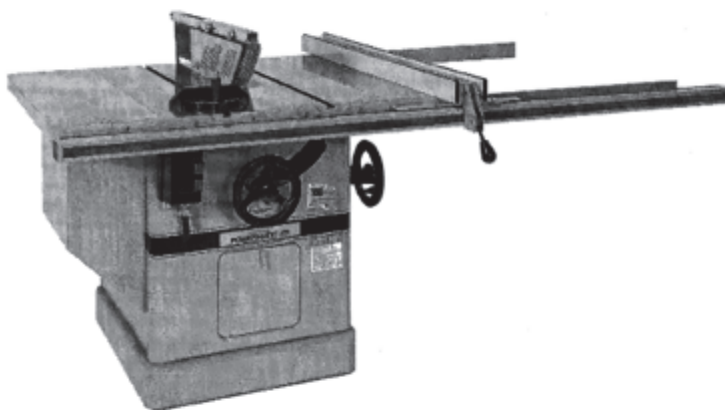
ii. Powermatic 1999

MAINTENANCE INSTRUCTION
AND PARTS LIST

Model

72-A

TILTING ARBOR SAW



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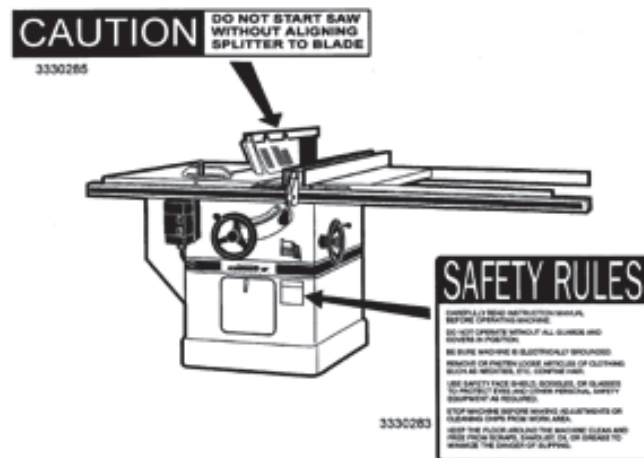
November

Cover of Powermatic 1999

SAFETY DEVICES: Always use the splitter, blade guard, push stick and other safety devices for all operations where they can be used. On operations such as dadoing or molding where such devices may not be used, use feather boards (see pg. 15), fixtures and other safety devices and use extreme caution. Re-install the splitter and blade guard immediately after completing the operation that required their removal.

SAW BLADE ROTATION: Be sure the saw blade rotates clockwise when viewed from the motor side (left side) of the machine.

SAFETY DECALS



Pages 4-5 of Powermatic 1999

SPLITTER & GUARD ASSEMBLY

1. Insert the grooved end of the splitter support shaft through slot in rear of saw and into hole in trunnion, Figure 1. Make sure the square head setscrew is backed out enough to allow easy insertion.

2. With a wrench, tighten sq. hd. setscrew into the groove of the shaft as shown in Figure 1. (NOTE: The groove will be in the proper position

if the end of the shaft is made flush with the opposite side of the trunnion hole.) Tighten the locknut. The upright member of the rear splitter support must be on the left side of the saw (observed from the saw's front).

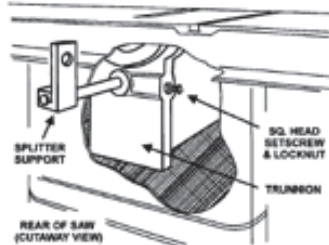


FIGURE 1

3. Mount the splitter assembly to the two adjusting screws, Figure 2. Place the two flanges of the splitter assembly onto the screws as shown.

4. The splitter and guard assembly must be aligned with the blade. Adjust the splitter according to the directions on page 8, "Splitter Alignment."

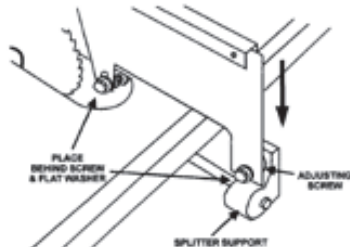


FIGURE 2

SPLITTER ALIGNMENT

One of the most critical adjustments to help avoid kickbacks is the splitter alignment. It should be checked and readjusted if necessary after each blade change. To align the splitter to the blade, use a combination square against the side of the raised up miter gauge bar and slide the scale against the top of the tooth as shown in Figure 11. Check the splitter for parallelism to the miter slot and readjust if required. Check for clearance. Move the miter gauge to the opposite side of the blade and using the combination square, slide the scale against the top of the tooth. Check for clearance. Clearance should be approximately equal on both sides of the blade. The insert will have to be removed to get at the adjustment jack screw mounted in the center trunnion.

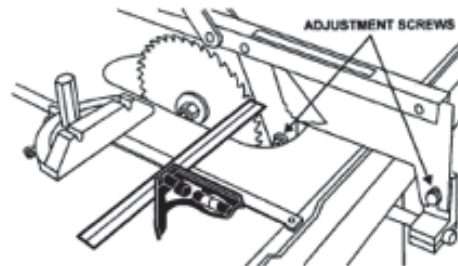


FIGURE 11

Pages 5 & 8 of Powermatic 1999

GENERAL INSTRUCTIONS

1. Familiarize yourself with the location and operation of all controls and adjustments and the use of accessories such as the miter gauge and rip fence.

2. Serious injury can result from kickbacks which occur when a work piece binds on the saw blade or binds between the saw blade and rip fence or other fixed object. This binding can cause the work piece to lift up and be thrown toward the operator. Listed below are the conditions which can cause kickbacks:

a. Confining the cutoff piece when cross-cutting or ripping.

b. Releasing the work piece before completing the operation or not pushing the work piece all the way past the saw blade.

c. Not using the splitter when ripping or not maintaining alignment of the splitter with the saw blade.

d. Using a dull saw blade.

e. Not maintaining alignment of the rip fence so that it tends to angle toward rather than away from the saw blade front to back.

NOTE: Caution decal on guard and splitter assembly.

f. Applying feed force when ripping to the cutoff (free) section of the work piece instead of the section between the saw blade and fence. Use push sticks or push blocks, Figure 13, for narrow, thin, or short work.

g. Ripping wood that is twisted (not flat), or does not have a straight edge, or a twisted grain.

Page 10 of Powermatic 1999

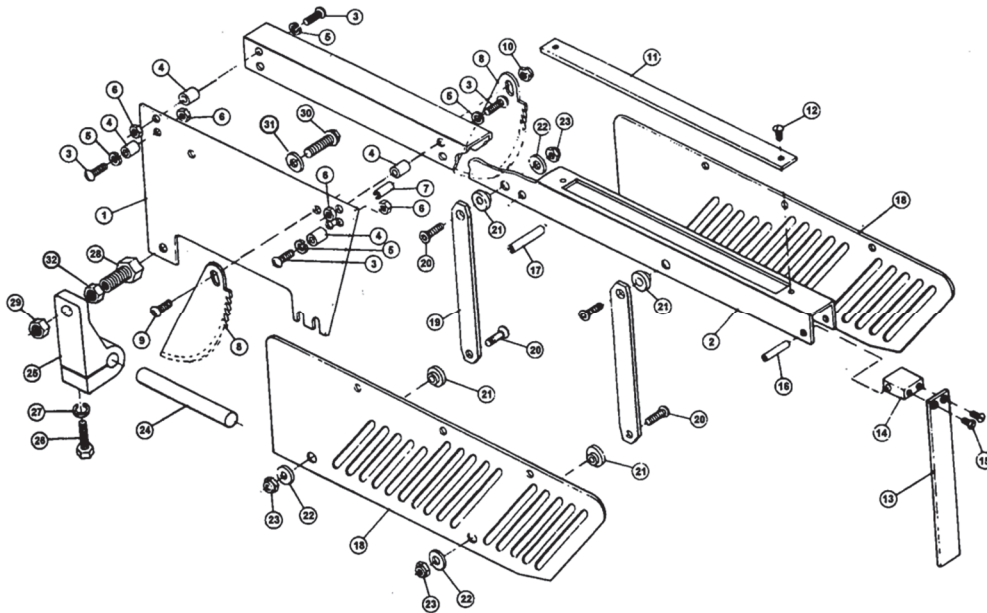
PARTS LIST: SPLITTER & GUARD ASSEMBLY

NO. PART NO. DESCRIPTION

	2250154	SPLITTER & GUARD ASSY. (Items 1 thru 23)
1	3750010	SPLITTER
2	3044341	BAR, SPLITTER
3	6714113	SCREW, ROUND HD. MACHINE 1/4-20 X 1"
4	3736012	SPACER
5	6861100	WASHER, LOCK PIN 1/4"
6	6514001	NUT, HEX. 1/4-20
7	6626039	PIN, SPRING 1/4" X 5/8"
8	3581005	PAWL, ANTI-KICKBACK
9	6716138	SCREW, BUT. HD. CAP 3/8-16 X 5/8"
10	6516020	NUT, FLEX LOCK (SH.) 3/8-16
11	3720209	SHIELD, GUARD
12	6710032	SCREW, RD. HD. MACHINE 10-24 X 1/4"
13	3720208	SHIELD, FRONT
14	3055094	BLOCK, PIVOT
15	6710030	SCREW, FLAT HD. MACHINE 10-24 X 1/4"
16	6626032	PIN, SPRING 3/16" X 1-1/4"

NO. PART NO. DESCRIPTION

17	6626049	PIN, SPRING 3/8" X 2"
18	3250111	GUARD, BLADE
19	3025073	ARM, PIVOT
20	6714192	SCREW, FLAT HD. SOC. 1/4-20 X 7/8"
21	3070108	BUSHING, PIVOT
22	3838015	WASHER, PIVOT
23	6514012	NUT, FLEX LOCK (SH.) 1/4-20
	2787008	10" REAR SPLITTER SUPPORT ASSY. (Items 24 thru 32)
24	3700090	SHAFT, UNTHREAD SPLITTER SUPPORT
25	3776050	SUPPORT, REAR SPLITTER
26	6715034	SCREW, HEX. HD. CAP 5/16-18 X 1-1/2"
27	6861200	WASHER, LOCK 5/16"
28	3690232	SCREW, ADJUSTING
29	6572005	NUT, HEX. 3/4-16
30	6716136	SCREW, HEX. HD. CAP 3/8-16 X 3/4"
31	6861301	WASHER, FLAT 3/8"
32	6572005	NUT, JAM 3/4-16



Page 22 of Powermatic 1999

EX1014, 4-7, 10, 22.

159. The preceding materials clearly show that the means of attaching the guard, riving knife and splitter are all mechanically achieved using screws and

washers. Fine adjustments were also to be made using aligning screws.

160. As shown, these designs were cumbersome to install and reinstall, required fine tuning to align, were subject to bending/misalignment, and could lead to hazardous situations if used out of alignment (increased risk of kickback).

161. Gass correctly identifies that “[s]afety systems or features are often incorporated into table saws to minimize the risk of injury,” and generally identifies a “guard,” “riving knife,” “spreader or splitter” and an “anti-kickback device” as such safety devices. EX1003, 1:41-2:7.

162. A POSA would understand the challenges of these safety devices and, as a result, would be drawn to seek better solutions. More specifically, the need for an easier and faster solution to implementing the securing force for positioning and securing the riving assembly would be obvious to a POSA. For example, riving knives available in the mid-1990s required the use of two threaded fasteners that required a tool to tighten or loosen. These fasteners were located below the working surface and accessed through the insert within the narrow opening of the access throat plate in the table saw. This required fine motor skills in a tight area where it is difficult to see past one’s hands. A clamping means that utilizes a tool-free lever and handle and cam-action mechanism with a lever handle would be one obvious (and commonly applied) solution to this challenge. Using a spring to apply a preset

fixed compressive load with the clamping force, coupled with positioning aids such as location pins and mating features, would also be obvious to a POSA.

VIII. PERSON HAVING ORDINARY SKILL IN THE ART

163. I understand that a POSA is one who is presumed to be aware of the pertinent art, thinks along conventional wisdom in the art, and is a person of ordinary creativity. A POSA would have had knowledge of the literature concerning design of table saws, including table saw riving knives, clamps, saw guards, and related arts as of the priority date.

164. In my opinion, a POSA relevant to the disclosure of the '622 patent is a person who, at the time of invention, would have earned at least an undergraduate degree in mechanical engineering or equivalent work experience, which would be 1-2 years working on the design of power tools.

165. I am at least a POSA and am more than likely to be a person having extraordinary skill in the art. I have Bachelor's and Master's degrees in mechanical engineering. I am the founder and owner of design safety engineering, inc., an engineering consulting firm in business since 1995. I am an experienced recreational woodworker and have owned and used table saws for many years. I have read and written peer-reviewed technical articles related to the hazards and uses of tables saws and guarding. I regularly conduct machinery safety audits for clients who have a

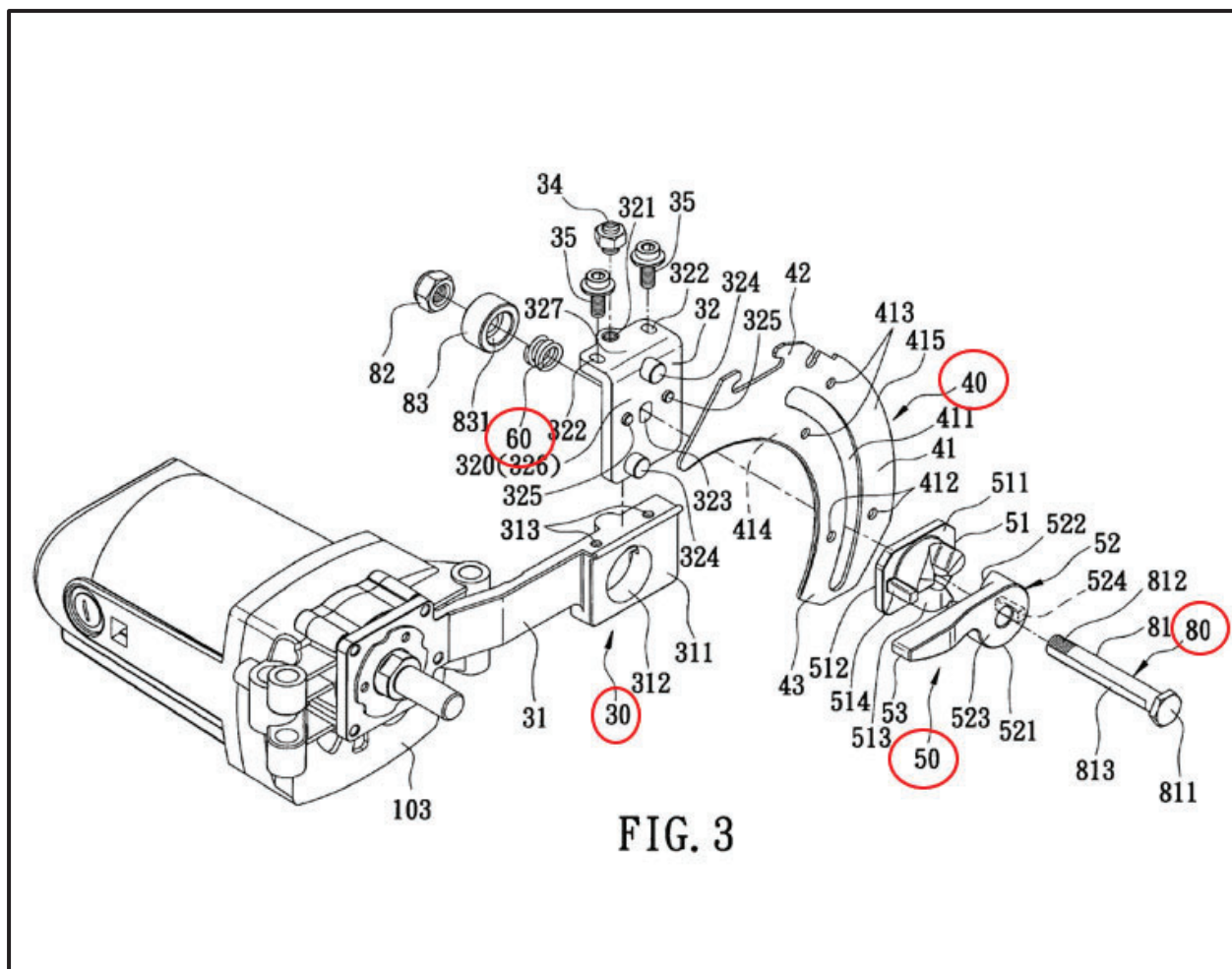
variety of machines, including table saws and other saws. I have served as an expert in several products liability and OSHA enforcement cases involving saws.

IX. OVERVIEW OF THE '622 PATENT

166. The '622 patent discloses a “supporting device” (a clamp) for a “protective cover” (a saw blade guard) that tightens to secure a “supporting frame” (a riving knife/spitter). The '622 patent has one independent claim and eight dependent claims.

167. The '622 patent teaches “[a] supporting device is adapted for mounting a protective cover to shield a cutting blade of a cutting machine, and includes a mount unit with a proximate tightening surface, a tightening bolt passing through the proximate tightening surface, a supporting frame adapted for holding the protective cover and having a guiding slot for passage of the tightening bolt so as to be movable between a position of use and a retreat position, a movable tightening member with a distal tightening surface and a cam follower surface, a cam actuating member having a cam surface mating with the cam follower surface and turnable to tighten or loosen the supporting frame, and a biasing member disposed to keep the actuating body in a tightening position.” EX1001, Abstract.

168. Figure 3 of the '622 patent shown below depicts “an exploded perspective view of a preferred embodiment of a supporting device according to this invention.” *Id.*, 3:5-7, Fig. 3.



Annotated Fig. 3 of the '622 Patent

169. According to the '622 patent, a preferred embodiment of the present invention is adapted to be mounted on a cutting machine, which includes a table saw, and comprises a “mount unit 30, a tightening bolt 80, a supporting frame 40, a movable tightening unit 50, and a biasing member 60.” *Id.*, 3:34-48.

170. The '622 patent discloses mount unit 30 as including “an elongated fixed mount 30 which is adapted to be secured to the drive motor 103 at a left end thereof, and which has a throughbore 312 at a right end 311 thereof.” *Id.*, 3:49-52.

171. The '622 patent further discloses tightening bolt 80 as follows:

The tightening bolt 80 has a shank 81 which is configured to pass through the axial hole 323 and the throughbore 312, and which has front and rear ends 811,812 opposite to each other in the tightening axis, and an intermediate segment 813 that is interposed between the front and rear ends 811,812 and that has a non-circular cross-section so as to be movable relative to the major abutment wall 320 along the tightening axis. The tightening bolt 80 further has a screw nut 82 which is threadedly engaged with the rear end 812 of the shank 81, and a flexible joint 83 which is received in the throughbore 312, which is sleeved on the intermediate segment 813 of the shank 81 between the screw nut 82 and the major abutment wall 320 of the movable mount 32, and which has an accommodation chamber 831.

Id., 4:19-32.

172. The '622 patent further discloses supporting frame 40 as having “upper and lower ends 42,43 opposite to each other, and a middle segment 41 interposed between the upper and lower ends 42,43. The upper end 42 is adapted to hold a protective cover (not shown). The middle segment 41 has proximate and distal tightened major surfaces 414,415 opposite to each other along the tightening axis, and an arcuate guiding slot 411 which extends through the proximate and distal tightened major surfaces 414,415 and which permits passage of the shank 81 therethrough.” *Id.*, 4:33-41.

173. The '622 patent further discloses that movable tightening unit 50 “includes a movable tightening member 51 and a cam actuating member 52.” *Id.*, 4:58-59.

174. The '622 patent further discloses that biasing member 60 is a coil spring 60 as follows:

The coil spring 60 is disposed to surround the shank 81, and has an end abutting against the major abutment wall 320, and an opposite end which is received in the accommodation chamber 831 in the flexible joint 83. Thus, the coil spring 60 acquires a biasing force which urges the tightening bolt 80 and the movable tightening unit 50 rearwardly so as to force the middle segment 41 of the supporting frame 40 to abut against the proximate tightening surface 326. Moreover, the biasing force of the coil spring 60 is adjustable by threaded movement of the screw nut 82 while being kept in line with the tightening axis. Furthermore, as a result of displacement of the actuating body 521 to the tightening position, as shown in FIG. 8, the coil spring 60 is being compressed to acquire an increment of the biasing force which can bias the front end 811 of the shank 81 towards the supporting frame 40 so as to counteract the axial frictional force to thereby keep the actuating body 521 in the tightening position.

Id., 5:42-58.

175. I have considered the disclosure of the '622 patent in light of the knowledge of a POSA as of the claimed priority date of the patent, which I understand to be October 26, 2007.

X. PROSECUTION HISTORY OF THE '622 PATENT

176. The '622 patent was filed on October 26, 2007 as the '779 application. The '779 application was filed with 9 original claims, 1 of which was independent. The original claims are as follows:

1. A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:

a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;

a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed between said front and rear ends;

a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis, and

a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end;

a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal, said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that are respectively proximate to and distal from said distal tightening surface along the tightening axis;

a cam actuating member including

an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening axis such that, said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position, and such that, when said

actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and

a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and

a biasing member disposed on said shank adjacent to said rear end of said shank such that, as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the tightening position.

2. The supporting device according to Claim 1, wherein said mount unit includes

a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and

a movable mount having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.

3. The supporting device according to Claim 2, wherein said movable mount has an anchoring wall which extends rearwardly from an upper edge of said major abutment wall, and which has a positioning hole that extends therethrough and that is elongated in a longitudinal direction parallel to the tightening axis, said mount unit further including a first screw fastener which extends through said positioning hole and which is secured to said fixed mount such that position of said movable mount relative to said fixed mount in the longitudinal direction is adjustable by movement of said first screw fastener in said positioning hole in the longitudinal direction.

4. The supporting device according to Claim 3, wherein said mount unit further includes a second screw fastener which is threadedly engaged with said anchoring wall and which extends to abut against said fixed mount so as to generate a depressing force to render angular

position of said major abutment wall of said movable mount relative to said fixed mount adjustable by virtue of varying the depression force.

5. The supporting device according to Claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member being a coil spring which is disposed to surround said shank and between said major abutment wall and said screw nut so as to acquire the increment of the biasing force.

6. The supporting device according to Claim 5, wherein said tightening bolt has a flexible joint which is received in said throughbore, which is sleeved on said shank between said screw nut and said major abutment wall of said movable mount, and which has an accommodation chamber, said coil spring having an end which abuts against said major abutment wall, and an opposite end which is received in said accommodation chamber so as to permit the biasing force of said coil spring to be adjustable by threaded movement of said screw nut while ensuring the biasing force to be kept in line with the tightening axis.

7. The supporting device according to Claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member including two spring disks which are sleeved on said shank and which are configured to be squeezable between said major abutment wall and said screw-nut so as to acquire the increment of the biasing force.

8. The supporting device according to Claim 7, wherein said tightening bolt has an elastic washer which is interposed between said screw nut and one of said spring disks so as to facilitate restoration of said spring disks to their unsqueezed state once said actuating body is displaced to the loosened position.

9. The supporting device according to Claim 1, further comprising _a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.

EX1002, Original Claims.

177. The independent claim 1 generally has the following components: a supporting device that mounts a protective blade cover to shield a rotating cutting machine, wherein the supporting device includes: a mount unit, a tightening bolt, a supporting frame, a movable tightening member, a cam actuating member, a handgrip, and a biasing member. Dependent claim 2 further defines the mount as having fixed and movable components, claim 5 adds a nut, and claim 9 adds a retaining unit.

178. On October 9, 2008, the Examiner issued a Notice of Allowance. *Id.*, Oct. 9, 2008 Notice of Allowance and Fee(s) Due. In the Reasons for Allowance, the Examiner indicated that “none of the art of record discloses a supporting device for mounting a protective cover to shield a cutting blade of a cutting machine comprising the elements of claim 1, wherein the biasing member acquires an increment of a biasing force biasing the front end of the shank towards the supporting frame counteracting the axial friction force to keep the actuating member in a tightening position.” *Id.* at 2.

XI. SUMMARY OF OPINIONS

179. As stated, for this declaration, I present opinions regarding whether the references relied on herein render obvious the Challenged Claims. Based on my

knowledge, experience, and materials considered, it is my expert testimony and opinion that the '622 patent is invalid as obvious.

180. In my opinion, the cited references disclose every element of the Challenged Claims. A POSA would have been motivated to combine the references to reach the claimed subject matter as a whole.

181. I note that my opinions in this declaration do not represent, nor are they intended to represent, all opinions I may have in this matter. The opinions herein are to explain my ultimate opinion that the Challenged Claims are invalid as obvious.

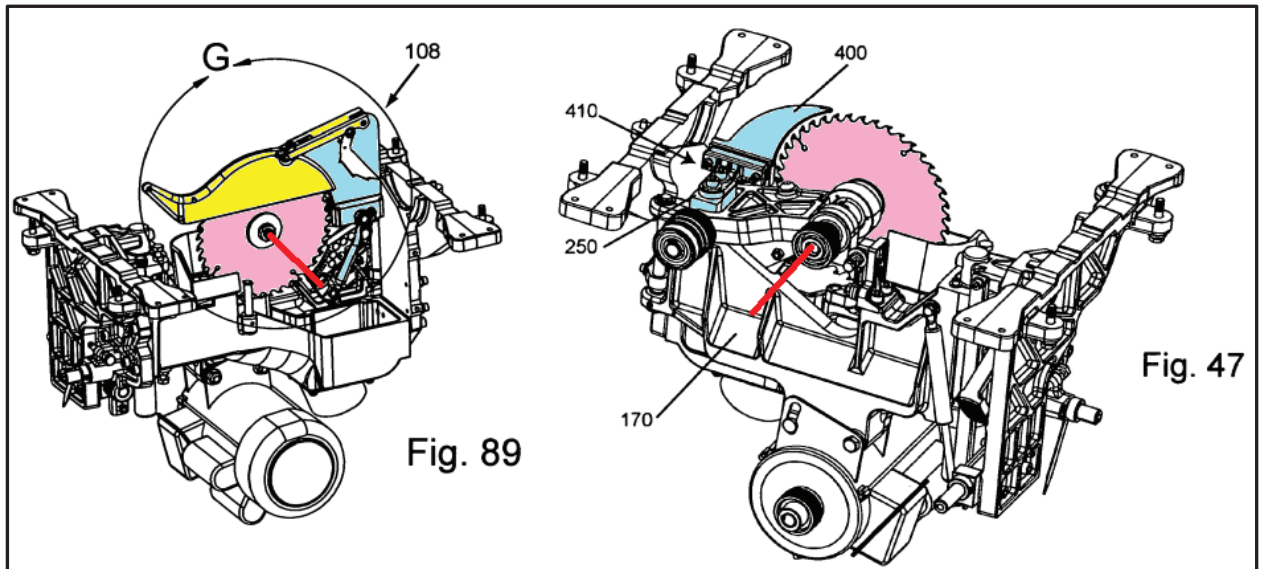
XII. THE CHALLENGED CLAIMS OF THE '622 PATENT ARE INVALID

A. Ground 1: Claims 1, 2, 5, and 9 are unpatentable as obvious under 35 U. S. C. § 103 over Gass in view of Applicant Admitted Prior Art (AAPA)

i. Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:

182. Gass teaches a supporting device 410 (blue below) for mounting a protective cover 108 (yellow below) to shield a cutting blade 105 (pink below) of a cutting machine 100. (EX1003, Figs. 3 & 47, 24:47-51 (“Blade guard assembly 108 is another item that may be mounted and indexed in the mounting system 410.... Blade guard 108 includes a blade shroud 520 shaped to fit over the blade and shield a person from accidentally contacting the blade.”).)

183. The cutting blade 105 (pink) of cutting machine 100 is driven to rotate about a rotating axis (red line shown below). *Id.*, Figs. 89 & 47, 14:46-47 (“[T]he blade of the saw is mounted on the arbor so that it spins when the arbor rotates.”).

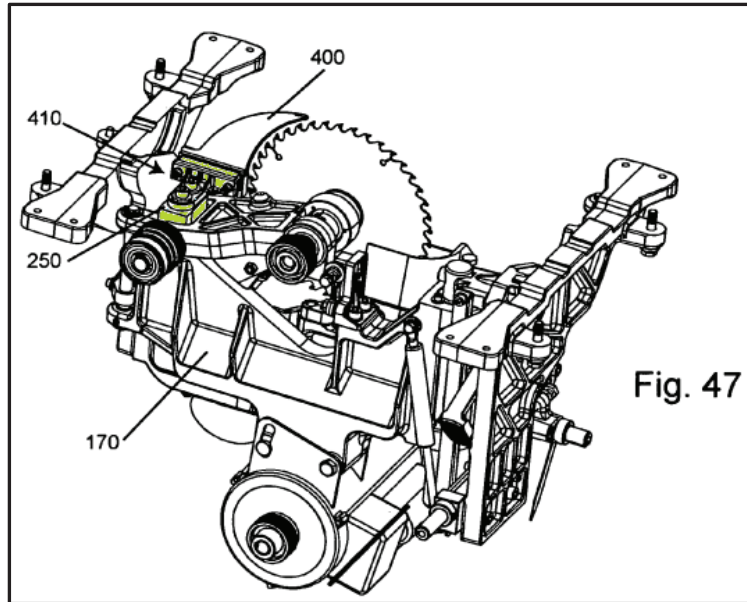


Annotated Figs. 89 & 47 of Gass

184. Limitation 1.0 contains no novel or nonobvious terms as it only contains content that exists in prior art.

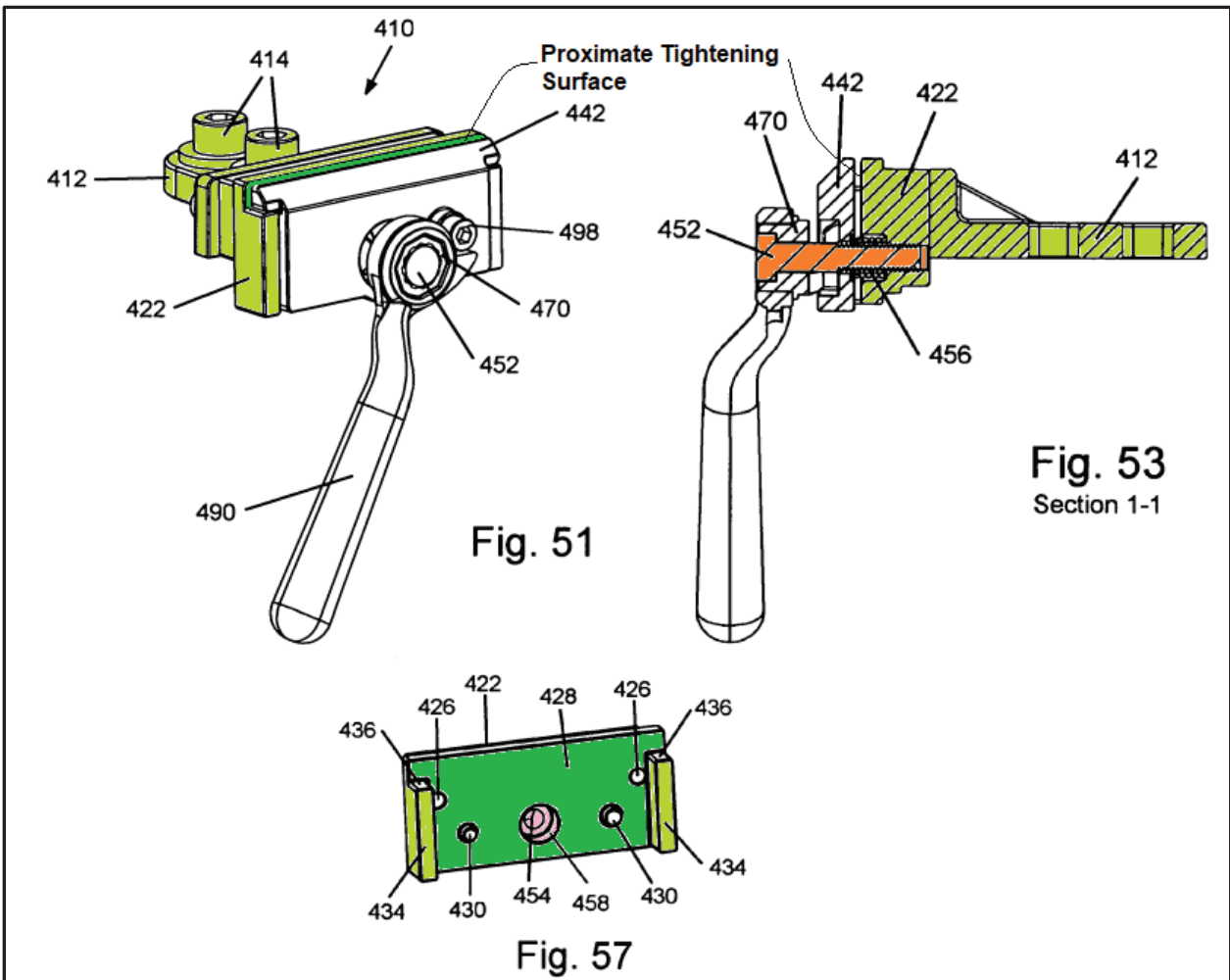
- ii. **Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;**

185. Gass teaches a mount unit 412,422,428 (green below) secured to a cutting machine (via 414). *Id.*, Fig. 47, 20:3-18 (“Mounting system 410 includes a mounting plate 412 that is bolted onto raised portion 250 of elevation plate 170 by bolts 414.”).



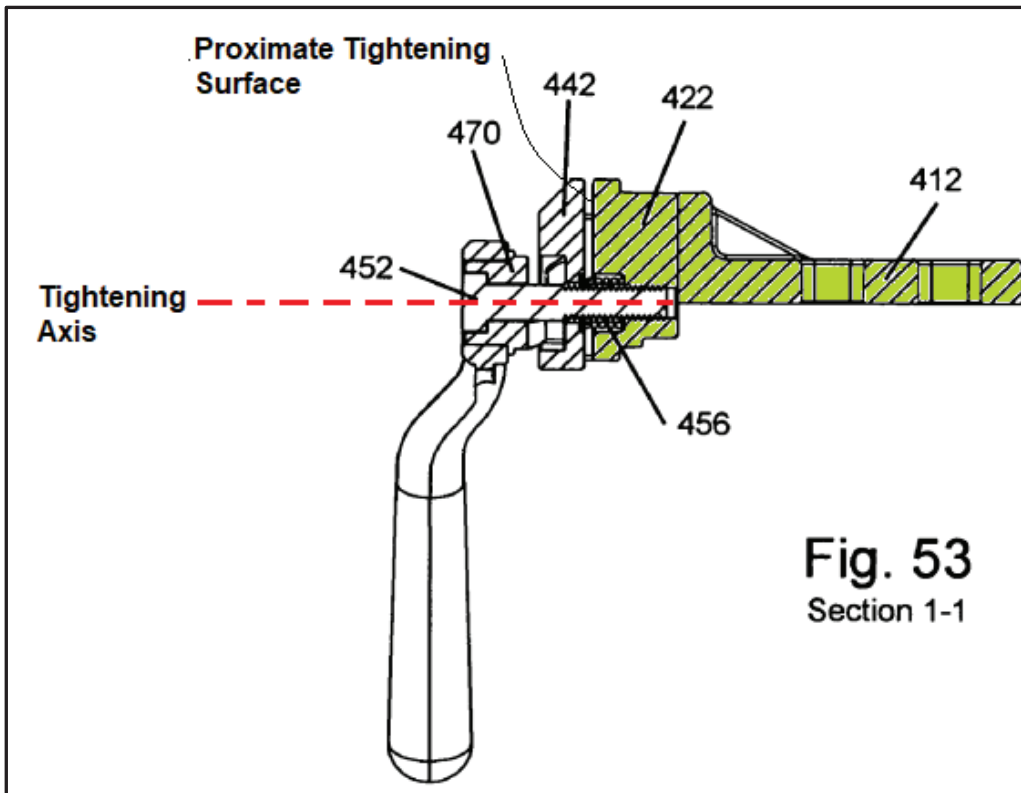
Annotated Fig. 47 of Gass

186. Gass's mount unit 412,422,428 (green) includes a major abutment wall 428 with a proximate tightening surface 428 (dark green below) and an axial hole 454,458 (pink below) extending therethrough. *Id.*, Figs. 50-58, 20:52-55 ("Bolt 452 passes through hole 450 and is threaded into a hole 454 in positioning plate 422 to loosely connect the clamping plate to the positioning plate.").

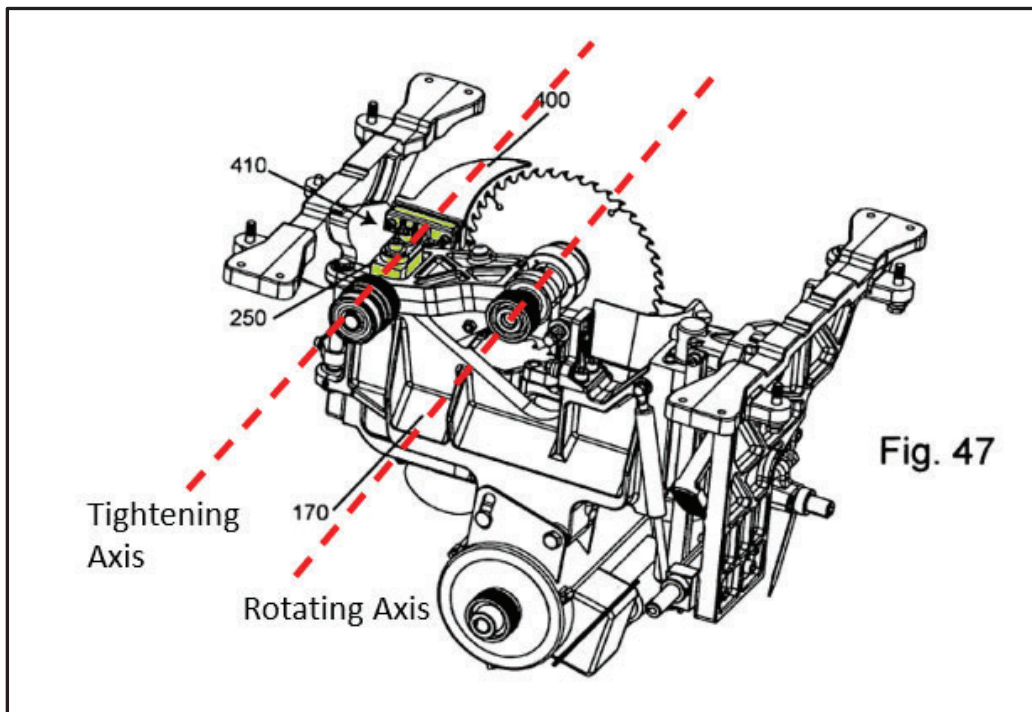


Annotated Figs. 51, 53 & 57 of Gass

187. As shown below, the axial hole 454,458 extends along a tightening axis parallel to the rotating axis of the cutting blade.



Annotated Fig. 53 of Gass

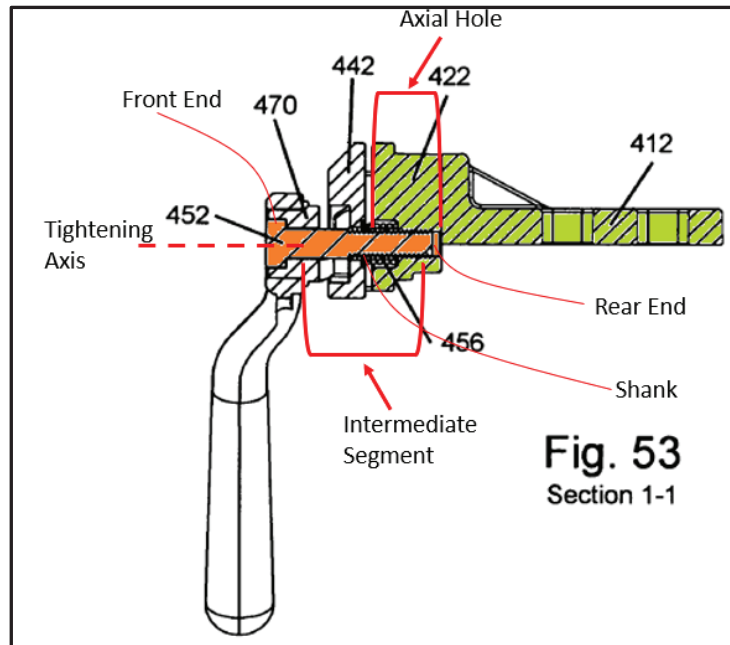


Annotated Fig. 47 of Gass

188. Limitation 1.1 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- iii. **Limitation 1.2: a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed between said front and rear ends;**

189. Gass teaches a tightening bolt 452 (orange below) having a shank (also orange below). The shank of the bolt 452 (orange) passes through the axial hole 454,458 (pink above) in the major abutment wall 428 (green below). *Id.*, Fig. 53, 20:52-55 (“Bolt 452 passes through hole 450 and is threaded into a hole 454 in positioning plate 422 to loosely connect the clamping plate to the positioning plate.”). The bolt 452 has front and rear ends (annotated below) opposite to each other in the tightening axis as well as an intermediate segment (annotated below) interposed between the front and rear ends. *Id.*, 20:19-38, 20:51-62, 21:30-36, Figs. 50-57.



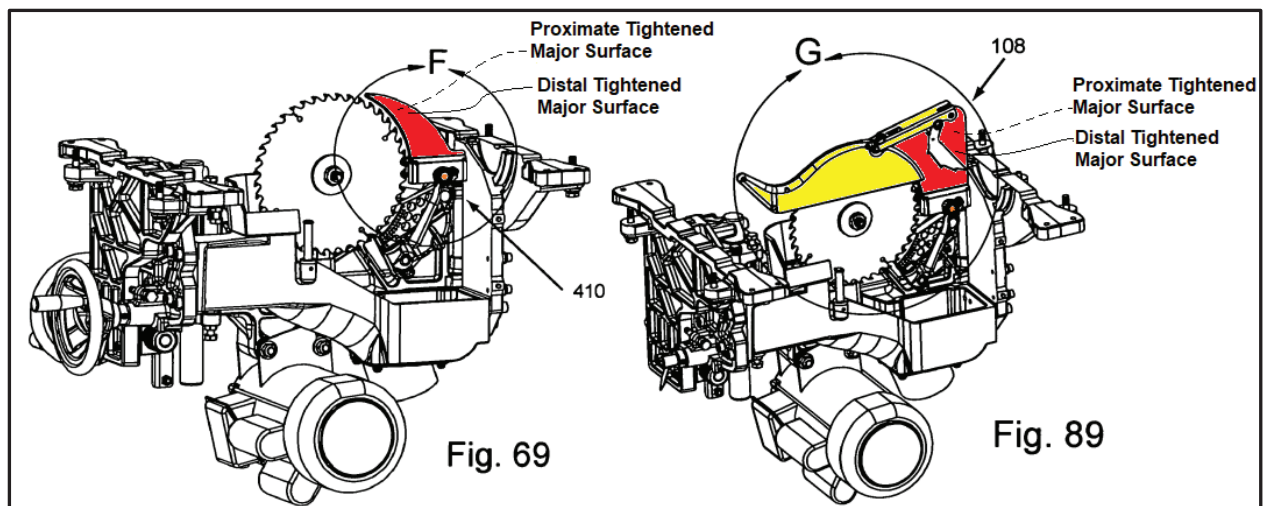
Annotated Fig. 53 of Gass

190. Limitation 1.2 contains no novel or nonobvious terms as it only contains content that exists in prior art. Bolts with front and rear ends and intermediate segments connecting said ends have existed in the prior art for centuries.

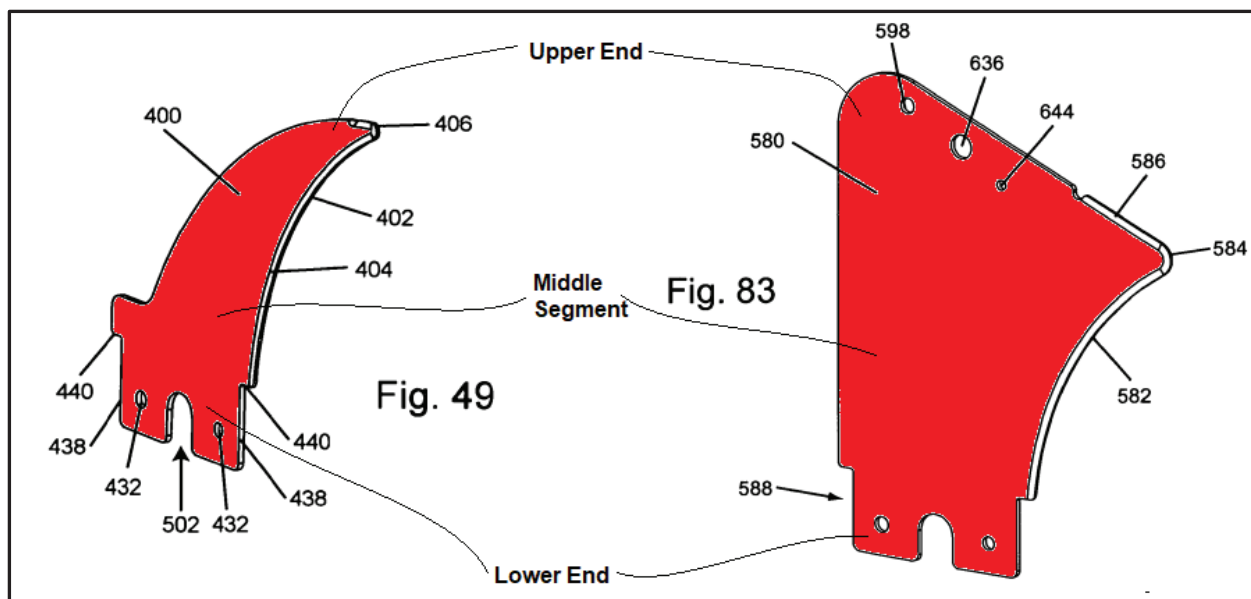
- iv. **Limitation 1.3: a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis,**

191. Gass discloses a supporting frame 400/580 (red below) that has an upper end (annotated below), a lower end (annotated below) opposite the upper end, and a middle segment (annotated below) interposed between the upper and lower ends. *Id.*, 18:34-35 (“FIG. 44 shows a table saw with a riving knife 400 positioned

adjacent the back edge of the blade.”), 27:38-43 (“Splitter 580 is a flat, metal plate similar to the riving knife discussed above. ... the splitter is positioned in the saw behind and within the kerf of the blade, like the riving knife.”), Figs. 44-49, 69, 74-77, 83-89, 93-94. Further, the upper end of the supporting frame 580 of Gass is adapted to hold a protective cover (yellow below). *Id.*, Fig. 89, 27:43-45 (“The splitter, however, extends above the height of the fully elevated blade so that a blade shroud may be mounted thereto.”). As shown below in annotated Figures 69 and 89 of Gass, the middle segment has proximate and distal tightened major surfaces opposite each other along the tightening axis (tightening axis extends through orange bolt 452). *Id.*, Figs. 69 and 89.



Annotated Figs. 69 & 89 of Gass



Annotated Figs. 49 & 83 of Gass

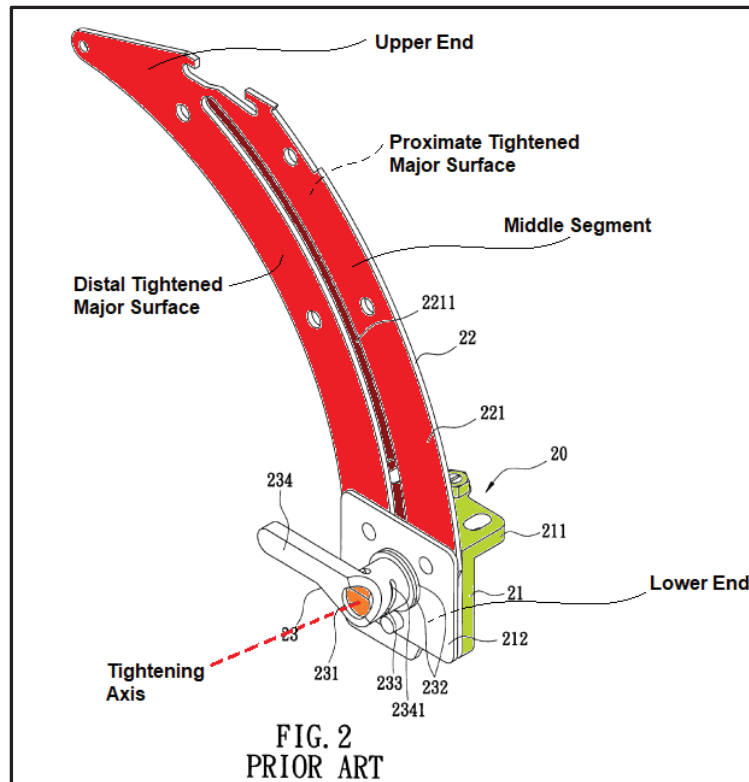
192. A POSA would understand the interchangeability of a riving knife 400, splitter 580, or an alternative support frame in view of the explicit teachings of Gass. *Id.*, 24:41-46 (“Mounting system 410 is constructed so that items other than a riving knife may be attached to or mounted in the saw. Any item that includes a base configured to fit over positioning plate 422 and sized to be clamped between the positioning plate and clamping plate 442 may be mounted and indexed in the saw as described.”).

193. The only structural difference between the two support frames taught by Gass (splitter 580 and riving knife 400) is the shape and the presence of attachment holes for the protective cover of the splitter; the splitter has upper and lower ends opposite each other, a middle segment, with opposing proximate and distal major tightened surfaces, interposed between the ends.

194. Limitation 1.3 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- v. **Limitation 1.4: and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end;**

195. Gass does not disclose a guiding slot as recited in the limitation. AAPA, as also disclosed in Section XII(C)(iv)-(vi) herein, discloses this limitation. Namely, AAPA discloses a guiding slot 2211 (dark red below) extending through the proximate and distal major tightened surfaces (annotated below) of supporting frame 22 which permits passage of the shank (orange) therethrough. EX1001, 1:53-62 (disclosing a “supporting frame 22” has an “arcuate slot 2211” with the shank of “a tightening bolt 231 [that] extends through the arcuate slot 2211 and into the fixed mount 211”), Fig. 2.



Annotated Fig. 2 of AAPA

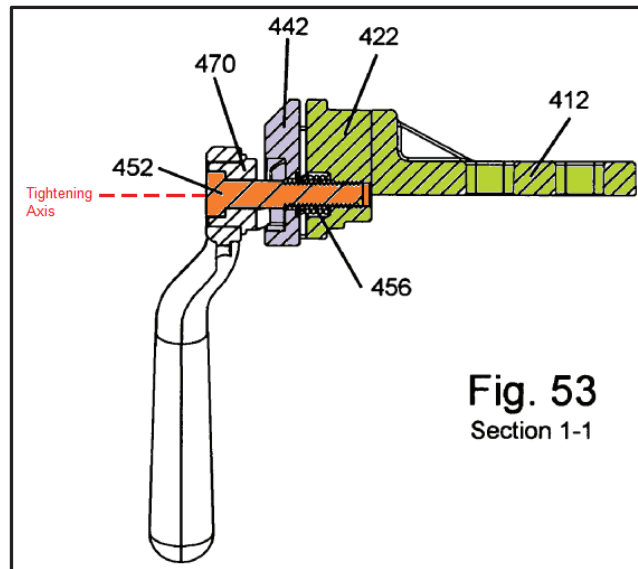
196. A POSA would know that the guiding slot 2211 (dark red) permits the middle segment (annotated above) to be movable between a position of use (as shown in AAPA, Fig. 2) where the shank 231 (orange) is remote from the upper end (annotated above), and a retreat position (not shown), where the shank 231 (orange) is closer to the upper end (annotated above).

197. The “retreat position” would be achieved by using the slot to guide the riving knife below the surface of the table such that the upper end of the riving knife is closer to the shank of the yellow tightening bolt.

198. Limitation 1.4 contains no novel or nonobvious terms as it only contains content that exists in prior art.

vi. **Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal,**

199. Gass discloses a movable tightening member 442 (purple below) that is sleeved on the shank 452 (orange below) and having a thrust major wall (also purple below) to which the tightening axis (red dashed lines below) is normal. EX1003, Fig. 53, 20:39-50 (The movable tightening member of Gass is “clamping plate 442,” which “works with positioning plate 422 to clamp and hold the riving knife in position.”), 20:51-55 (“Clamping plate 442 also includes a hole 450 through which a bolt 452 passes. Bolt 452 is labeled in FIG. 53. Bolt 452 passes through hole 450 and is threaded into a hole 454 in positioning plate 422 to loosely connect the clamping plate to the positioning plate.”), 22:33-38 (disclosing that clamping plate is movable: “[m]oving handle 490 down causes cam bushing 470 to turn. When the cam bushing turns, cam surfaces 472 and 474 and/or leading edges 471 and 476 slide up cam surfaces 462 and 464, respectively, on the clamping plate and push the clamping plate toward the positioning plate.”). As illustrated, the tightening axis oriented normal to the thrust major wall.



Annotated Fig. 53 of Gass

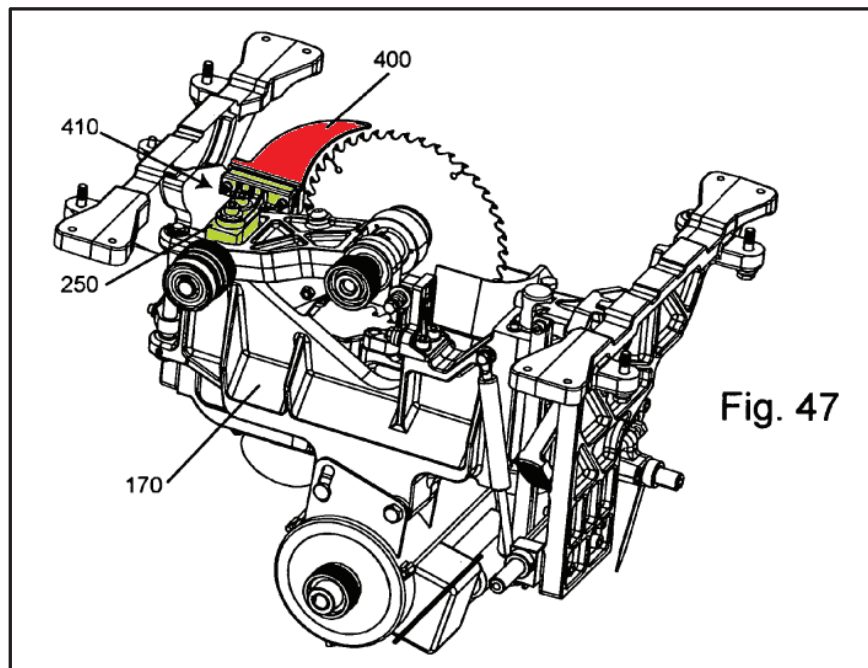
200. Limitation 1.5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

vii. **Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and**

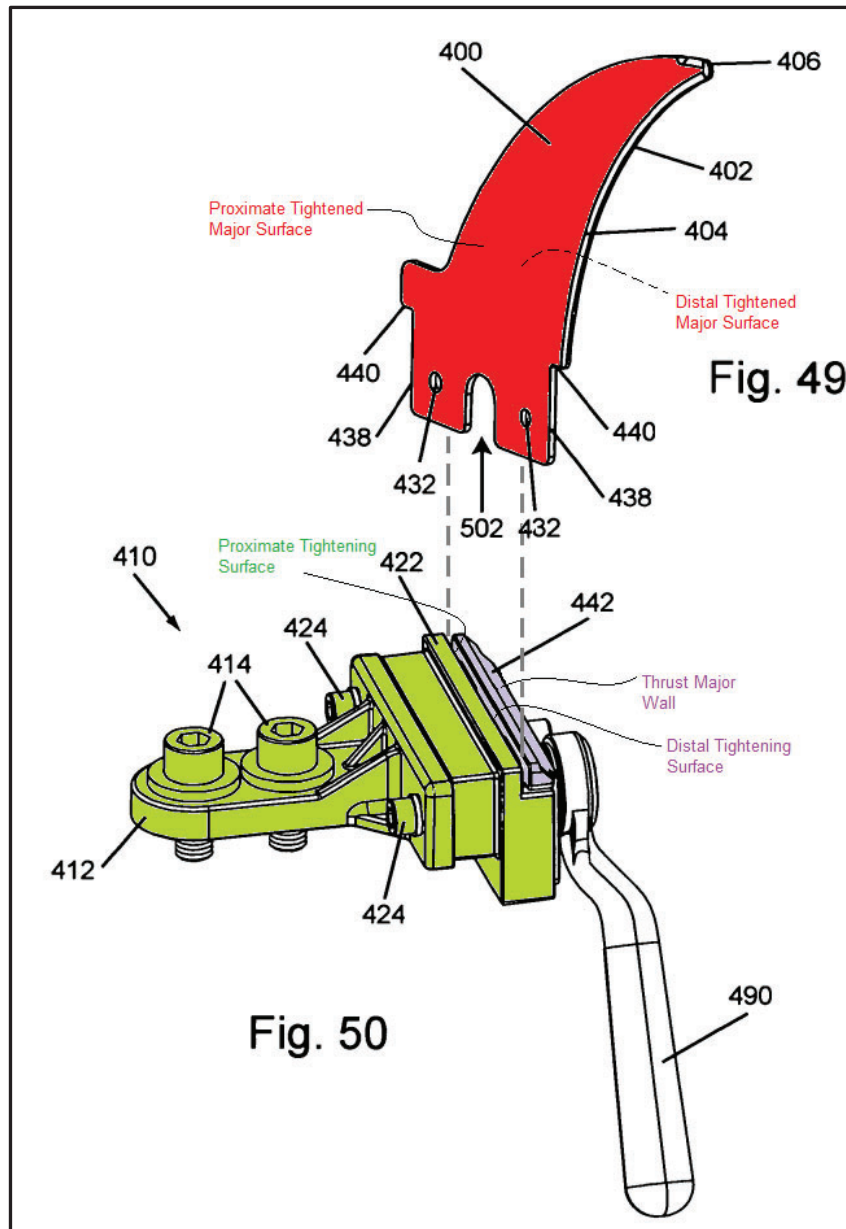
201. A POSA would understand this limitation to describe clamping the supporting frame (riving knife).

202. As best seen in Figures 47 and 49-50 of Gass, the thrust major wall (purple below) of movable tightening member 442 has a distal tightening surface (annotated below) that confronts and which is to be brought to press distal tightened major surface (annotated below) of supporting frame 400 (red). *Id.*, Fig. 47, 20:39-50 (Gass’s clamping plate 442 “supports the side of the riving knife opposite the side supported by the positioning plate.”). During operation, the proximate tightened

major surface (annotated below) of the supporting frame 400 (red) is forced to abut the proximate tightening surface (annotated below) of the mount unit 412,422,428 (green). *Id.*, Fig. 47, 20:39-41 (“Mounting system 410 also includes a clamping plate 442 that works with positioning plate 422 to clamp and hold the riving knife in position. Clamping plate 442 includes a flat surface 444 that supports the side of the riving knife opposite the side supported by the positioning plate.”).



Annotated Fig. 47 of Gass



Annotated Figs. 49-50 of Gass

203. Limitation 1.6 contains no novel or nonobvious terms as it only contains content that exists in prior art.

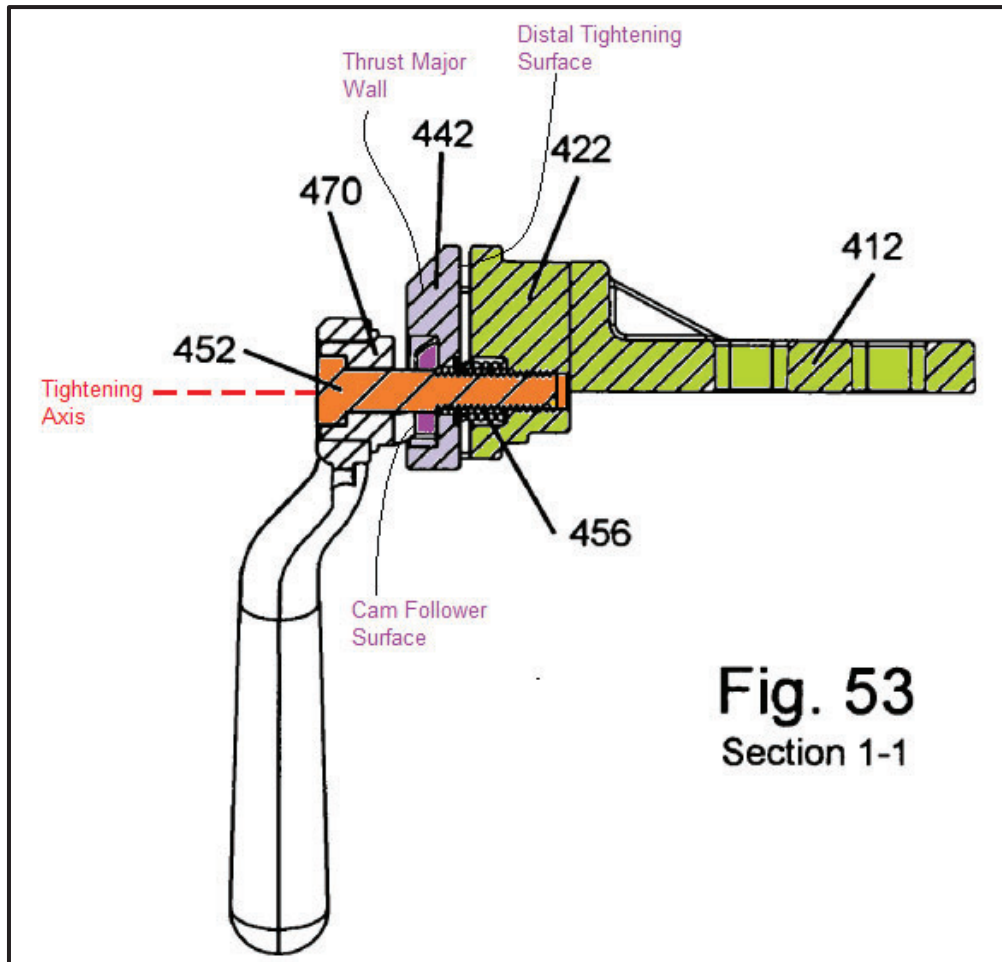
viii. **Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that**

are respectively proximate to and distal from said distal tightening surface along the tightening axis;

204. A POSA would understand this limitation to describe the rotationally static member of a common cam, the “cam follower,” that translates rotary motion into linear motion along the rotational axis at required rates.

205. A POSA would further understand this limitation, and limitations 1.8 to 1.10, to be describing the manner in which cams function. A POSA would understand that camming actions require contact between two surfaces. A POSA would then understand that the “first and second pressed areas” of the instant claim limitation and the “first and second pressing spots” of limitation 1.8 to be merely describing this contact. Arbitrarily assigning names, like “first and second pressed areas,” and “first and second pressing spots,” to these surfaces is meaningless to a POSA and creates confusion.

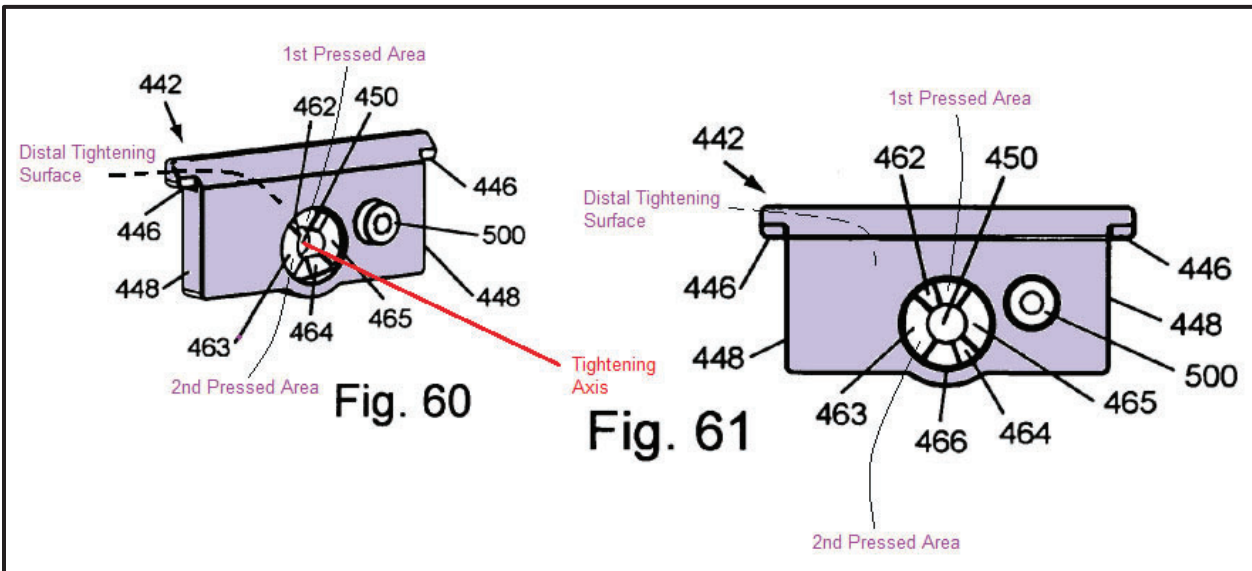
206. The thrust major wall (purple) of Gass includes a cam follower surface 462-465 (annotated and dark purple below) that is opposite to the distal tightening surface (annotated below) along the tightening axis (red dashed line). *Id.*, Fig. 53.



Annotated Fig. 53 of Gass

207. Gass's cam surface 462-465 has a first pressed area 466 (annotated below) and a second pressed area 463 (annotated below) that are angularly displaced from each other about the tightening axis. Further, the first pressed area (annotated) of Gass is proximate to (closer to) the distal tightening surface (annotated below) along the tightening axis (dashed red line) compared to the second pressed area 463 of Gass, which is distal to (farther from) the distal tightening surface (annotated below) along the tightening axis. *Id.*, Figs. 60-61, 20:63-21:2 ("Clamping plate 442 also includes a first set of cam surfaces 462 and 463 and a second set of cam surfaces

464 and 465. The cam surfaces are positioned in a recess 466 that is concentric with hole 450 and the cam surfaces are arcuately spaced around the hole, as shown. Cam surfaces 462 and 464 slope up from the bottom of recess 466 to where they join with cam surfaces 463 and 465, respectively.”).



Annotated Figs. 60-61 of Gass

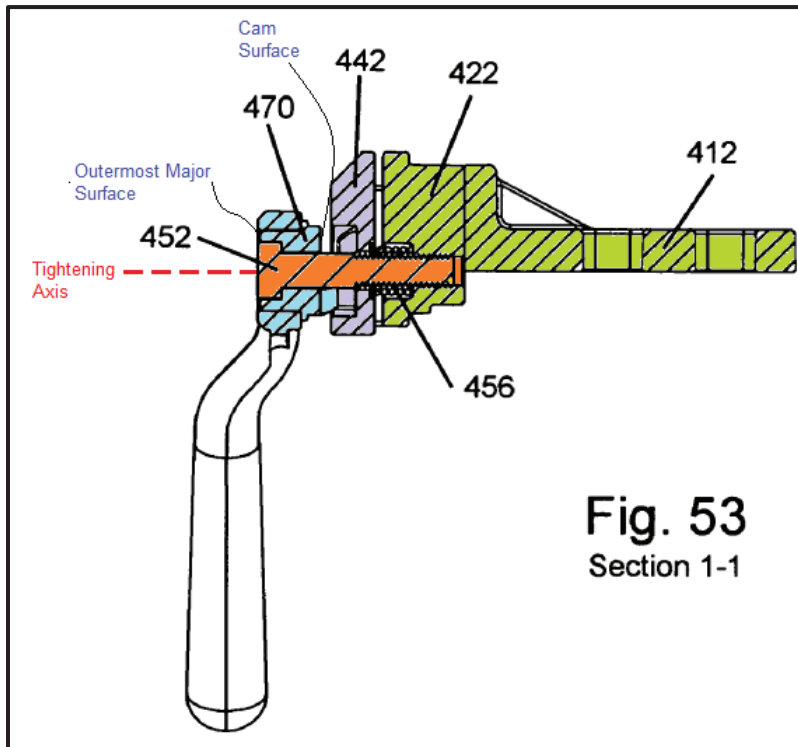
208. Limitation 1.7 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- ix. **Limitation 1.8:** a cam actuating member including an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening axis such that,

209. A POSA would understand limitation 1.8 to describe the configuration of the cam actuating member, the rotationally movable member of a common cam, on the shank of the bolt. As described with respect to limitation

1.7, a POSA would understand this limitation to be describing the manner in which cams function. As also described with respect to limitation 1.7, a POSA would understand that camming actions require contact between two surfaces and would know that the “first and second pressing spots” of limitation 1.8 are merely describing this contact. Arbitrarily assigning names, like “first and second pressed areas” and “first and second pressing spots,” to these surfaces is meaningless to a POSA and creates confusion.

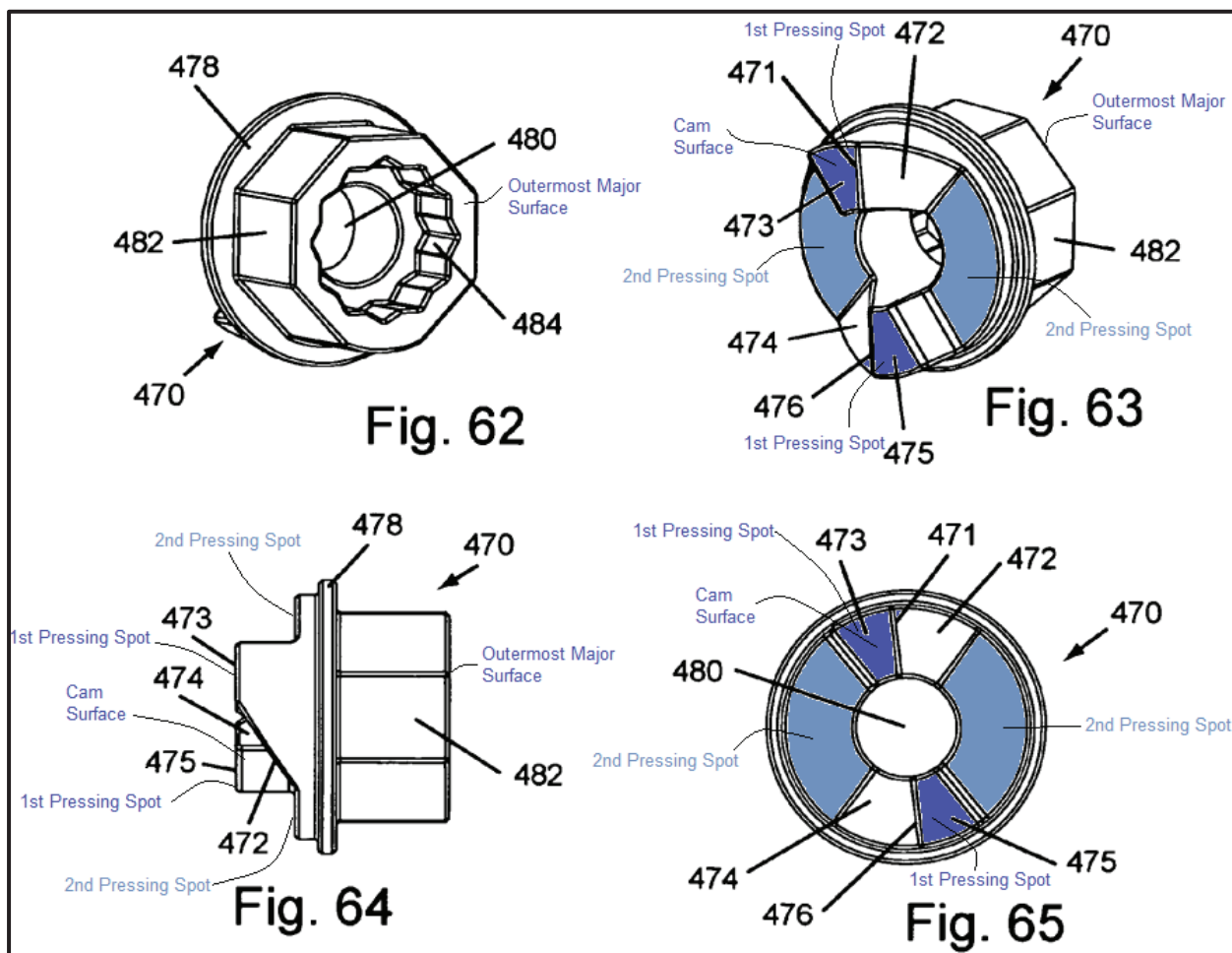
210. Gass also discloses a cam actuating member (shown below in blue). The cam actuating member 470 includes an actuating body that is sleeved (via 480) on the shank 452 (orange, Fig. 53 above). EX 1003, Figs. 53, 62-65, 21:26-27 (“Bolt 452 passes through hole 480 in the cam bushing and through hole 450 in the clamping plate.”).



Annotated Fig. 53 of Gass

211. Further, as shown in reproduced Gass Figures 62-65 below, the cam actuating member 470 has cam surfaces 471-476 (annotated above and below) and an outmost major surface (annotated above and below) opposite the cam surfaces 471-476 in the tightening axis (all annotated below in blue). Cam surfaces 471-476 include a first pressing spot 473 (annotated in royal blue below) and a second pressing spot (annotated in grayish blue) which are angularly displaced from each other about the tightening axis. *Id.*, Figs. 62-65, 21:11-19 (“Cam bushing 470 includes cam surfaces 472 and 473 joined by a first edge 471, and a second set of cam surfaces 474 and 475 joined by a second edge 476. Those cam surfaces are arcuately spaced around a hole 480 ... each of cam surfaces 472 and 474 is a portion

of a helix or coil with a pitch of 44 mm. Each of cam surfaces 473 and 475 is a flat surface”).



212. A POSA would understand Gass to be teaching first and second pressing spots that are part of a multi-component camming system having a “geometry . . . [that] prevents vibration or other factors from causing the mounting system to unclamp or open.” *Id.*, 22:32-64 (“[o]ne possible configuration is to make cam surfaces 463, 465 . . . relatively flat and smooth with only very little or no slope.”)

213. Limitation 1.8 contains no novel or nonobvious terms as it only contains content that exists in prior art.

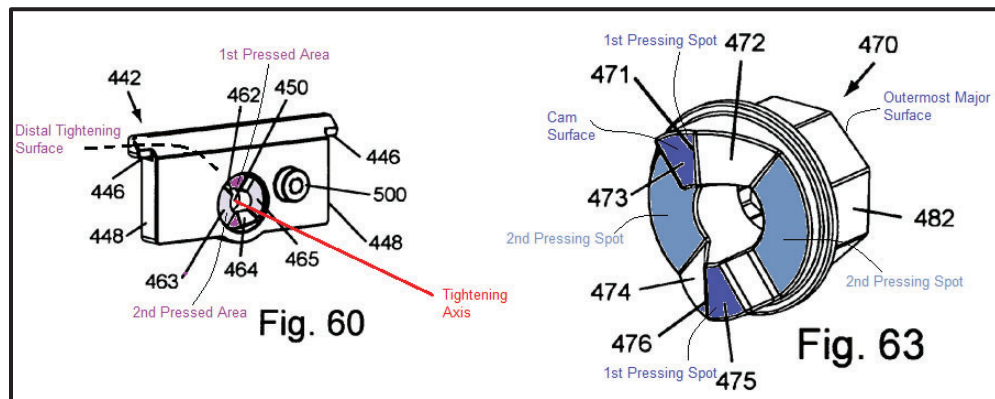
- x. **Limitation 1.9: said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position,”**

214. A POSA would understand this limitation to describe the cam and cam follower actions. A POSA would struggle to understand why the limitation would assume the cam surfaces would not remain in contact in the loosened position because, in the open/loosened position, the compressive spring force would maintain some contact of the cam surfaces. A POSA would also understand that if the cam surfaces were allowed to separate, the parts might not remain in proper alignment in the loosened position. A POSA would also understand that if the cam surfaces were allowed to displace, sawdust and debris could fall on the surfaces and impair the operation of the cam, potentially resulting in an unstable, movable clamp.

215. A POSA would understand limitation 1.9 to describe the mating of the rotational member of the simple cam described in limitations 1.7 and 1.8. As described above, a POSA would find that assigning names to camming surfaces, like the “first and second pressing spots” of the limitation, are meaningless and confusing.

216. Gass discloses (1) the first pressing spot 473 (annotated and royal blue below) of the actuating member 470 is brought into contact with the first pressed

area (annotated and dark purple below) of the movable tightening member 442; and (2) the second pressing spot (annotated and gray blue below) of the actuating member 470 is brought into contact with the second pressed area 463, 465 (annotated and light purple below) of the movable tightening member 442 when the cam surface 471-476 is brought to mate with the cam follower surface 462-465 in a loosened position. *Id.*, 21:59-22:13 (“[w]hen handle 490 is moved up to open the clamp, the handle turns cam bushing 470 so that the cam bushing fits into recess 466 on the clamping plate without engaging the cam surfaces.”).



Annotated Figs. 60 & 63 of Gass

217. Limitation 1.9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xi. **Limitation 1.10:** and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and

218. A POSA, reading this claim limitation, may find this limitation to be indefinite. A POSA would struggle to understand the limitation because of the obtuse language used to describe what is fundamentally the manner in which cams function. This limitation describes merely a combination of known elements of the prior art performing the functions a POSA would expect them to perform.

219. In particular, a POSA would understand that all camming actions require contact between at least two surfaces. A POSA would then understand the terms “said first pressing spot is displaced to contact said pressed spot” to be merely describing this contact. A POSA would further understand that, because the Gass cam has a circular/disc-like configuration, angular displacement of one spot/area to contact another is an intrinsic aspect of the camming action, and arbitrarily assigning names, like “first and second pressing spots” and “first and second pressed areas” to these surfaces is meaningless and obfuscating. Accordingly, a POSA would understand the terms “said first pressing spot is displaced to contact second pressed spot” to be merely describing this contact. A POSA would further understand that arbitrarily assigning names, like “first and second pressing spots,” and “first and second pressed areas” to the surfaces is meaningless and confusing. A more accurate description would be to use “cam” and “cam follower,” as used in the technical literature.

220. A POSA would further understand that the “axial frictional force” does not act to create or impart motion in this application. Basic physics teaches that friction acts to resist relative motion between two surfaces. A POSA would further understand that the limitation requires an “axial clamping force” in order to accomplish the recited action.

221. In fact, a POSA would understand this limitation to be technically inaccurate. Ultimately, Gass informs the POSA that its cams, including its first and second pressing spots and first and second pressed areas (Gass’s “cam surfaces”), are to be designed such that their “geometry . . . prevents vibration or other factors from causing the mounting system to unclamp or open.” *Id.*, 22:49-62 (“[o]ne possible configuration is to make cam surfaces 463, 465 . . . relatively flat and smooth with only very little or no slope.”) Although the ’622 patent states that its purported invention “hold[s] a protective cover . . . against vibration of the cutting machine 100 during operation,” (EX1001, 5:59-62) Gass had already solved this problem. Gass is within the knowledge of a POSA, which makes the Challenged Claims obvious.

222. Gass discloses that when the actuating body 470 is turned about the tightening axis to a tightening position, the first pressing spots 473, 475 (royal blue above) are displaced to contact the second pressed areas 463, 465 (light purple above) so as to move the distal tightening surface of the movable tightening member

(purple above) to press the distal tightened major surface of the supporting frame 400 (red above), which thereby forces the proximate tightened major surface of the supporting frame 400 (red above) to abut against the proximate tightening surface (dark green above) of the mount unit 412,422,428 (green above). *See* EX1003, 21:59-22:54 (“When handle 490 is moved up to open the clamp, the handle turns cam bushing 470 so that the cam bushing fits into recess 466 on the clamping plate without engaging the cam surfaces.... Handle 490 may then be moved down to clamp the riving knife between the positioning and clamping plates. Moving handle 490 down causes cam bushing 470 to turn. When the cam bushing turns, cam surfaces 472 and 474 and/or leading edges 471 and 476 slide up cam surfaces 462 and 464, respectively, on the clamping plate and push the clamping plate toward the positioning plate.... When edges 471 and 476 move to the top of cam surfaces 462 and 464, cam surfaces 473 and 475 on the cam bushing will engage cam surfaces 463 and 465 on the clamping plate. Continued downward rotation of the handle will then cause cam surfaces 473 and 475 to slide over cam surfaces 463 and 465.”).)

223. By its disclosure, a POSA would understand Gass to be describing how the riving knife is clamped by turning the cam handle. Similarly, but using obtuse language, the '622 patent describes how the riving knife is clamped by turning the cam handle.

224. Even if Gass did not explicitly disclose this limitation, a POSA would find it obvious to try multiple mating configurations of the first and second pressing spots and the first and second pressed areas until they arrived at one that prevented the clamp from loosening. A POSA would have a reasonable expectation of success given Gass's guidance and the fact that there are a finite number of solutions.

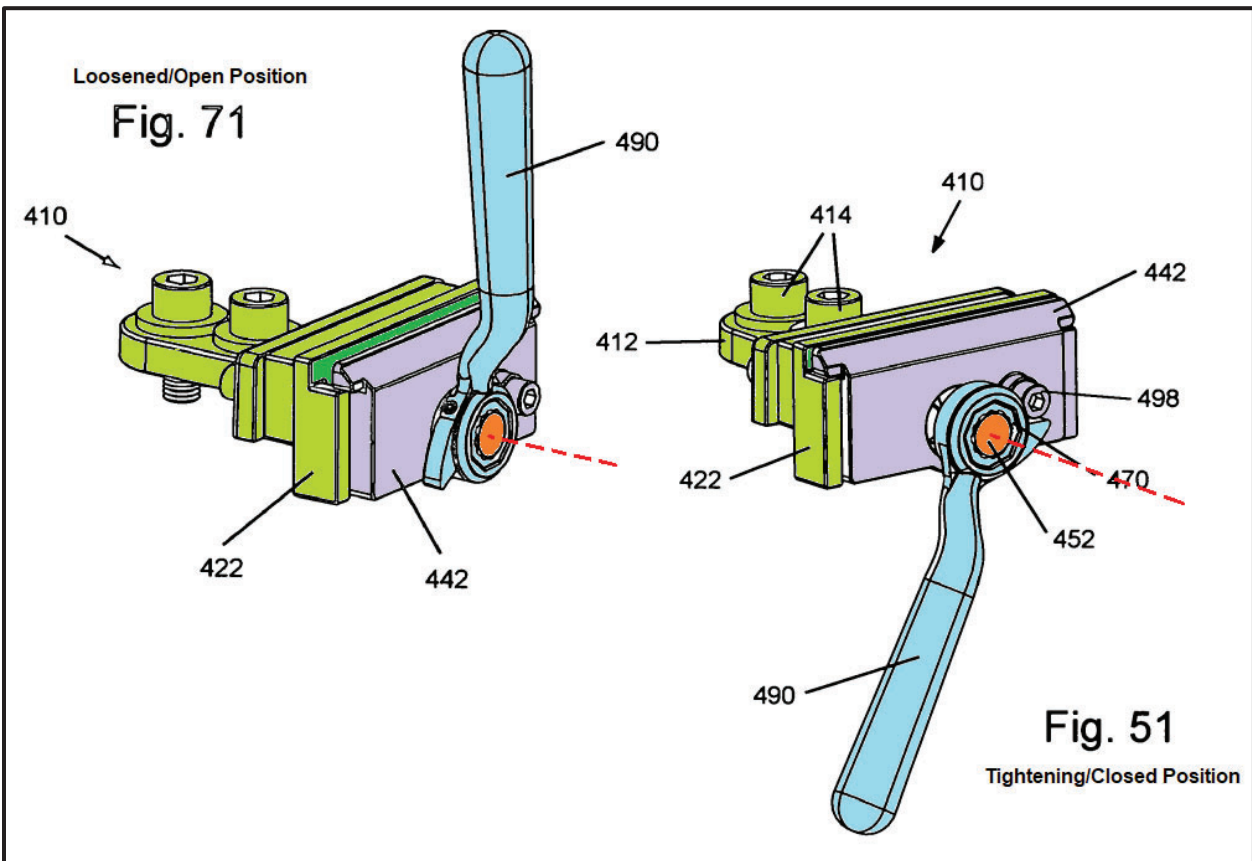
225. Limitation 1.10 contains no novel or patentable elements that are not obvious and only contains content that exists in prior art.

xii. Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and

226. A POSA would understand limitation 1.11 to describe that a clamping or releasing action occurs when the handle is turned due to the cam and bolt assembly.

227. Gass discloses a handgrip 490 (blue below) disposed to extend from the actuating body 470 (also blue below) radially so as to turn the actuating body 470 about the tightening axis (red dashed line) between the loosened (Figure 71) and tightening (Figure 51) positions. EX1003, 21:30-58 ("handle 490 ... has an elongate body ... configured to fit over octagon-shaped drive head 482 on cam bushing 470.... The open position is shown in FIGS. 71 and 72. In that position, handle 490 is raised and plates 422 and 442 are spaced apart. ... The closed position is shown in FIGS.

50, 51 and 69. In that position handle 490 is lowered and plates 422 and 442 are closer together to clamp the riving knife and hold it in position.”).



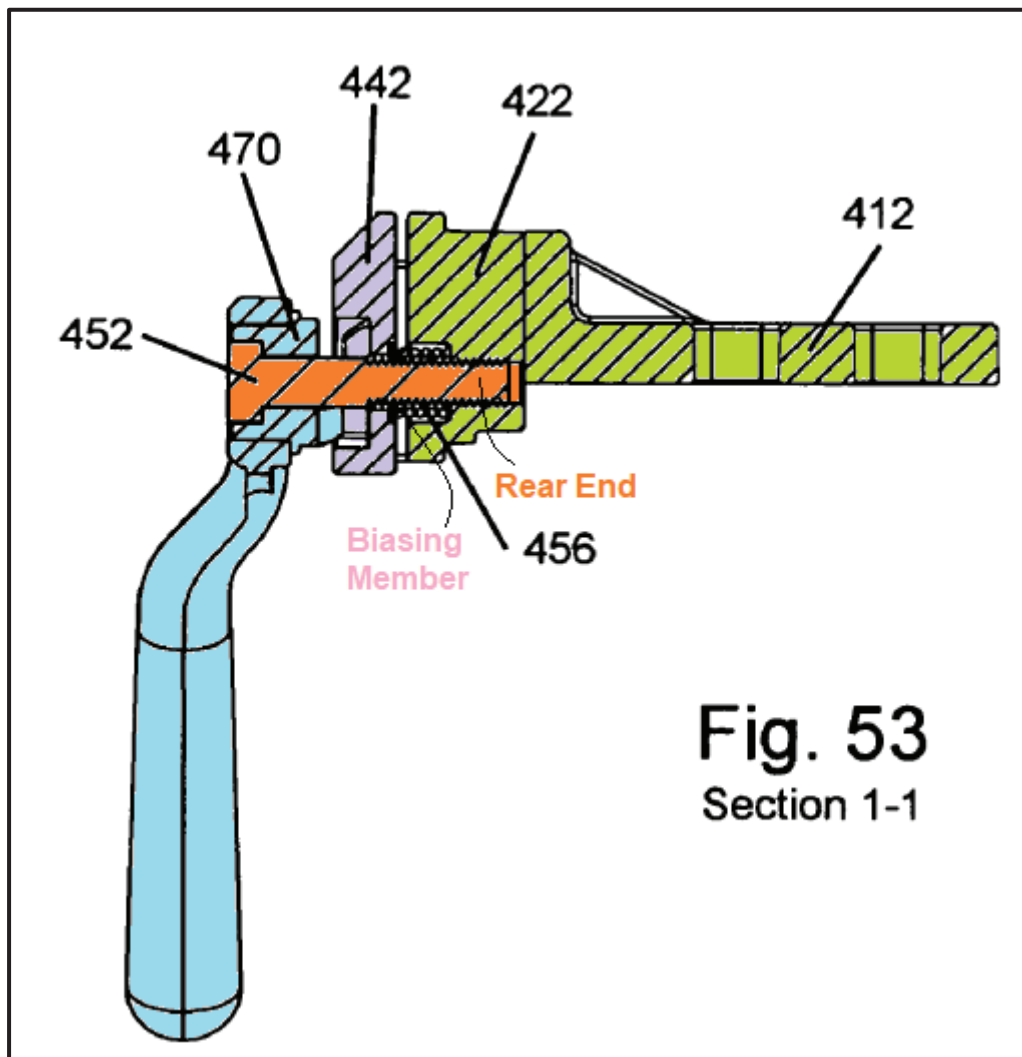
Annotated Figs. 51 & 71 of Gass

228. Limitation 1.11 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xiii. Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that,

229. A POSA would understand that this limitation describes a spring placed around the shank of a bolt or shaft used to generate a biasing force. Gass also discloses a biasing member 456 (annotated below) disposed on the shank 452

(orange below) adjacent to the rear end (annotated below) of the shank 452. *Id.*, Fig. 53, 20:51-62 (a “spring 456 ... placed over bolt 452.”).



Annotated Fig. 53 of Gass

230. [INTENTIONALLY LEFT BLANK]

231. Limitation 1.12 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xiv. **Limitation 1.13:** as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of

said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the tightening position.

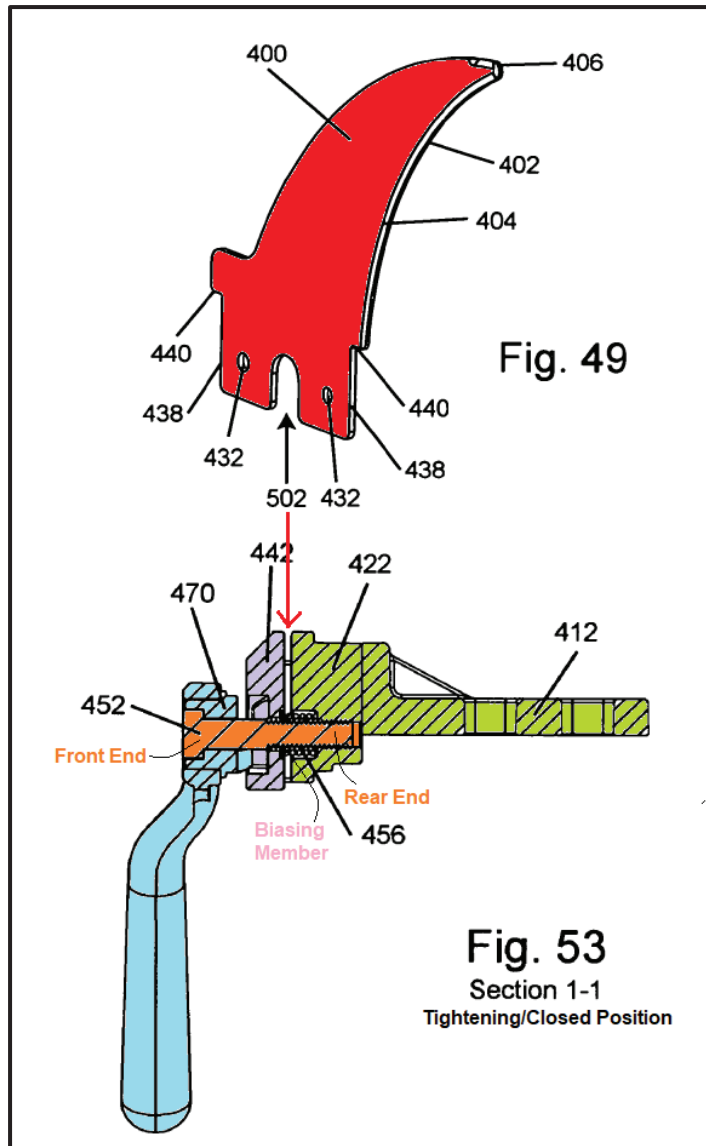
232. A POSA would understand this limitation to describe the mechanics of a bolt with a cam and a preloaded spring.

233. A POSA would struggle to understand limitation 1.13 due to the obtuse, confusing and inaccurate language used. A POSA would understand that “as a result of displacement of said actuating body to the tightening position,” the bolt would be displaced in the axial direction and force the clamping surfaces together. This displacement would then act to further compress the spring and impart an axial force commensurate with the spring constant. The axial force clamps the riving knife in place. A POSA would also understand that in the tightened position, the cam geometry and the normal force would serve to maintain the clamped assembly in the tightened position.

234. A POSA would struggle to understand “axial frictional force” because the axial force is due to the compressed spring, rather than friction. Further, a POSA would understand that “biasing force . . . to counteract the axial frictional force” attempts to refer to the normal force acting between the cam and the cam follower to keep them in a clamped position. A POSA would understand that without traversing the full travel of the cam surface, vibration from the saw would result in

an unstable, movable clamp and that the aforementioned friction generated would result in a more stable, less movable clamp.

235. Gass further discloses that, as a result of displacement of the actuating body 470 (blue below) to the tightening (closed) position, the biasing member 456 acquires an increment of a biasing force which biases the front end (annotated in orange below) of the shank 452 (orange) towards the supporting frame 400 (red). *Id.*, Figs. 49 & 53, 20:60-61 (“Spring 456 biases clamping plate 442 away from positioning plate 422 to help open the clamp....”), 22:18-23 (“[T]he spring may be sized and selected so that it applies 5 to 15 pounds of force against the clamping plate in the open position, and more force when compressed. In this manner, the spring biases the clamping plate out so that the mounting system opens when handle 490 is raised.”). Compressing a spring results in increased spring force.



Annotated Figs. 49 & 53 of Gass

236. Limitation 1.13 contains no novel or nonobvious terms as it only contains content that exists in prior art.

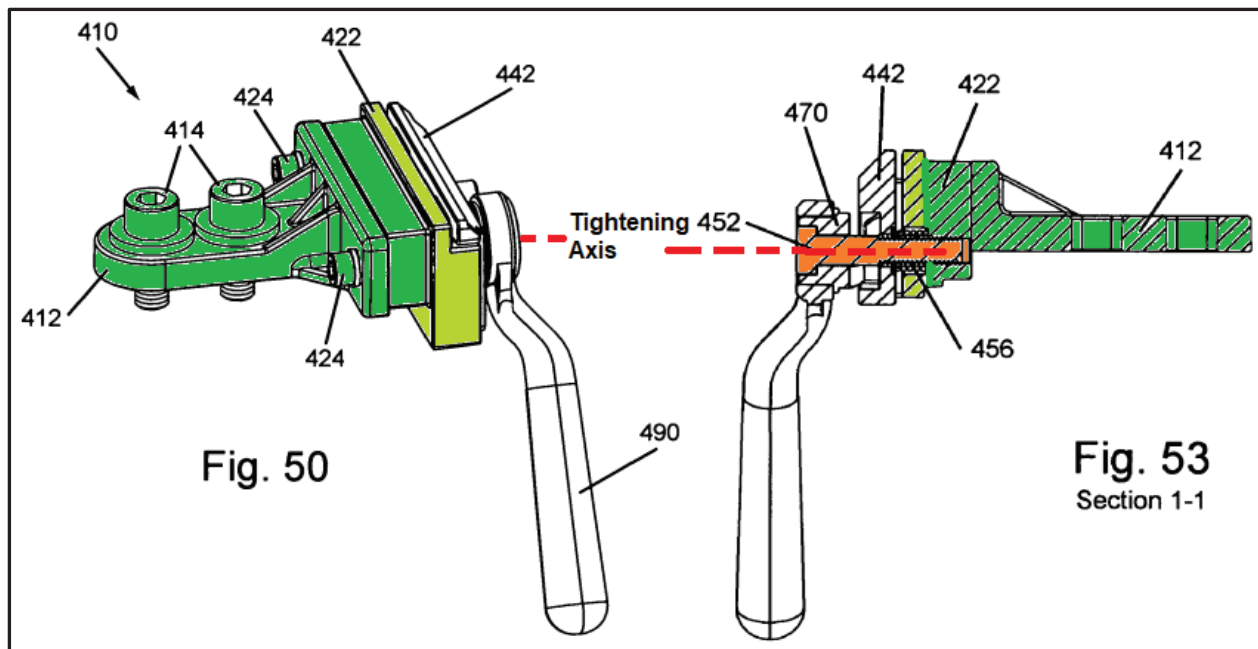
- xv. **Claim 2.** The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable mount having said major abutment wall, which is disposed forwardly of said fixed mount along

the tightening axis to permit said throughbore to be coaxial with said axial hole.

237. A POSA would struggle to understand the meaning of this claim because of the obtuse language used to describe what appears to be the mere alignment of the throughbore with the axial hole.

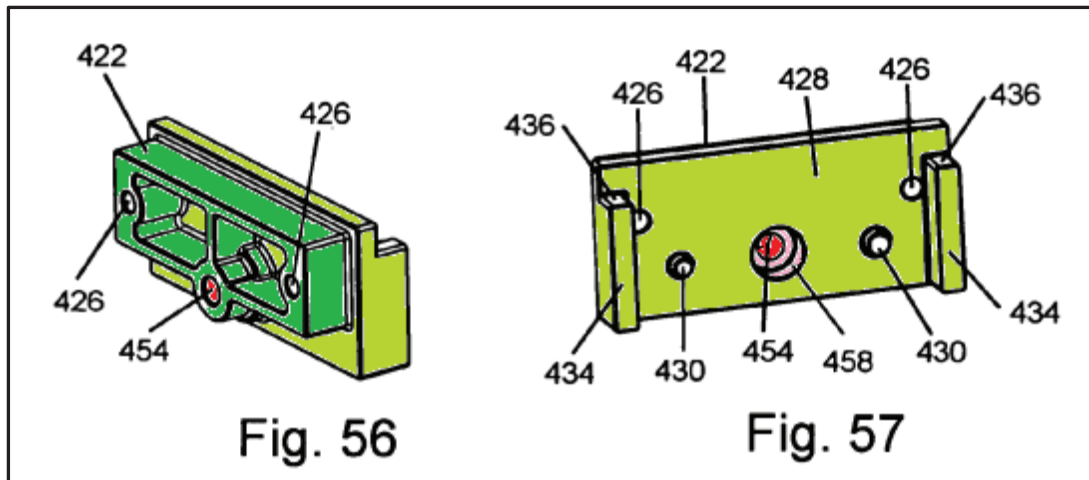
238. This claim adds a “fixed mount,” having a “throughbore,” and a “movable mount.”

239. Gass teaches the additional limitations of claim 2. Particularly, Gass discloses that its mount unit 412, 422, 428 includes a fixed mount (412, partial 422) (dark green below) that is adapted to be secured to the cutting machine (via 414) and has a throughbore 454 that extends along the tightening axis (red dashed line) for passage of the shank 452 (orange). *Id.*, Fig. 47 & 50, 20:3-5 (“Mounting system 410 includes a mounting plate 412 that is bolted onto raised portion 250 of elevation plate 170”), 20:52-55 (“Bolt 452 passes through hole 450 and is threaded into a hole 454 in positioning plate 422 to loosely connect the clamping plate to the positioning plate.”).



Annotated Figs. 50 & 53 of Gass

240. As shown in Figures 56 and 57 reproduced below, the mount unit 412, 422, 428 of Gass also includes a moveable mount (partial 422, 428) (light green above and below) that includes the major abutment wall 428 that is disposed forwardly of the fixed mount (412, partial 422) along the tightening axis (red dashed line) to permit the throughbore 454 (red below) to be coaxial with the axial hole 458 (pink below) (also referenced herein as 454, 458).



Annotated Figs. 56 & 57 of Gass

241. A POSA would find it obvious to extend the throughbore along the tightening axis further into the fixed mount (into 412) for passage of a shank. A POSA would understand that this addition is a mere design choice and thus may decide to extend the throughbore further into fixed mount portion 412 because it may better stabilize and secure the riving knife and the clamp assembly when the shank passes through/screws into an immobile fixed mount attached to the saw frame.

242. Additionally, a POSA would find it obvious to make the fixed mount (80, rear surface 90) a separate structural component from the movable mount (front surface of 90) so that, for example, the movable mount could allow for additional tolerances and flexibility when adjusting the supporting frame/knife 34 of Burke. A POSA would understand that this modification is common sense, ordinary routine practice, and an obvious engineering choice.

243. A POSA would know that the assembly would be better-held in place by attaching it to an immobile fixed mount attached to the saw frame. This would keep the riving knife assembly in the proper and safe position. Therefore, a POSA would understand that the addition of a throughbore is a mere design choice, which would provide the needed clearance for the nut, cap, and spring assembly, and permit said attachment of the assembly to the saw frame. The components located on the shank require clearance to function, the throughbore must be sized to allow for said clearance, and to maintain the clearance, the throughbore must be coaxial with the hole for the shank.

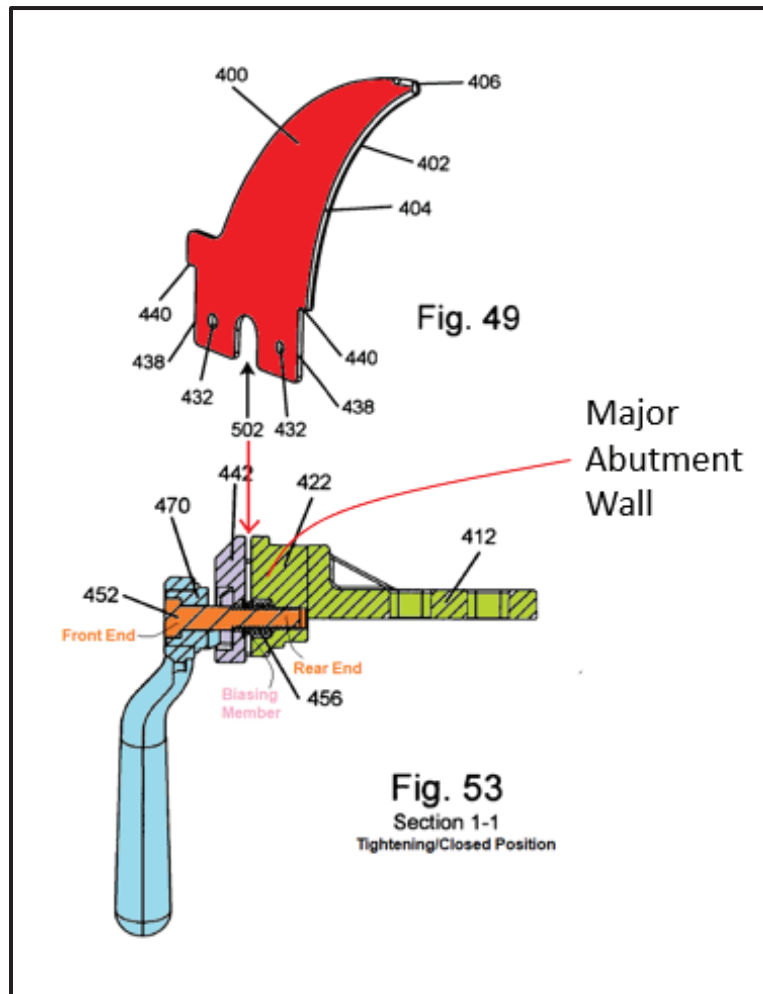
244. Claim 2 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xvi. Claim 5. The supporting device according to claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member being a coil spring which is disposed to surround said shank and between said major abutment wall and said screw nut so as to acquire the increment of the biasing force.

245. This claim adds a “screw nut” and defines the “biasing member” as a “coil spring.”

246. Gass teaches the additional limitations of claim 5. As shown in Figure 53 of Gass, the tightening bolt 452 (orange) has a screw nut 454 that is threadedly engaged with the rear end of the shank 452 (orange). *Id.*, Fig. 53. Hole 454 of Gass

functions as a screw nut as it threadedly engages the rear end of the shank 452 (orange). *Id.*, 20:52-54 (“Bolt 452 ... is threaded into a hole 454 in positioning plate 422.”). Further, the biasing member 456 of Gass is a coil spring 456 that is disposed to surround the shank 452 (orange) between the major abutment wall 428 (green) and functioning screw nut 454 (at threads of 422 in Figure 53 below) so as to acquire the increment of the biasing force. *Id.*, Fig. 53, 20:58-60 (“Spring 456 may be a compression spring, a wave compression spring or some other spring.”).



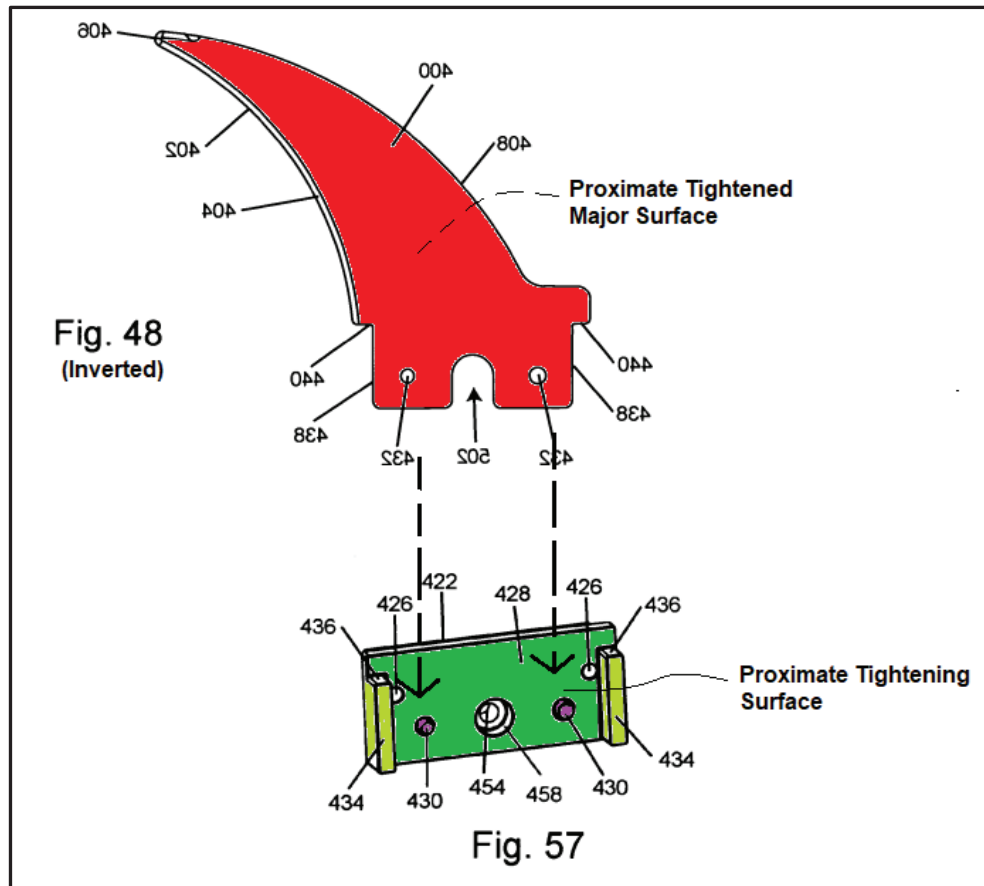
247. A POSA would understand that a nut could be added to the clamping assembly threadedly engaged with the rear end of the shank as one means to retain the bolt in place and transmit force between the spring to the bolt shank. Adding a threaded nut to retain a bolt is well known in the prior art and would be a mere design choice: it would allow the operator to adjust the amount of clamping force applied and would transmit the force from the coil spring to the shank. Indeed, Gass provides explicit motivation to add a nut as it discloses that lock nuts hold bolts in place. *Id.*, 12:40-42.

248. A POSA would also understand that Gass's compression spring 456 is a coil spring. Moreover, as a design choice, a POSA would understand that the position of fixed mount 412 in relation to 422 could be altered so that a traditional "nut" could be added to the rear end of bolt 452. It may then be a further design choice to run the spring 456 the entire length of the shank 452 between the major abutment wall 428 and the traditional "nut."

249. Claim 5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xvii. **Claim 9. The supporting device according to claim 1, further comprising a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.**

250. This claim adds “a retaining unit.” Gass discloses a retaining unit 430 (purple below) that is disposed between the proximate tightening surface (dark green and annotated below) of the mount unit 412,422,428 (green) and the proximate tightened major surface (annotated below) of the supporting frame 400 (red below). *Id.*, Figs. 48 & 57. The retaining unit 430 is configured to retain the supporting frame 400 in a corresponding one of the position of use and the retreat position. *Id.*, Figs. 48, 57, 58, 20:27-38 (“The base of riving knife 400 includes two holes 432 and pins 430 are configured to extend through those holes to locate the riving knife in the mounting system.... Thus, the riving knife is positioned in the mounting system by fitting on pins 430....”).



Annotated Figs. 48 & 57 of Gass

251. While the retaining unit 430 does not retain the supporting frame 400 of Gass when in the removed/retreat position, a POSA would understand that the retaining units 430 would be used to retain the supporting frame 400 when the slotted supporting frame 22 disclosed by AAPA is used. The AAPA supporting frame 22 includes openings at its upper end for such retention in the retreat position. *See* Section XII(C)(xvii) herein.

252. Claim 9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xviii. Motivation to Combine

253. A POSA would be motivated to combine Gass with AAPA. Gass and AAPA are directed to the same subject matter and are in the same field of invention: Gass is directed to “[t]able saws having a mounting system configured to hold a riving knife or splitter adjacent a blade,” EX1003, Abstract; similarly, AAPA is directed to “a conventional table cutting machine, such as a circular saw machine.” EX1001 at 1:14-15. Moreover, the structures disclosed by Gass and AAPA share many commonalities. Gass discloses, among other components, a riving knife or splitter with a blade guard, (EX1003, 18:41-47, 24:47-52, 27:37-45), and AAPA discloses a “protective cover” and a “supporting frame” (i.e., a riving knife) (EX1001, 1:39-41 & Figs. 1 & 2).

254. A POSA would understand that they could use most any variation of a riving knife or splitter as the “support frame” given that Gass contemplates interchangeably using a riving knife 400, splitter 580, or “[a]ny item that includes a base configured to fit over positioning plate 422 and sized to be clamped between the positioning plate and clamping plate 442 may be mounted and indexed in the saw as described.” EX1003, 24:41-46.

255. Gass is clear in that one of its objectives is to improve the safety of table saws and attachments thereto. *Id.*, 19:56-65 (“It is desirable for a user to be able to install and remove the riving knife quickly and easily when performing different operations with the saw so that the riving knife is not an inconvenience.... If it were

complicated, difficult or time consuming to remove and reinstall the riving knife between the different cutting operations, then it would be less likely a person would use the riving knife.”). A POSA would, therefore, understand that, in order to further reduce the complexity, difficulty, and inconvenience of using a riving knife, it would be desirable to design the knife so that it could be retracted below the work surface of the table saw when performing certain cuts and extended when making other cuts.

256. A POSA would understand that the methods employed to support guards above the blade are limited, and adding the protective cover to the supporting frame would have been obvious and was already known in the art. A POSA would have a reasonable expectation of success in making this modification given the reference’s teaching regarding the similarity in function and form of both safety devices.

257. A POSA would understand the arcuate slot of AAPA would allow the user to change the elevation of the riving knife to, for example, be retracted into the table, or to be raised above the table. A POSA would find it obvious to utilize this adjustment mechanism in other riving knife/clamp assemblies, including that disclosed by Gass and would then find it obvious to add a retention unit such that the knife could be secured in place in the desired position, further increasing usability and safety. As described above, one of Gass’s objectives is to improve the safety profile of table saws, and Gass identifies riving knives as one type of safety

device. To that end, Gas discloses that, because not all types of cuts can be performed with a riving knife in place:

It is desirable for a user to be able to install and remove the riving knife quickly and easily when performing different operations with the saw so that the riving knife is not an inconvenience. . . . If it were complicated, difficult or time consuming to remove and reinstall the riving knife between the different cutting operations, then it would be less likely a person would use the riving knife.

Id., 19:56-65.

258. A POSA would therefore understand that, in order to further reduce the complexity, difficulty, and inconvenience of using a riving knife (and a protective cover), it would be desirable to design the knife so that it could be retracted below the work surface of the table saw when performing certain cuts and extended when making others. A POSA would further understand that AAPA's retaining units would increase the utility of the knife and protective cover by securing the device in use or in a retreat position.

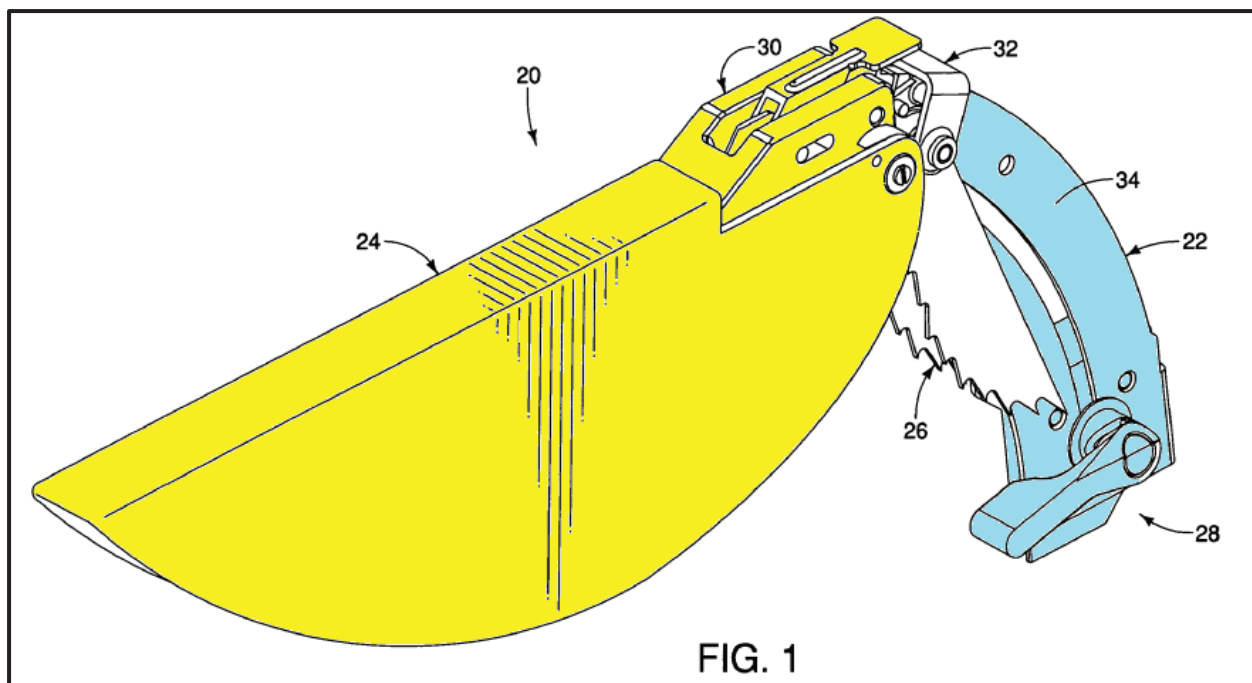
259. Given that Gass describes the hazards of operators failing to use riving knives/splitters as a known problem, it would be obvious to a POSA to use the slot configuration of AAPA to construct a riving knife that could be raised and lowered, thereby mitigating the installation inconvenience with which Gass is concerned. The arcuate slot disclosed in AAPA is simple, inexpensive, and easy for saw operators to use, making it an obvious solution to a known problem in the art. In machinery

safety more generally, safety features that are easy to use and adjust have long been known to improve the likelihood that they will be used rather than removed or defeated. In the application of table saws specifically, improving the ease of use and minimizing the annoyance of dysfunction is known to benefit woodworker safety. Moreover, a POSA would have a reasonable expectation of success in trying the adjustment method disclosed by AAPA. The claimed invention is no more than the conventional use of components in the prior art according to their established uses.

B. Ground 2: Claims 1, 2, 5, and 9 are unpatentable as obvious under 35 U. S. C. § 103 over Burke in view of Gass

i. Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:

260. Burke teaches a supporting device 22 (blue below) for mounting a protective cover 24 (yellow below). *See* EX1010, Fig. 1, 4:55-58 (“[W]hen the riving knife mechanism is in its fully extended position, the blade guard mechanism 24 ... can be easily mounted to the riving knife mechanism 22.”) The supporting device 22 and protective cover 24 are for shielding a cutting blade of a cutting machine which is driven to rotate about a rotating axis. *See id.*, Fig. 1, 1:44-46 (“the present invention is directed to a modular saw guard system for a power table saw of the type which has ... a rotatable circular saw blade.”).



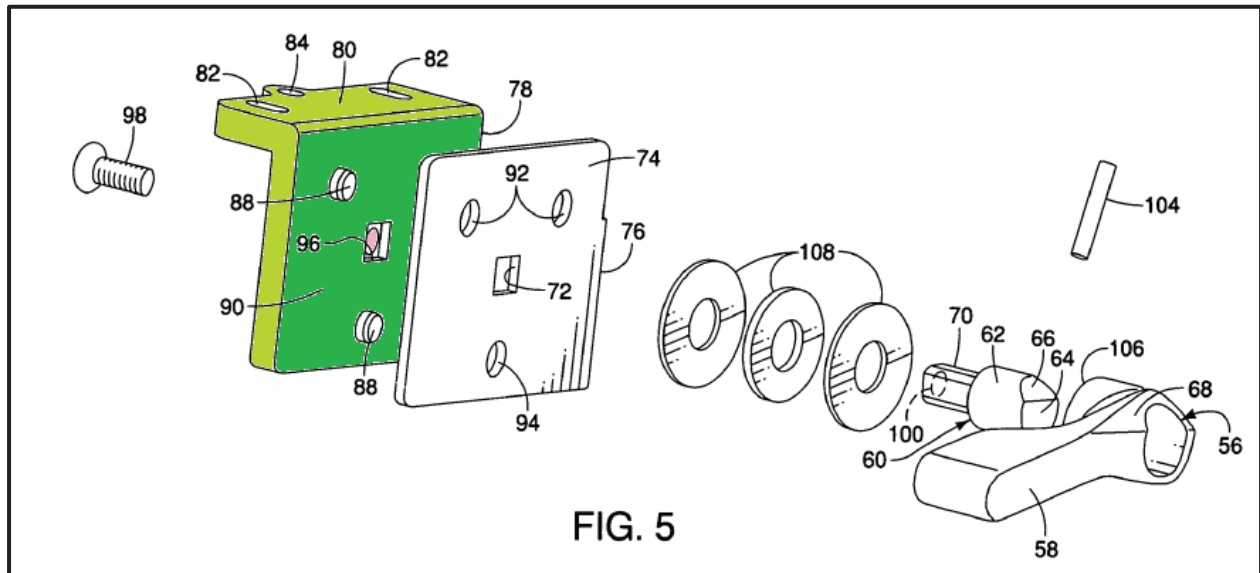
Annotated Fig. 1 of Burke

261. Limitation 1.0 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- ii. **Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;**

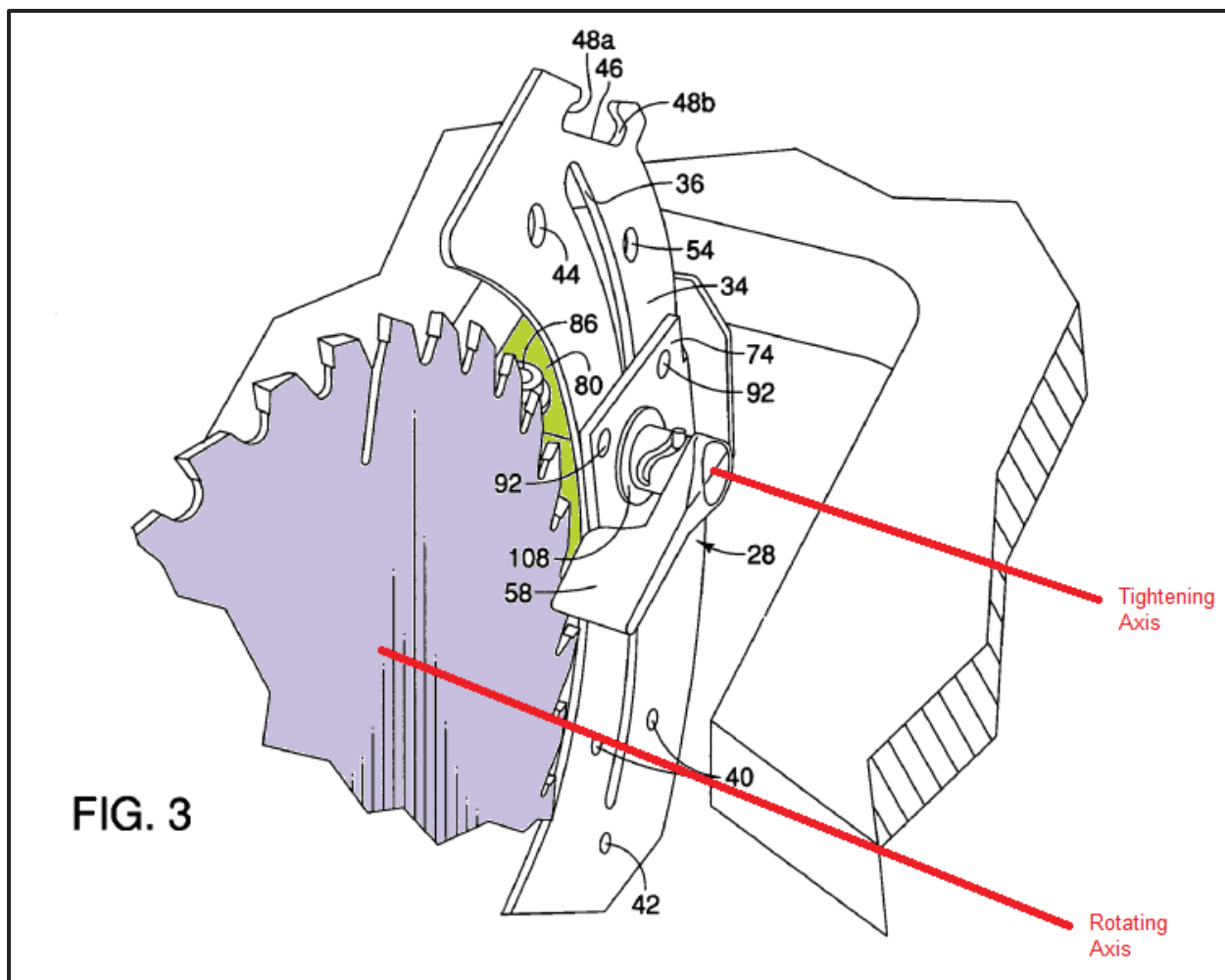
262. As shown in annotated Figure 5 of Burke below, the supporting device of Burke includes a mount unit 78 (shown in green) adapted to be secured to a cutting machine. *See id.*, Figs. 2-8, 5:43-46 (“The bracket 78 has an upper transverse extension 80 with apertures 82 and 84 for mounting the bracket to either the frame or the portion of the blade drive structure of the table saw.”). The mount unit 78 includes a major abutment wall having a proximate tightening surface 90 (shown in

dark green) that has an axial hole (shown in pink) extending therethrough. *See id.*, Figs. 2-5).



Annotated Fig 5 of Burke

263. As best seen in annotated Figure 3, when the mount unit 78 is secured to a cutting machine (at 80 via 86 and 82), the axial hole extends through the mount unit along a tightening axis (shown in red) parallel to the rotating axis (also shown in red) of the cutting blade (purple).



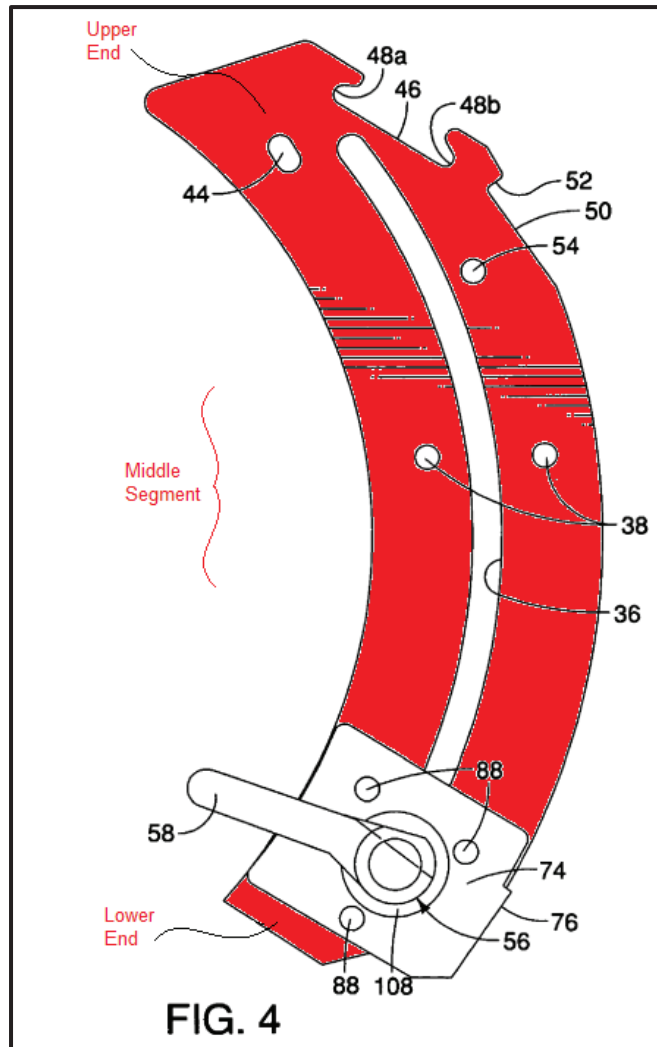
Annotated Fig. 3 of Burke

264. Limitation 1.1 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- iii. **Limitation 1.2: a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed between said front and rear ends;**

265. As best illustrated in Figure 5 of Burke, which is annotated below, Burke discloses a tightening bolt 98 (shown in orange) having a shank (shown in light orange) that is configured to pass through the axial hole (pink). *Id.*, 5:65-67

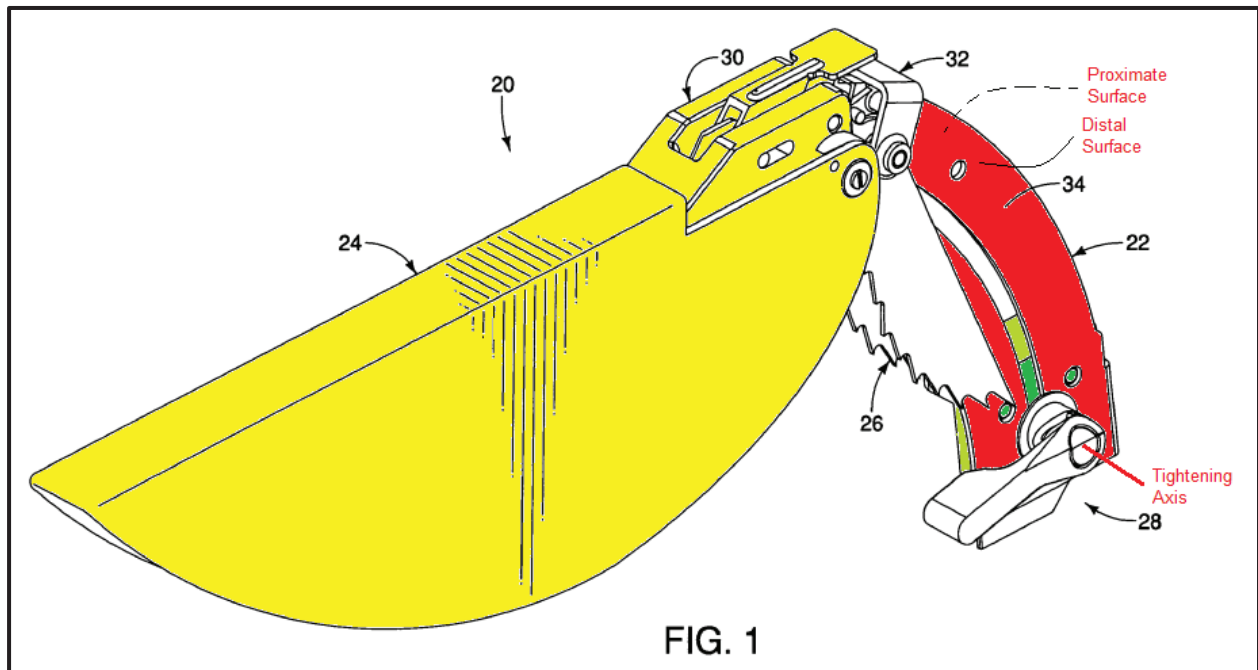
267. As shown in Figures 1-4 of Burke, Burke teaches a supporting frame 34 (shown in red in annotated Figure 2 below). *Id.*, 3:59-61 (“Turning now to the drawings and particularly FIG. 1, there is shown a modular saw guard system, indicated generally at 20, that includes a riving knife mechanism, indicating generally at 22....”). The supporting frame (red) of Burke includes upper and lower ends opposite each other as annotated in Figure 4 below, and also includes a middle segment (also annotated below) interposed between the upper and lower ends. *Id.*, Fig. 4.



Annotated Fig. 4 of Burke

268. As shown in Figure 1 of Burke reproduced and annotated below, the upper end of supporting frame 22 (red) is adapted to hold a protective cover (yellow). *Id.*, Fig. 1, 5:7-13 (“As best shown in FIG.4, an aperture 44 is located on the left side of the slot 36 and an elongated recess 46 is formed in the outer surface on the opposite side of the slot 36 with the recess 46 having a pair of spaced apart hook configurations 48a and 48b thereof which cooperate with the blade guard mechanism quick release assembly 30 to mount the blade guard mechanism 24 to

the knife 34.”). The middle segment of supporting frame 22 (red) has proximate and distal tightened major surfaces (annotated below) opposite to each other along the tightening axis (annotated below).



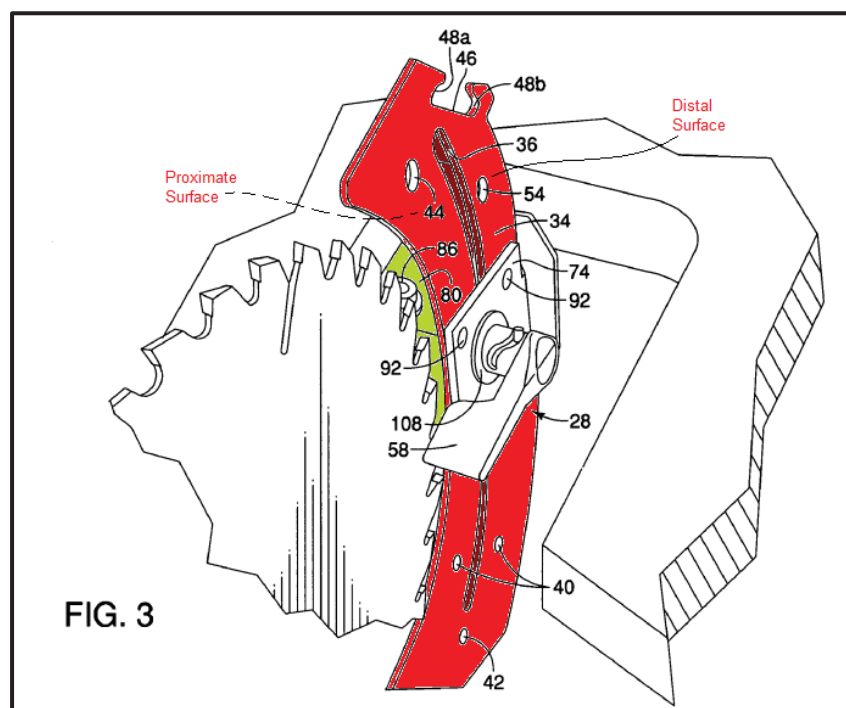
Annotated Fig. 1 of Burke

269. Limitation 1.3 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- v. **Limitation 1.4:** and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end;

270. As shown in reproduced and annotated Figure 3 below, the middle segment of the supporting frame 22 (red) of Burke includes a guiding slot 36 (dark

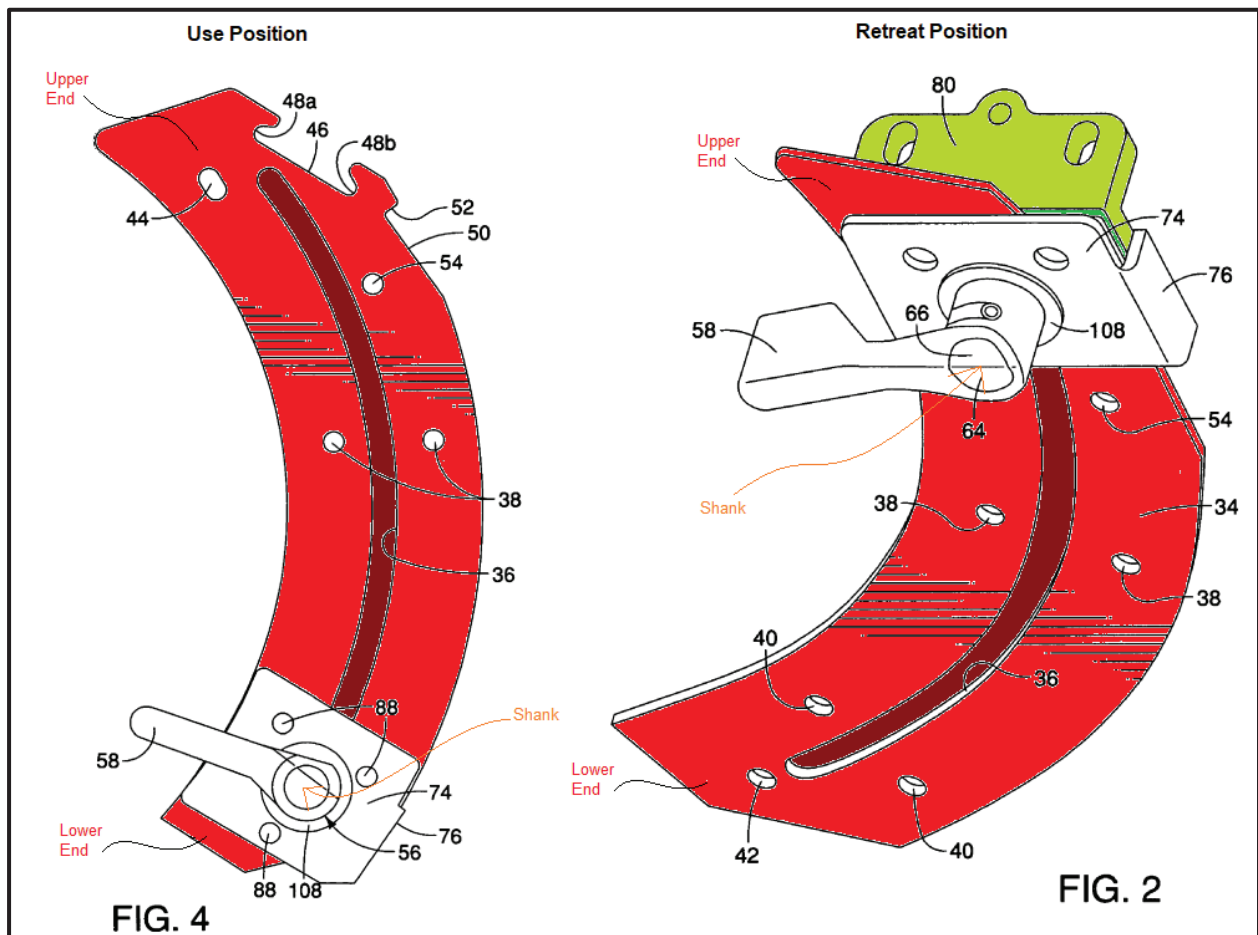
red) that extends through the proximate and distal tightened major surfaces (annotated below) and permits passage of the shank 98 (orange shown in Fig. 5 above) therethrough. *Id.*, Figs. 2-4, 4:66-5:2 (“[T]he knife 34 is preferably a steel stamping and has a generally curved configuration with a center slot 36 that extends substantially the full length of the knife 34.”), 6:1-2 (“The screw 98 is configured to fit through ... the slot 36 of the knife 34....”).



Annotated Fig. 3 of Burke

271. As comparatively shown in annotated Figures 2 and 4 of Burke below, the gliding slot 36 (dark red) of Burke permits the middle segment of the supporting frame 22 (red) to move between a position of use where the shank (extending through the mount unit shown in green) is remote from the upper end (Figure 4 configuration) and a retreat position where the shank is closer to the upper end

(Figure 2 configuration). *Id.*, 2:5-7 (“FIG. 2 is a perspective view ... particularly illustrating a riving knife mechanism as shown in a retracted position....”).



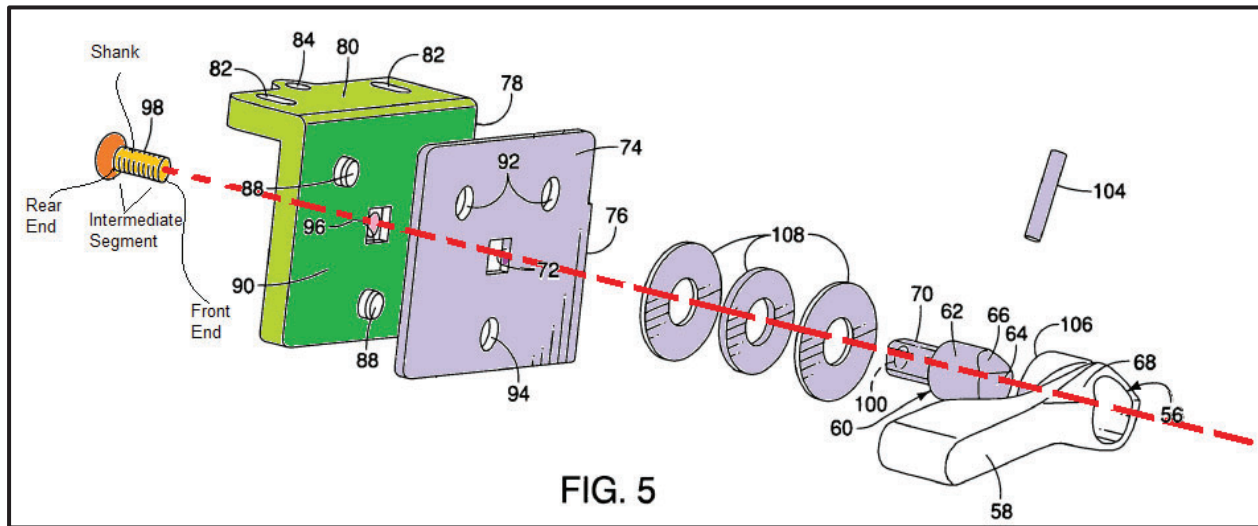
Annotated Figs. 4 and 2 of Burke

272. Limitation 1.4 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- vi. **Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal,**

273. As shown in Burke Figures 1-7, Burke includes a movable tightening member (shown in purple in annotated Fig. 5 below) that is sleeved (via 70) on the

shank (orange). *Id.*, Fig. 5, 6:1-3 (“The screw 98 is configured to fit through ... the aperture 72 and into a threaded aperture 100 in the extension 70 of the stud 60.”). The movable tightening member (purple) of Burke includes a thrust major wall 74 to which the tightening axis (red dashed line below) is normal.



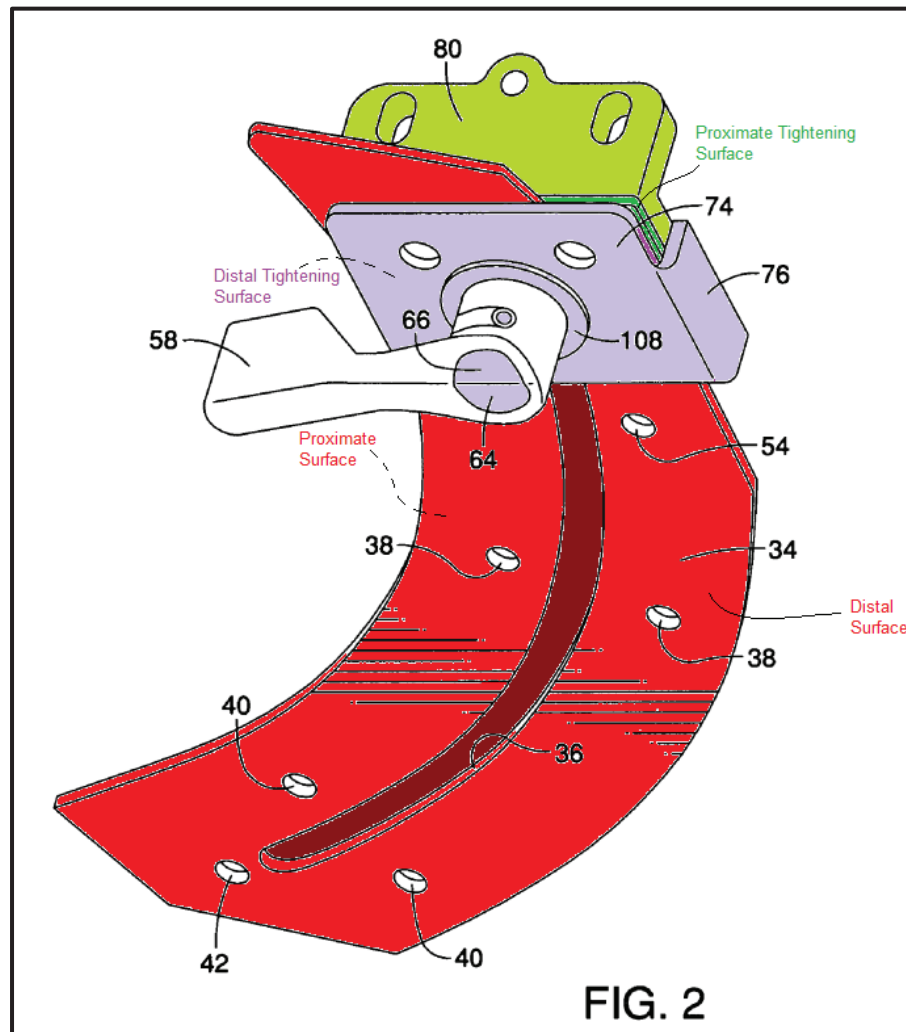
Annotated Fig. 5 of Burke

274. Limitation 1.5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- vii. **Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and**

275. The thrust major wall 74 of the movable tightening member (purple) of Burke has a distal tightening surface (annotated in purple below) that confronts and which is to be brought to press the distal tightened major surface (annotated in red below) of the supporting frame 22 (red). *Id.*, Fig. 2. Further, the proximate tightened

major surface (annotated in red below) of the supporting frame 22 (red) abuts against the proximate tightening surface (dark green) of the mount unit 78 (green). *Id.*, Fig. 2, 6:16-19 (“the quick release mechanism 28 is configured to clamp the plate member 74 and knife 34 against the front face 90 of the bracket 78 when the quick release assembly is in its locked position.”).



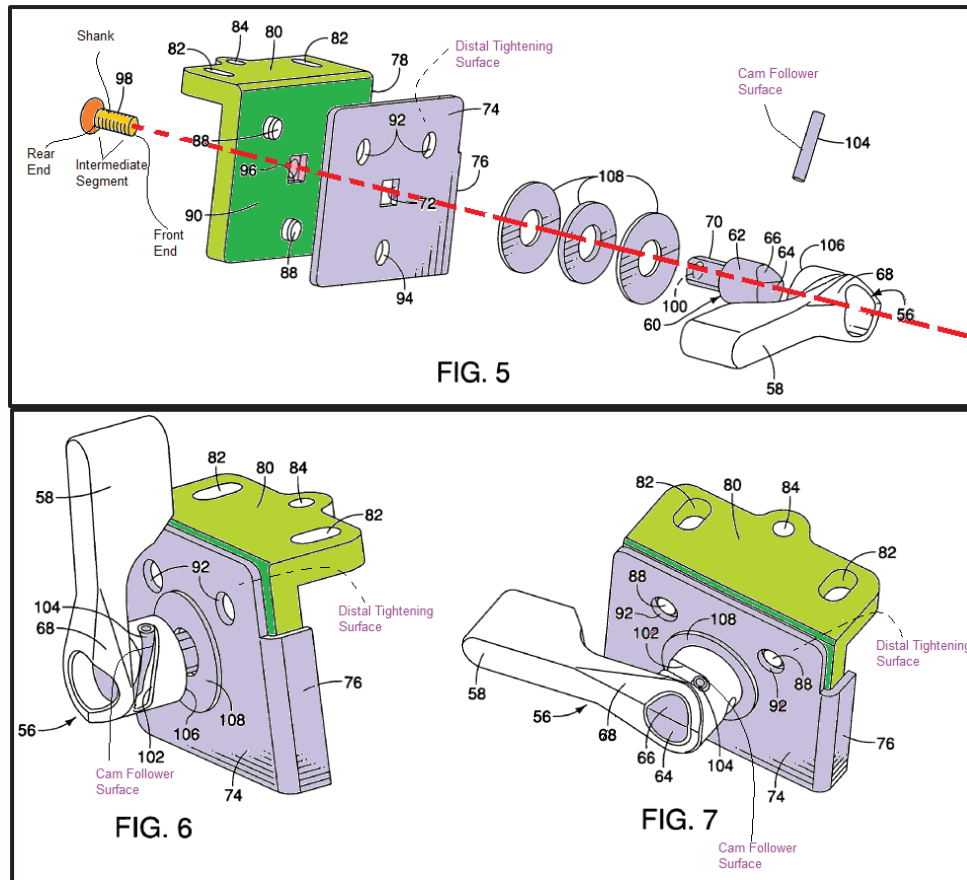
Annotated Fig. 2 of Burke

276. Limitation 1.6 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- viii. Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that are respectively proximate to and distal from said distal tightening surface along the tightening axis;**

277. Burke does not show the cam follower surface having “first and second pressed areas that are angularly displaced from each other about the tightening axis that are respectively proximate to and distal from said distal tightening surface along the tightening axis.” Rather, the cam surface of Burke is a pin. Gass, however, discloses limitation 1.7 as set forth above in Section XII(A)(viii).

278. The thrust major wall 74 of the movable tightening member (purple) of Burke has a cam follower surface (bottom surface of pin 104, annotated and purple below) which is opposite to the distal tightening surface (annotated in purple below) along the tightening axis (red dashed line) as shown in annotated Figures 5-7 reproduced below. *See id.*, Figs. 5-7, 6:16-21 (“[T]he quick release mechanism 28 is configured to clamp the plate 74 and knife 34 against the front face 90 of the bracket 78 when the quick release assembly is in its locked position. This is accomplished by the lever 56 having a cam surface 102 that extends approximately $\frac{1}{4}$ of a rotation between its locked and release position.”).



Annotated Figs. 5-7 of Burke

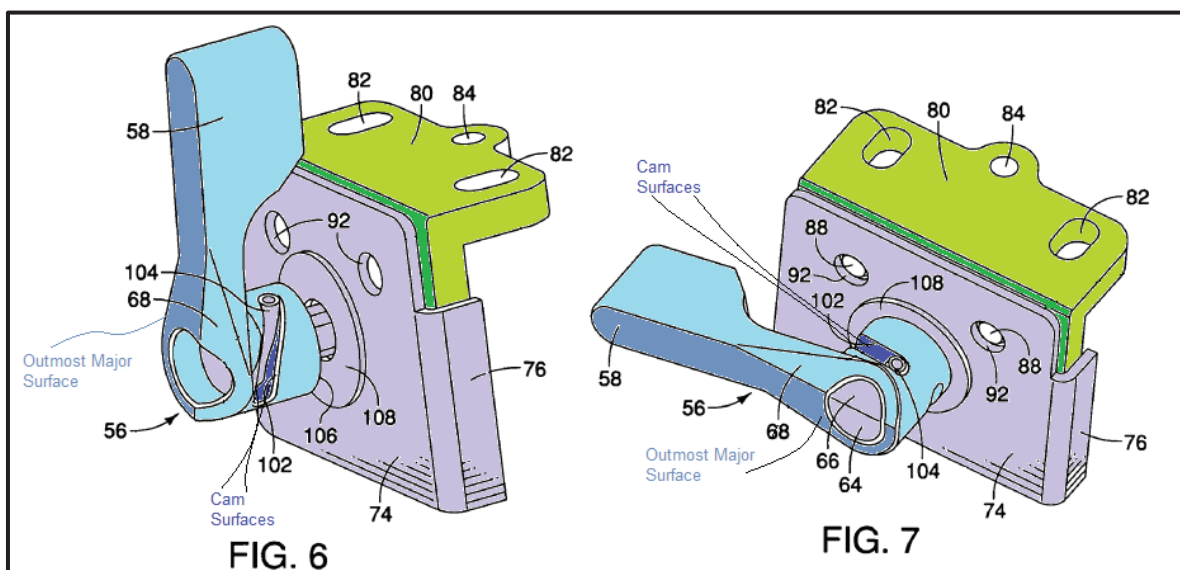
279. Gass, however, discloses limitation 1.7 as described in Section XII(A)(viii).

280. Limitation 1.7 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- ix. **Limitation 1.8: a cam actuating member including an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening axis such that,**

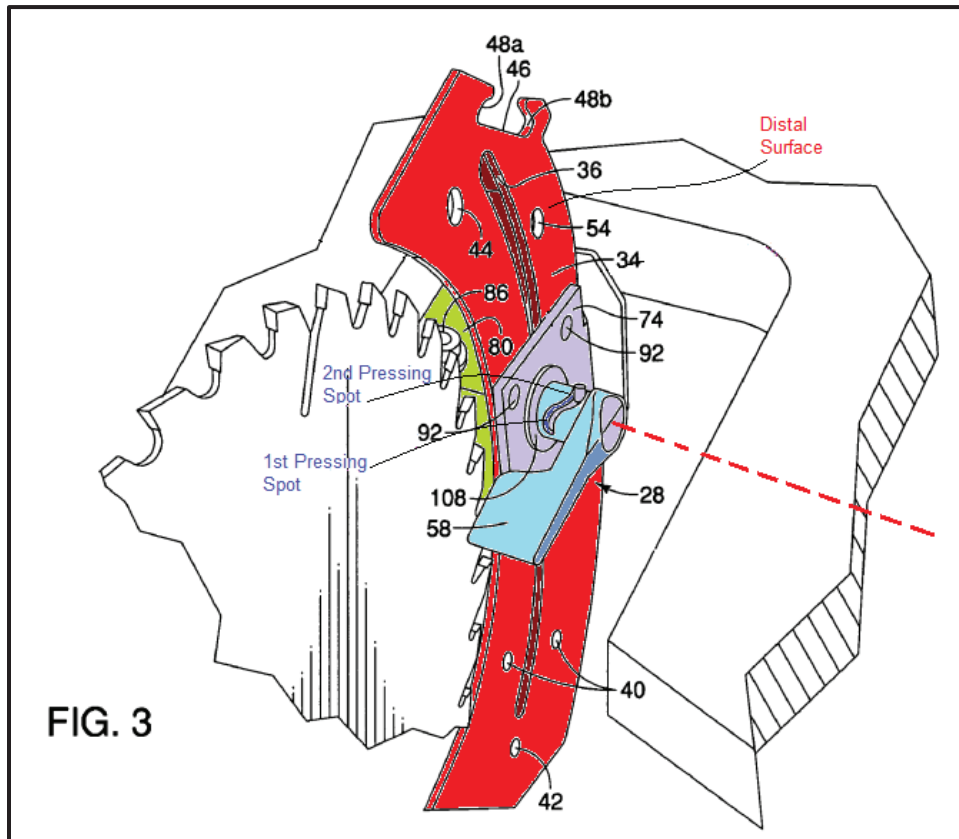
281. Burke teaches a cam actuating member 56 (shown in blue below) that includes an actuating body 106 that is sleeved on the shank 98. *Id.*, Figs. 6-7; 6:27-

29 (“[A]s the lever 56 is rotated, it will cause its end face 106 to move toward and away from the plate 74.”). Further, as shown in annotated Figures 6-7 of Burke below, the cam actuating member 56 of Burke has a cam surface 102 (shown in royal blue as well as surface above pin 104, which mirrors cam surface 102) and an outmost major surface (annotated and shown in dark blue below) opposite to the cam surface in the tightening axis. *Id.*, Figs. 6-7.



Annotated Figs. 6-7 of Burke

282. As best seen in reproduced Figure 3 of Burke, the cam surface (royal blue) has first and second pressing spots (annotated in light blue) that are angularly displaced from each other about the tightening axis. *Id.*, Fig. 3.



Annotated Fig. 3 of Burke

283. Gass also discloses limitation 1.8 as set forth above in Section XII(A)(ix).

284. Limitation 1.8 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- x. **Limitation 1.9: said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position,**

285. Gass discloses limitation 1.9 as set forth above in Section XII(A)(x).

286. Limitation 1.9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

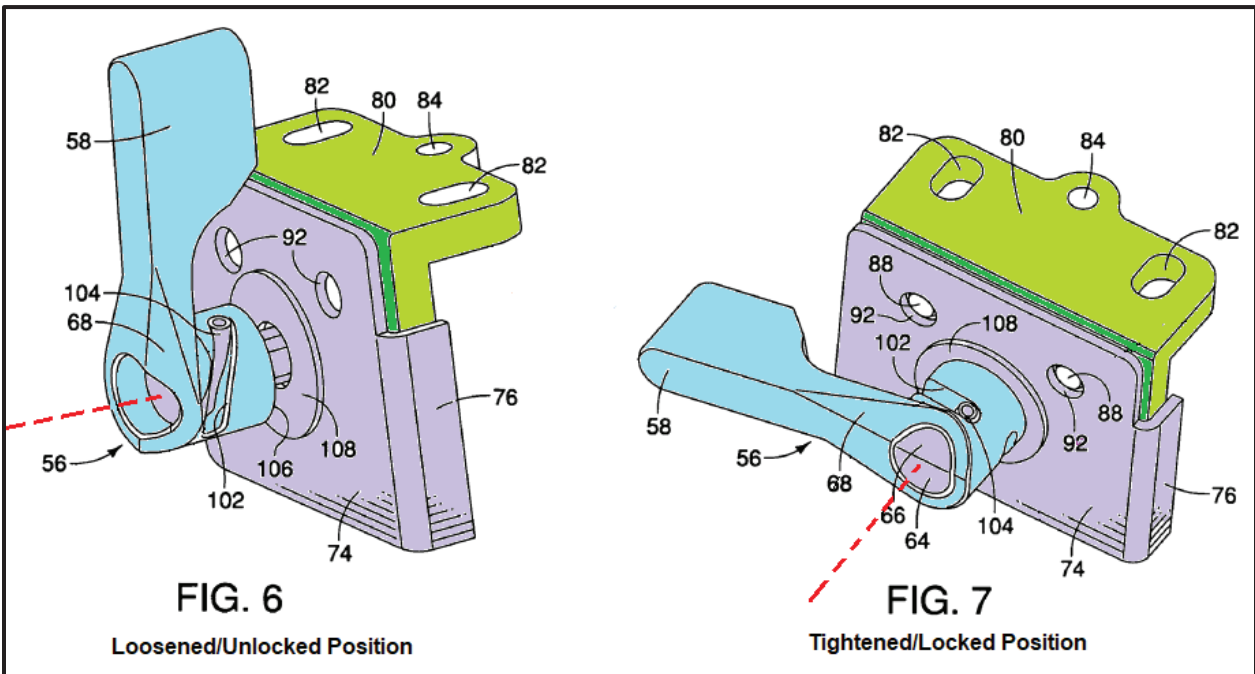
- xi. Limitation 1.10: and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and**

287. Gass also discloses limitation 1.10 as set forth above in Section XII(A)(xi).

288. Limitation 1.10 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xii. Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and**

289. Burke discloses a handgrip 58 (shown in blue below) disposed to extend from the actuating body 56 (also shown in blue below) radially so as to turn the actuating body 56 about the tightening axis (red dashed line) between the loosened and tightening positions (*compare* Figure 6 (loosened positioned) *with* Figure 7 (tightened position)). *Id.*, Figs. 6-7, 2:18-22 (“FIG. 6 is a perspective view of a portion of the quick release assembly ... and shown in the unlocked position; FIG. 7 is a perspective view of a portion of the quick release assembly ... and shown in the locked position.”).



Annotated Figs. 6-7 of Burke

290. As described in Section XII(A)(xii), Gass discloses this limitation.

291. Limitation 1.11 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xiii. Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that,

292. Burke does not disclose “a biasing member disposed on the shank.” As described in Section XII(A)(xiii), Gass discloses this limitation.

293. Limitation 1.12 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xiv. Limitation 1.13: as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract

the axial frictional force to thereby keep said actuating body in the tightening position.

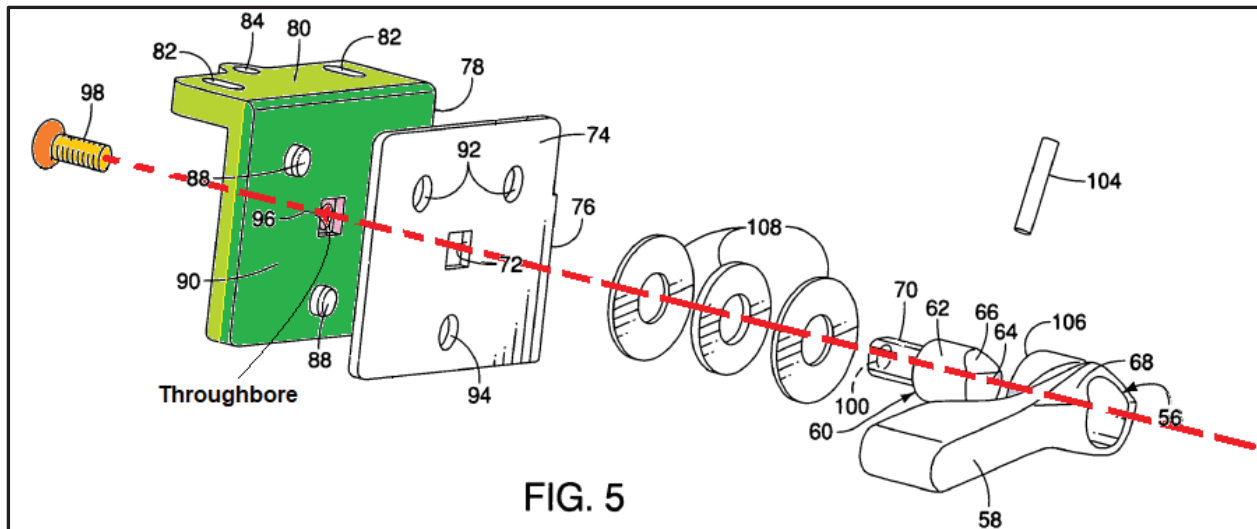
294. As described in Section XII(A)(xiv), Gass discloses this limitation.

295. Limitation 1.13 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xv. Claim 2: The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable mount having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.

296. This claim adds a “fixed mount” having a “throughbore” and a “movable mount.

297. Particularly, Burke discloses that its mount unit 78 includes a fixed mount (80, rear surface of 90) (light green below) that is adapted to be secured to the cutting machine (via 82,84) and has a throughbore (annotated and red below) that extends along the tightening axis (red dashed line) for passage of the shank 98 (orange). *Id.*, Fig. 5, 5:43-48 (“The bracket 78 has an upper transverse extension 80 with apertures 82 and 84 for mounting the bracket to either the frame or the portion of the blade drive structure of the table saw.”).



Annotated Fig. 5 of Burke

298. The mount unit 78 of Burke also includes a moveable mount (front surface of 90) (dark green above) that includes the major abutment wall that is disposed forwardly of the fixed mount (80, rear surface of 90) along the tightening axis (red dashed line) to permit the throughbore (red) to be coaxial with the axial hole 96 (pink above).

299. For the same reasons set forth above in Section XII(A)(xv), a POSA would find it obvious to make the fixed mount (80, rear surface 90) a separate structural component from the movable mount (front surface of 90).

300. As described in Section XII(A)(xv), Gass discloses this limitation.

301. Claim 2 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xvi. Claim 5: The supporting device according to claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing

member being a coil spring which is disposed to surround said shank and between said major abutment wall and said screw nut so as to acquire the increment of the biasing force.

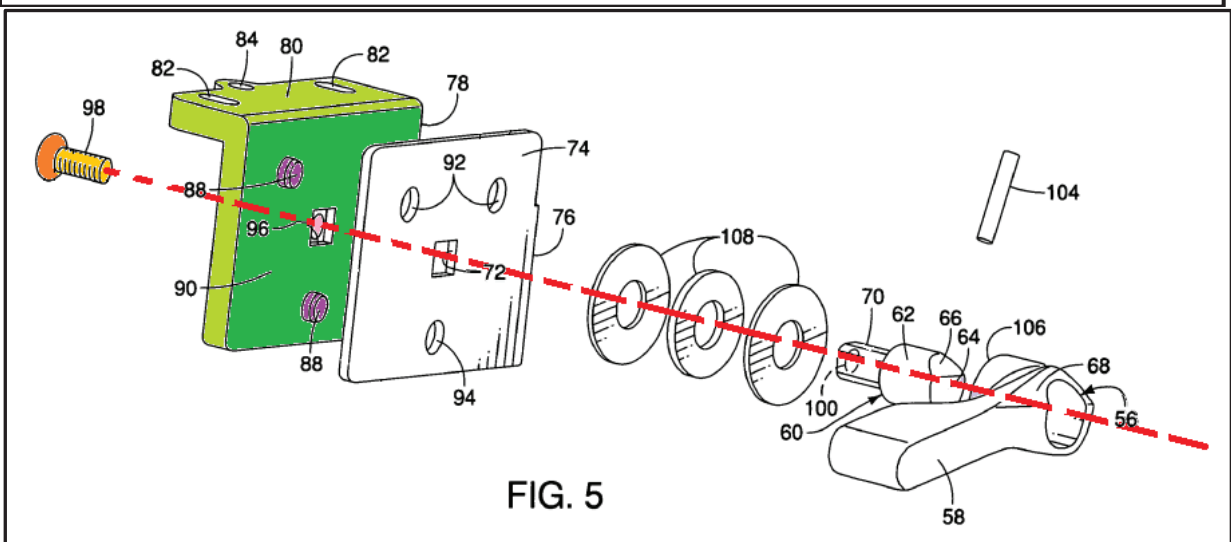
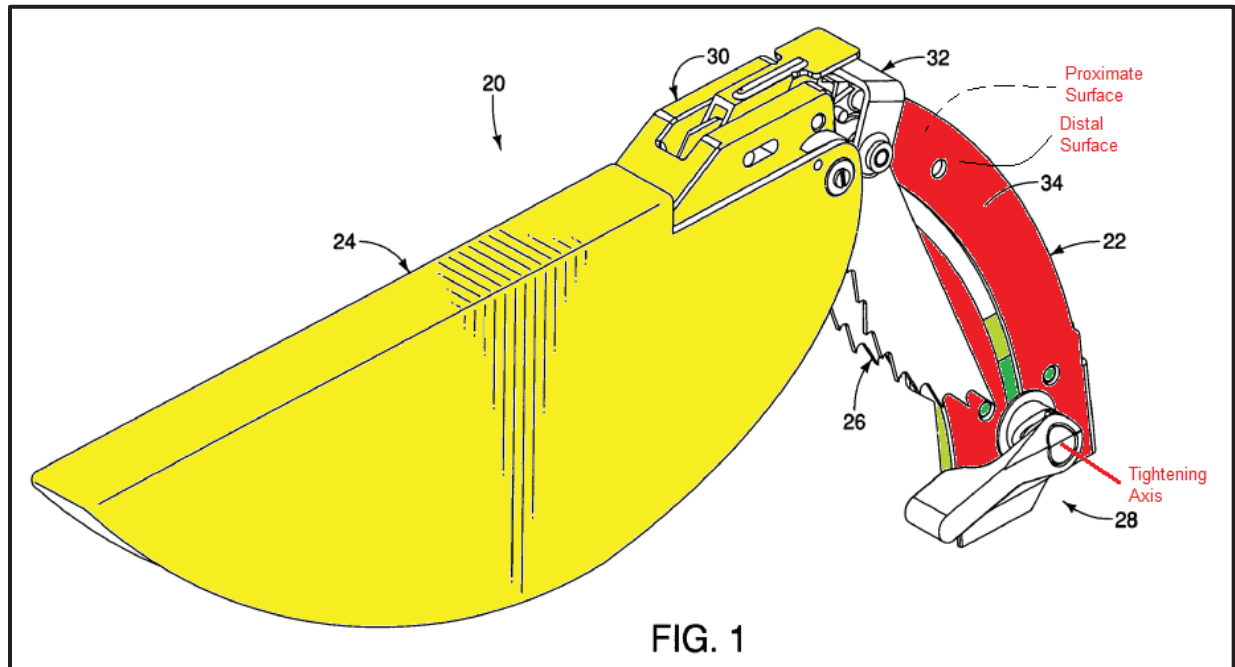
302. As described in Section XII(A)(xvi), Gass discloses this limitation. For the reasons set forth in Section XII(A)(xvi), a POSA would understand that a traditional nut could be added.

303. Claim 5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xvii. Claim 9: The supporting device according to claim 1, further comprising a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.

304. Burke discloses a retaining unit disposed between the proximate tightening surface and the proximate tightened major surface to retain the supporting frame in a position of use and the retreat position. Burke discloses the additional retaining unit limitations of claim 9. Specifically, Burke discloses a retaining unit 88 (purple below) that is disposed between the proximate tightening surface (dark green) of the mount unit 78 (green) and the proximate tightened major surface (annotated below) of the supporting frame 34 (red below). *Id.*, Figs. 1 & 5, 5:49-53 (“The bracket 78 also has a number of relatively short pins 88 which extend from a front face 90 thereof. The front face contacts the knife 34 and the pins 88 are located

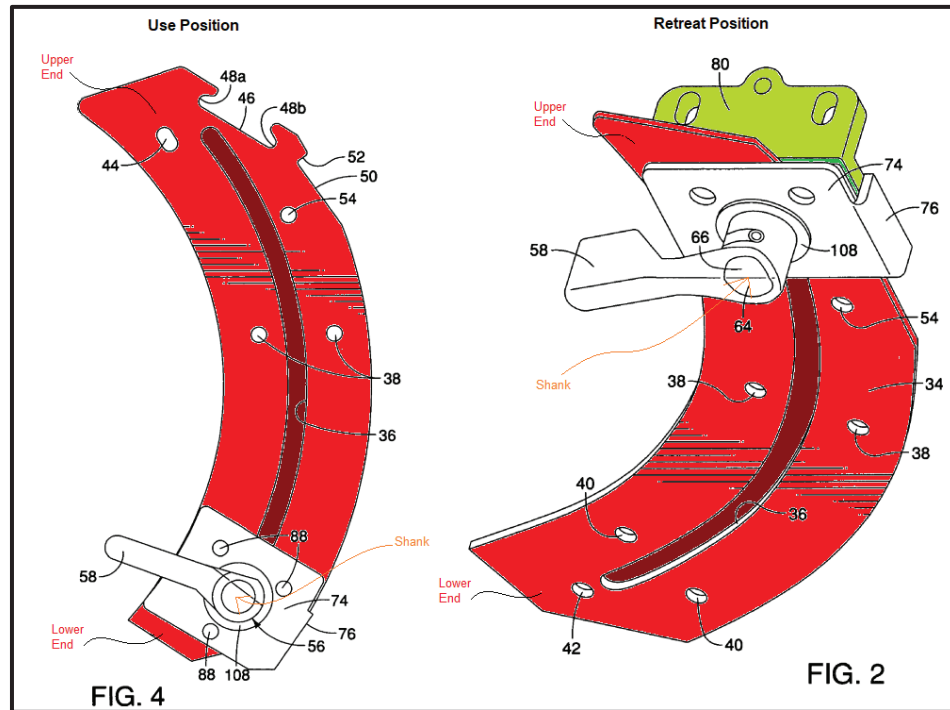
on the front face 90 so that they can engage the apertures 38, 40, and 42 of the knife 34.”).



Annotated Figs. 1 & 5 of Burke

305. The retaining unit 88 of Burke is configured to retain the supporting frame 34 in a corresponding one of the position of use and the retreat position. *Id.*, 5:59-65 (“It should be apparent from FIGS. 2 and 5, that the knife 34 can be

positioned in one of three positions, i.e., the lower position where the pattern of pins 88 penetrate the apertures 40 and 42, the mid position where the pins 88 penetrate the apertures 38 and the lower pin rides in the slot 36 and in the upper position where one of pins 88 penetrates the aperture 44 and another seats in the recess 46.”).



Annotated Figs. 4 & 2 of Burke

306. Claim 9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xviii. Motivation to Combine

307. A POSA would be motivated to modify the supporting device of Burke to include (1) the cam follower surface having first and second pressed area; and (2) the biasing member disposed on the shank as taught by Gass.

308. Burke and Gass are directed to the same subject matter in the same field of invention. *See* Section XII(A)(xviii); EX1003, Abstract (“[t]able saws having a mounting system configured to hold a riving knife or splitter adjacent a blade”); EX1010, Abstract. Burke discloses a device with a similar structure to that of Gass—a clamp for support frames carrying blade guards. EX1003, 18:41-47, 24:47-52, 27:37-45; EX1010, 5:7-13; 6:16-20.

309. Both Gass and Burke are concerned with same problem: that safety devices like riving knives are not used frequently enough because of the challenges they create for the user, such as being a hindrance to a user when making certain specialty cuts. EX1003, 1:41-58, 19:32-20:2; EX1010, 3:5-56, 4:4-21. Gass discloses a device for quick and easy removal/placement of a riving knife/splitter, while Burke discloses a device that eliminates the need to physically remove/insert the riving knife at all by allowing for rapid adjustments. EX1003, 19:37-65; EX1010, Abstract, 4:46-49. This is a mere design choice to achieve the desired outcome of increased use of the safety features of a table saw.

310. A POSA would look to Gass’s disclosure regarding cams to provide an explanation as to the manner in which Burke’s cam piece and cam follower pieces work to translate rotational motion into linear clamping motion. Moreover, a POSA would be motivated to add a spring to Burke’s supporting device because a POSA would understand that springs are commonly used with cams to maintain contact

between the cam member and the cam follower member. Further, a POSA would understand Gass to identify the loosening of the riving knife clamp during operation as a problem known in the art. A POSA, knowing that compression springs apply biasing force and absorb/release energy, would find it obvious to use a spring in a clamp assembly to improve the operation of the clamp, replicating Gass's solution to the problem. A POSA would therefore find it obvious to add Gass's pressed cam surfaces and biasing member with the device of Burke to provide more secure and easier release/tightening of the Burke supporting device. As stated with respect to Section XII(A)(xv) and understanding Gass's teachings regarding safety, a POSA would further find it obvious to make the fixed mount a separate structural component from the movable mount to allow for additional tolerances and flexibility in positioning the knife and to permit a throughbore to extend through both mounts in order to secure and stabilize the saw and to make it easier to use. A POSA would also find it obvious to add a nut and use a coil spring as described in Section XII(A)(xvi).

311. Given the above-described similarities in the structure of Gass and Burke and the similarity in the problem to be solved, a POSA would have a reasonable expectation of success in combining the references.

C. Ground 3: Claims 1, 2, 5, and 9 are unpatentable as obvious under 35 U. S. C. § 103 over AAPA in view of Gass

- i. Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:**

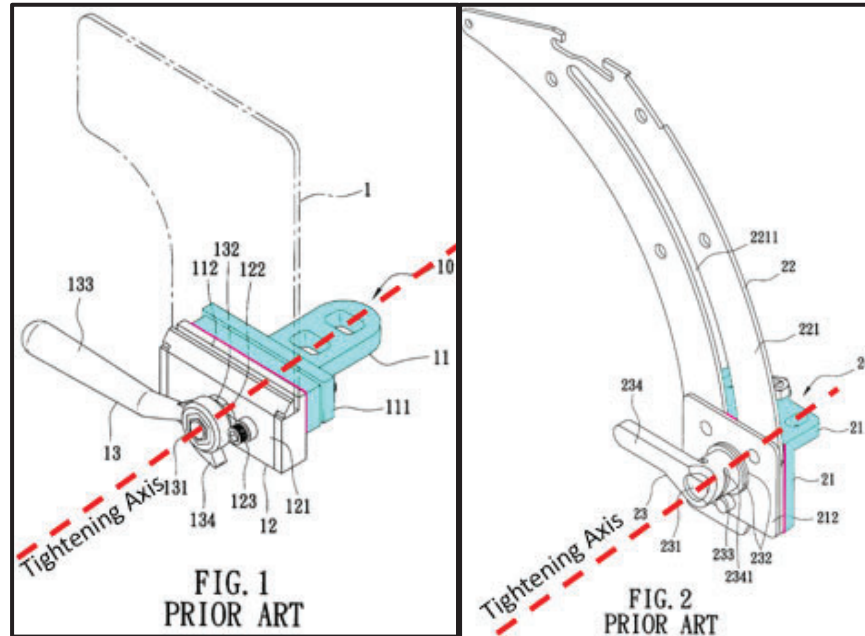
312. AAPA teaches a supporting device 1/22 for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis. EX1001, Figs 1 & 2, 1:14-26 (“In a conventional table cutting machine, such as a circular saw machine, a supporting device is disposed adjacent to a circular saw blade for mounting a protective cover to shield the circular saw blade.”), 1:39-41 (“An upper portion of the supporting frame 1 is adapted to hold a protective cover (not shown).” A POSA would understand that a circular saw machine rotates about an axis.

313. Limitation 1.0 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- ii. Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;**

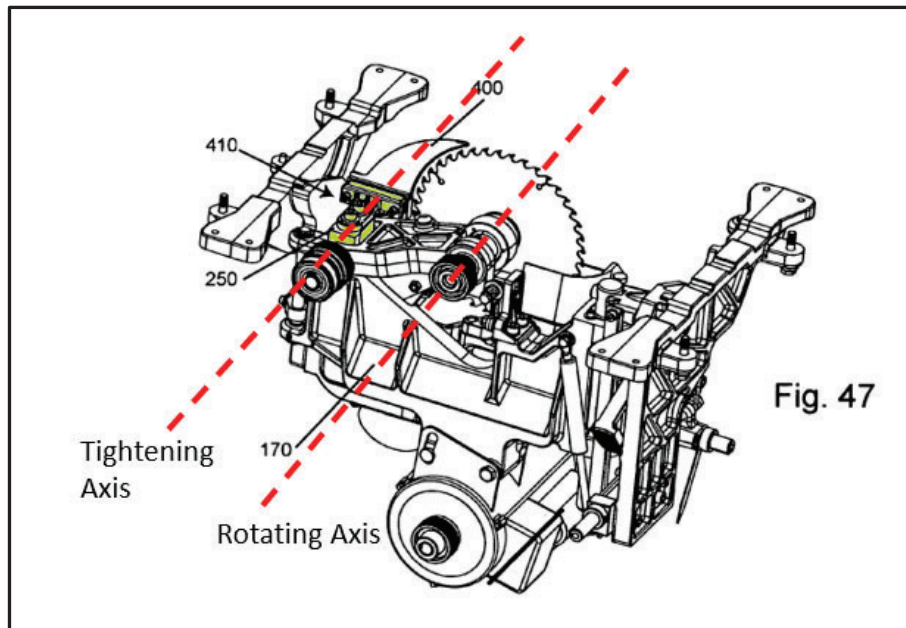
314. AAPA teaches a mount unit 11,211 that is adapted to be secured to the cutting machine. *Id.*, 1:21-26 (“fixed mount 111 secured on a tabletop ... of a cutting machine”), 1:50-53. As shown in annotated Figures 1-2 of AAPA below, the mount unit 11,211 (teal below) includes a major abutment wall (also teal) that has a

proximate tightening surface (outlined in magenta below; the wall of the mount unit 11,211 pushing up against 1,22).



Annotated Figs. 1 & 2 of AAPA

315. A POSA would understand that the proximate tightening surface (magenta above) has an axial hole extending therethrough along a tightening axis (red dashed line above). *See id.*, 1:32-37, 1:56-62 (“The control unit 23 has a tightening bolt 231 which extends through the arcuate slot 2211 and into the fixed mount 211.”). A POSA would also understand that the axial hole extends along a tightening axis (defined by the tightening bolts) that is parallel to the rotating axis of the cutting blade when mounted to a table saw, such as illustrated in Gass below.



Annotated Fig. 47 of Gass

316. A POSA would understand that, in order for a component to accommodate a bolt, the component must define an aperture, or a hole, for that bolt to fit through.

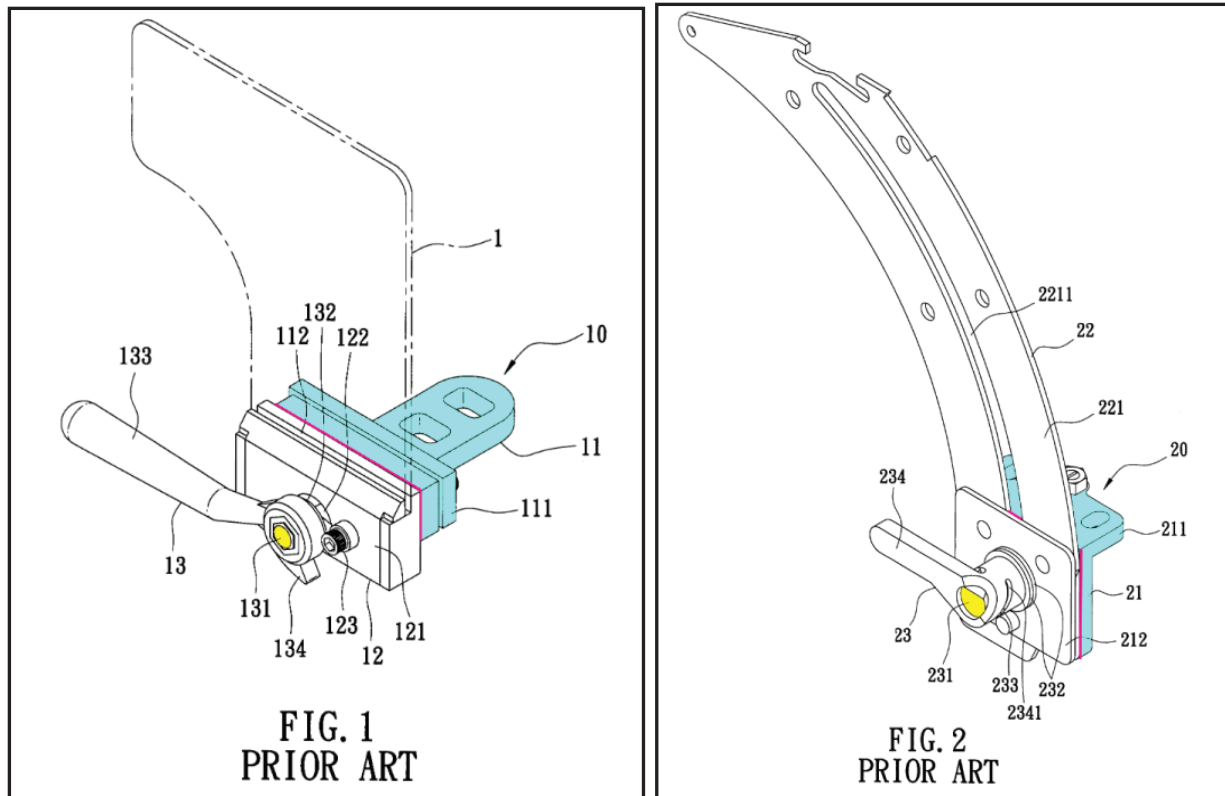
317. Limitation 1.1 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- iii. **Limitation 1.2: a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed between said front and rear ends;**

318. AAPA teaches a tightening bolt 131, 231 (yellow below) having a shank that is configured to pass through the axial hole of the proximate tightening surface (magenta below). *Id.*, 1:32-37, 1:56-62 (“The control unit 23 has a tightening

bolt 231 which extends through the arcuate slot 2211 and into the fixed mount 211.”).

319. Because the term “bolt” is a well-known conventional item in the art, a POSA would understand that “bolt” 131, 231 would have front and rear ends opposite each other in the tightening axis (red dashed line above) with an intermediate segment interposed between the front and rear ends. As also described above, the bolts define the tightening axis.

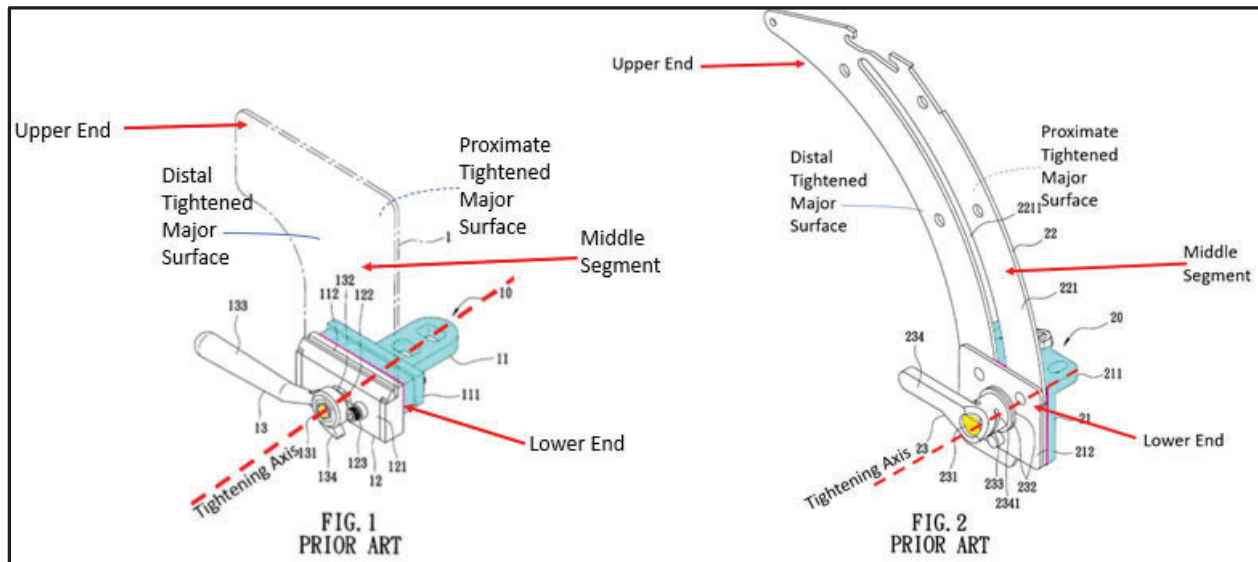


Annotated Figs. 1 & 2 of AAPA

320. Limitation 1.2 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- iv. **Limitation 1.3: a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis,**

321. AAPA teaches a supporting frame 1,221 that has upper and lower ends (annotated below) opposite each other and a middle segment (annotated below) interposed between the upper and lower ends. *Id.*, Figs. 1-2. As discussed with respect to limitation 1.0, AAPA teaches supporting frame 1 being adapted to hold a protective cover. *Id.*, 1:39-44 (disclosing a “protective cover” held by “[a]n upper portion of the supporting frame.”). Further, the middle segment of AAPA has proximate and distal tightened major surfaces (annotated below) opposite each other along the tightening axis (red dashed line). *Id.*, 1:53-56, Figs 1 & 2.



Annotated Figs. 1 & 2 of AAPA

322. Limitation 1.3 contains no novel or nonobvious terms as it only contains content that exists in prior art.

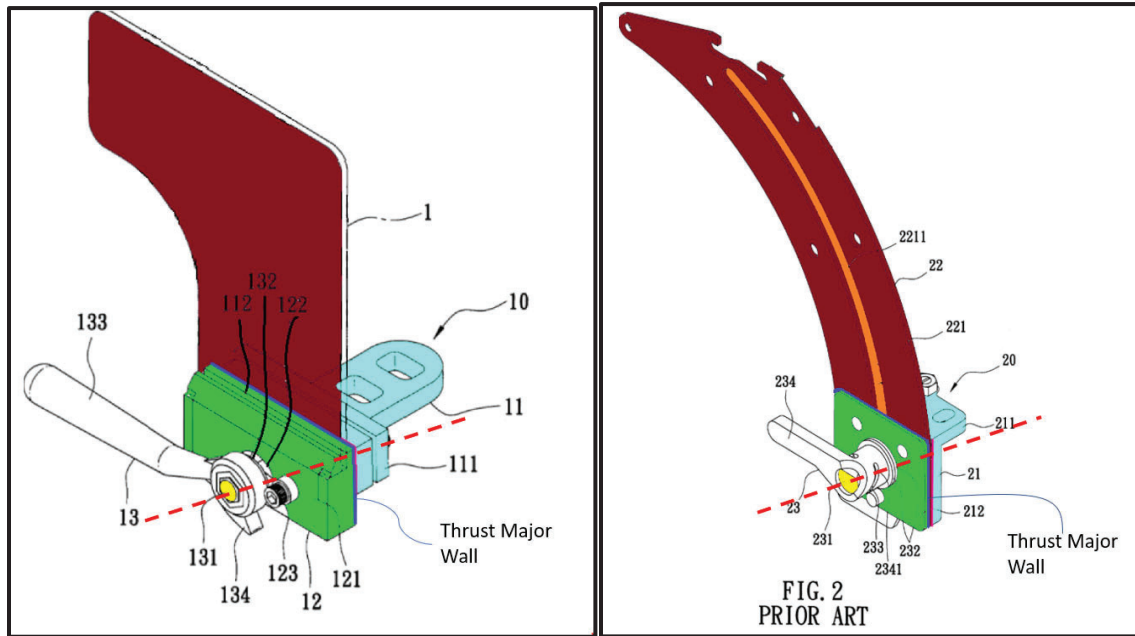
- v. **Limitation 1.4: and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end;**

323. AAPA discloses limitation 1.4 as described above in Section XII(A)(v).

324. Limitation 1.4 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- vi. **Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal,**

325. AAPA teaches a movable tightening member 12, 212 that is sleeved on the shank (yellow below). *Id.*, 1:56-57 (“[T]ightening bolt 231 [] extends through the arcuate slot 2211” and therefore must also extend through an opening in tightening member/plate 212.). The movable tightening member 12, 212 has a thrust major wall (green) that is normal to the tightening axis (red dashed line).



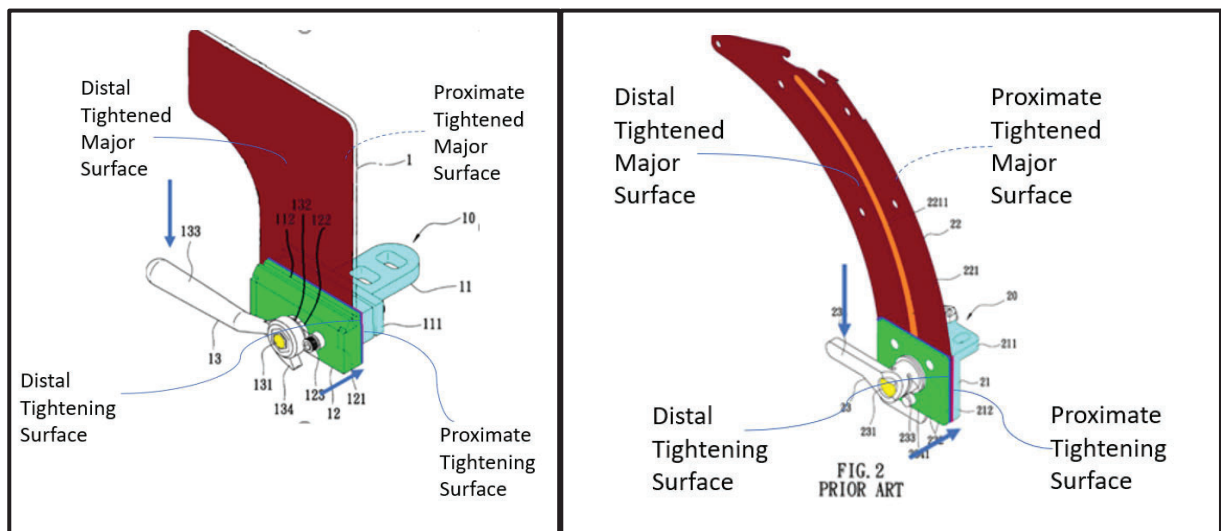
Annotated Figs. 1 & 2 of AAPA

326. Limitation 1.5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- vii. **Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and**

327. AAPA also teaches the thrust major wall (green below) having a distal tightening surface (annotated below—outlined in dark blue and is the surface facing support frame 1,221). The distal tightening surface (dark blue outline) of AAPA confronts and is brought to press the distal tightened major surface (annotated below) of the support frame 1,221 (dark red) so as to force the proximate tightened major surface (annotated below) of the support frame 1,221 (dark red) to abut against the

proximate tightening surface (magenta, annotated below) of the mount unit. *Id.*, Figs. 1 & 2, 1:41-67 (“When the user operates the handgrip 133 to rotate the cam piece 132, the cam follower piece 122 is pressed toward the fixed mount 111 so as to tighten the supporting frame 1” and “when the user rotates the cam actuator 234, the cam actuator 234 can press the tightening plate 212 via the washers 232 towards the fixed mount 211 so as to tighten the supporting frame 221.”).



Annotated Figs. 1 & 2 of AAPA

328. A POSA would understand this claim limitation in the same way as set out in Section XII(A)(vii).

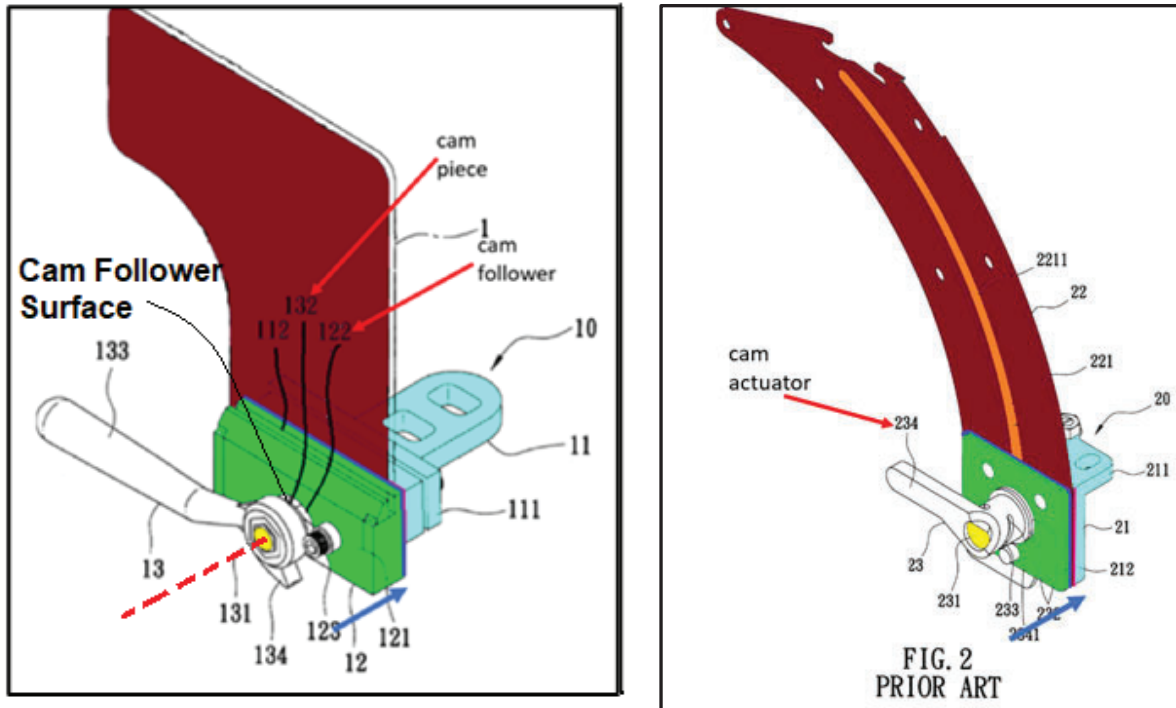
329. Limitation 1.6 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- viii. **Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that**

are respectively proximate to and distal from said distal tightening surface along the tightening axis;

330. A POSA would understand the “cam follower” to have the same meaning as described in Section XII(A)(viii). As also described in that section, a POSA would also understand this limitation, and limitations 1.8 to 1.10, to be describing the manner in which cams function, that assigning names to these spots/areas is both meaningless and confusing, and that the pressing areas could occupy different planes.

331. AAPA discloses a cam follower surface (annotated below) that is opposite the distal tightening surface (dark blue outline, annotated below) along the tightening axis (dashed red line). *Id.*, 1:32-44; (“a cam piece 132 which meshes with the cam follower piece 122” such that “[w]hen the user operates the handgrip 133 to rotate the cam piece 132, the cam follower piece 122 is pressed toward the fixed mount 111 so as to tighten the supporting frame 1.”).



Annotated Figs. 1 & 2 of AAPA

332. A POSA would understand AAPA to necessarily/inherently teach the cam follower surface 122 (annotated above) to have first and second pressed areas that are angularly displaced from each other about the tightening axis (red dashed line) and that are respectively proximate to and distal from the distal tightening surface along the tightening axis (red dashed line). *Id.*, Fig. 1, 1:32-44 (“The control unit 13 has ... a cam piece 132 which meshes with the cam follower piece 122 ...”). In other words, a POSA would understand the “cam follower piece 122” to have a cam surface as recited by the limitation 1.7.

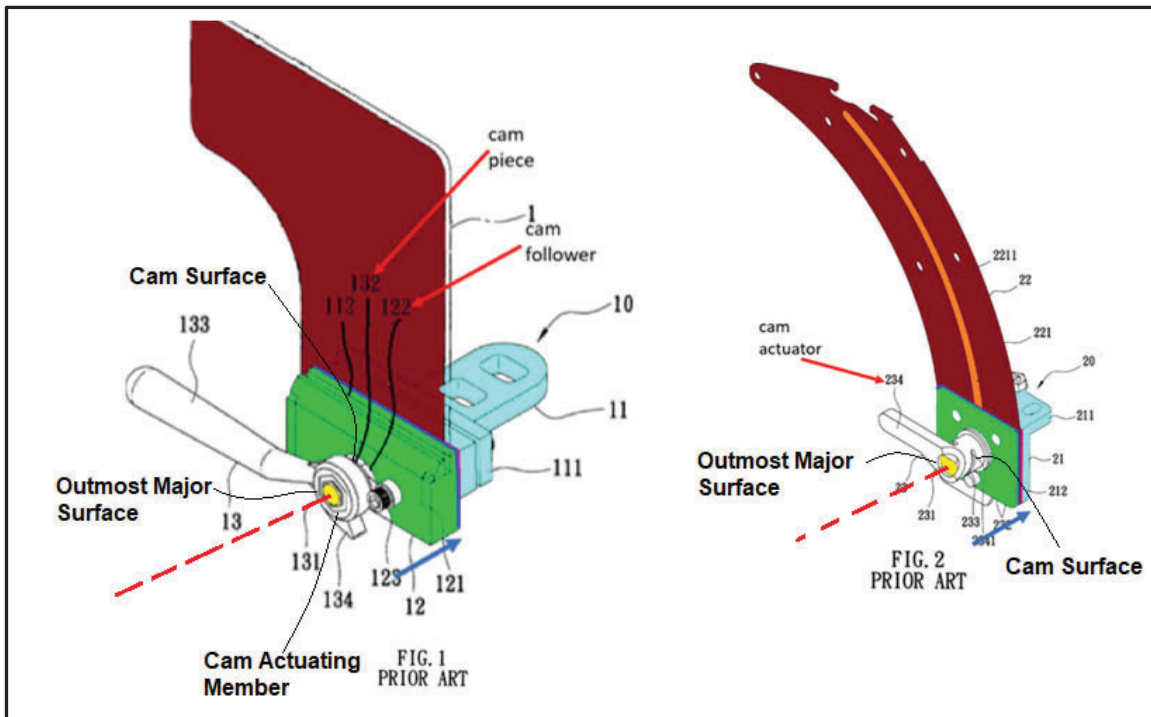
333. Moreover, Gass discloses this limitation as described in Section XII(A)(viii).

334. Limitation 1.7 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- ix. **Limitation 1.8: a cam actuating member including an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening axis such that,**

335. A POSA would understand this limitation as described in Section XII(A)(ix). In particular, a POSA would understand this limitation to be describing the way in which cams function and that assigning names to pressing spots (Gass's cam surfaces) is meaningless and confusing.

336. AAPA teaches a cam actuating member 132,234 including an actuating body that is sleeved on the shank (yellow). *Id.*, Figs. 1-2, 1:56-62 ("The control unit 23 has a ... a cam actuator 234 which is sleeved on the tightening bolt 231 at one end thereof."), 1:32-35 ("The control unit 13 has a tightening bolt 131, a cam piece 132 which meshes with the cam follower piece 122."). The cam actuating member 132,234 has a cam surface (annotated below) and an outmost major surface (annotated below) opposite to each other in the tightening axis.



Annotated Figs. 1 & 2 of AAPA

337. A POSA would understand the embodiment of Figure 1 of AAPA to necessarily/inherently teach the cam surface (annotated above) to have first and second pressing spots which are angularly displaced from each other about the tightening axis. *Id.*, Fig. 1, 1:32-44 (“The control unit 13 has ... a cam piece 132 which meshes with the cam follower piece 122”). In other words, a POSA would understand the “cam piece 132” to have a cam surface as recited by the limitation 1.8.

338. Moreover, Gass discloses this limitation as described in Section XII(A)(ix).

339. Limitation 1.8 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- x. **Limitation 1.9:** said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position,

340. A POSA would understand this claim limitation in the same way as set out in Section XII(A)(x).

341. A POSA would understand the embodiment of Figure 1 of AAPA to necessarily/inherently teach the first and second pressing spots are brought into contact with the first and second pressed areas respectively when the cam surface is brought to mate with the cam follower surface in a loosened position. *Id.*, 1:32-44 (“The control unit 13 has ... a cam piece 132 which meshes with the cam follower piece 122.”).

342. Gass discloses this limitation as described in Section XII(A)(x).

343. Limitation 1.9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

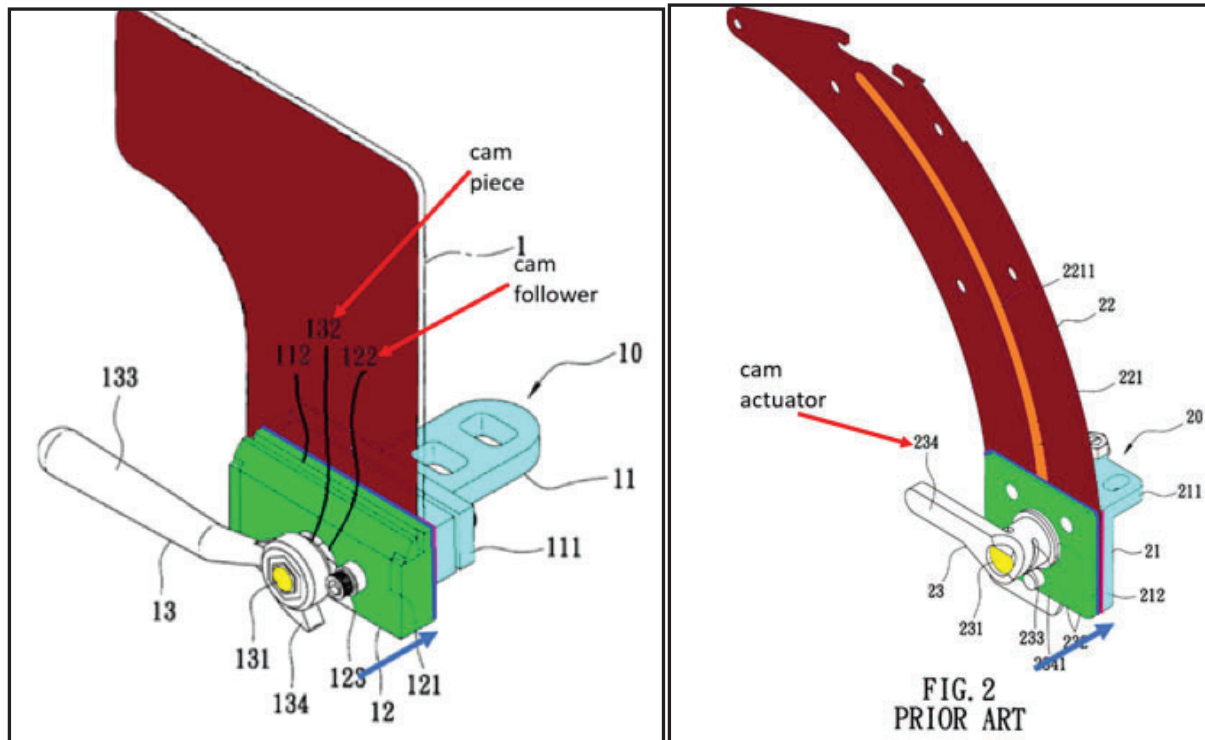
- xi. **Limitation 1.10:** and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and

344. A POSA would understand this claim limitation in the same way as described in Section XII(A)(xi). In particular, a POSA would understand that this claim limitation uses obtuse language to describe a simple concept.

345. A POSA would understand the embodiment of Figure 1 of AAPA to necessarily/inherently teach that when the actuating body of the cam actuating member 132,234 is turned about the tightening axis (red dashed line below) to a tightening position, the first pressing spot is displaced to contact the second pressed area with an axial force so as to move the distal tightening surface (dark blue above) to press the distal tightened major surface (annotated above) of the support frame 1 (dark red above), thereby forcing the proximate tightened major surface (annotated above) of the support frame 1 (dark red above) to abut against the proximate tightening surface (magenta above) of mount unit 11 (teal above). *Id.*, 1:41-44 (“When the user operates the handgrip 133 to rotate the cam piece 132, the cam follower piece 122 is pressed toward the fixed mount 111 so as to tighten the supporting frame 1.”), 1:64-67.

346. In other words, a POSA would understand the AAPA disclosure to mean that turning the actuating body of the cam piece 132 engages the cam surfaces to move the distal tightening surface (dark blue) to press distal tightened major surface (dark red) to force the proximate tightened major surface (surface of support

frame 1 opposite the dark red surface) to abut against the proximate tightening surface (magenta), i.e., to clamp the support frame/riving knife in place.



Annotated Figs. 1 & 2 of AAPA

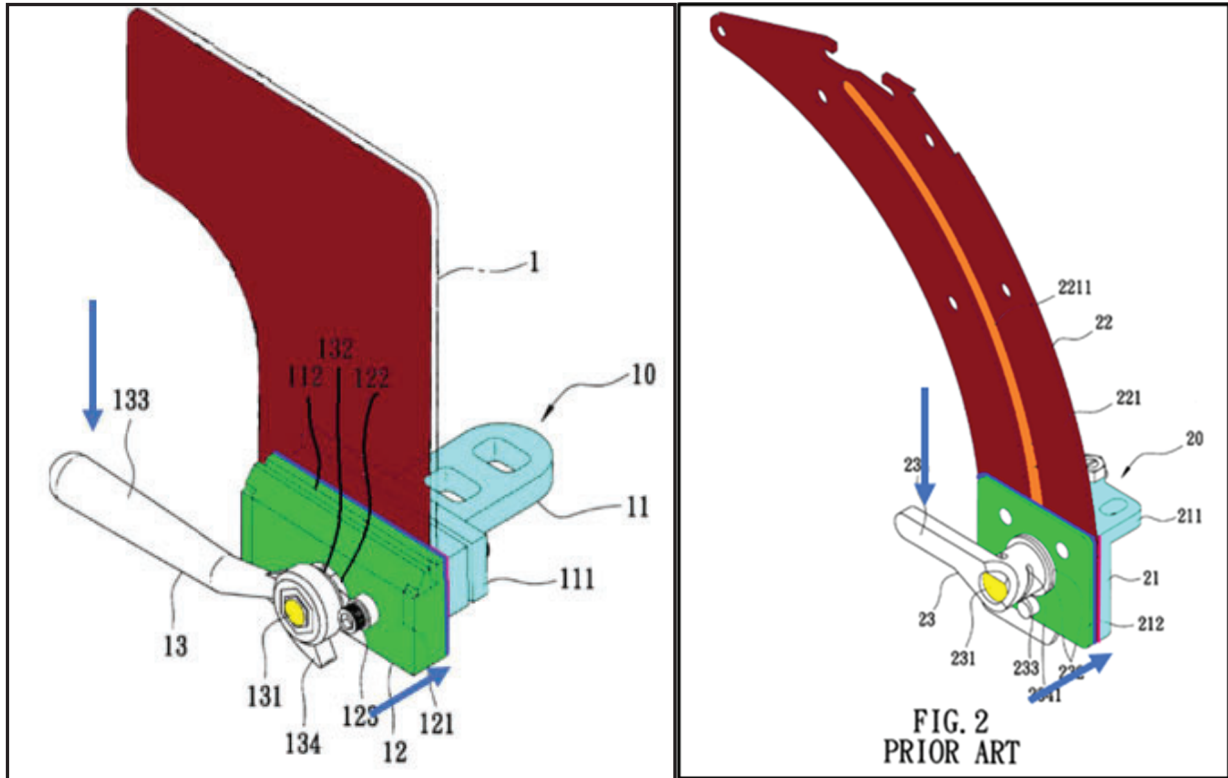
347. Gass discloses this limitation as described in Section XII(A)(xi).

348. Limitation 1.10 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xii. **Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and**

349. AAPA discloses a handgrip 133, at 234 extending from the actuating body 132,23 radially so as to turn the actuating body 132,23 about the tightening axis (defined by the yellow bolt below) between the loosened and tightening

positions. *Id.*, Figs. 1-2, 1:32-44 (“When the user operates the handgrip 133 to rotate the cam piece 132, ... to tighten the supporting frame 1.”).



Annotated Figs. 1 & 2 of AAPA

350. Moreover, Gass discloses this limitation as described in Section XII(A)(xii).

351. Limitation 1.11 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xiii. Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that,

352. Gass discloses this limitation as described in Section XII(A)(xiii).

353. Limitation 1.12 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xiv. **Limitation 1.13: as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the tightening position.**

354. Gass discloses this limitation as described in Section XII(A)(xiv).

355. Limitation 1.13 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xv. **Claim 2. The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable mount having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.**

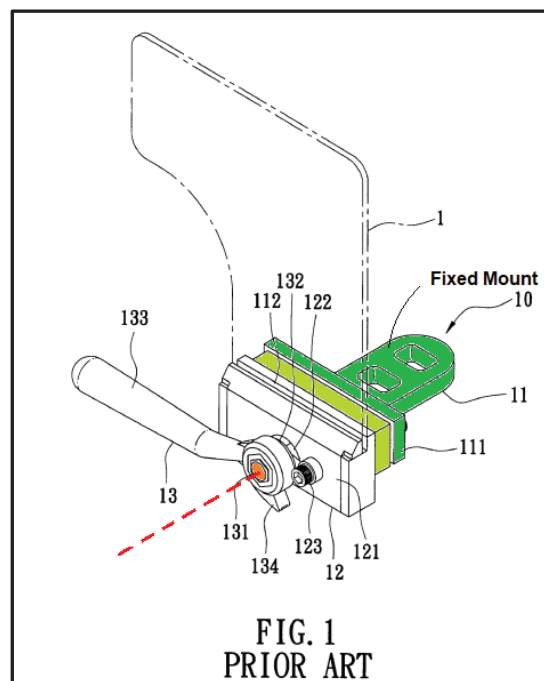
356. This claim adds a “fixed mount” having a “throughbore” and a “movable mount.”

357. AAPA discloses “a tightening bolt 231 which extends through the arcuate slot 2211 and into the fixed mount 211. . .” *Id.*, 1:56-62. Given that the fixed mount receives the tightening bolt, a POSA would understand that it has a throughbore that is coaxial with the axial hole of the mount unit’s major abutment wall (magenta).

358. The mount unit (green below) of AAPA Figure 1 includes a fixed mount (dark green) adapted to be secured to a cutting machine (via openings in the

fixed mount). *Id.*, Fig. 1, 1:24-25 (“The fixed mount unit 11 has a fixed mount 111 secured on a tabletop (not shown) of a cutting machine”). A POSA would understand that the fixed mount (dark green) includes a throughbore that extends along the tightening axis for passage of the shank 131 (orange). *Id.*, Fig. 1, 1:32-35. A POSA would also understand that AAPA teaches a movable mount (light green) that includes the major abutment wall and is disposed forwardly of the fixed mount (dark green) along the tightening axis (red dashed line) to permit the throughbore to be coaxial with the axial hole. *Id.*, Fig. 1.

359. For the same reasons identified in Section XII(A)(xv), POSA would understand that the component carrying the major abutment wall, which is disposed forwardly of the fixed mount, could be separate from the fixed mount (dark green).



Annotated Fig. 1 of AAPA

360. Gass discloses this limitation as described in Section XII(A)(xv).

361. Claim 2 contains no novel or nonobvious terms as it only contains content that exists in prior art.

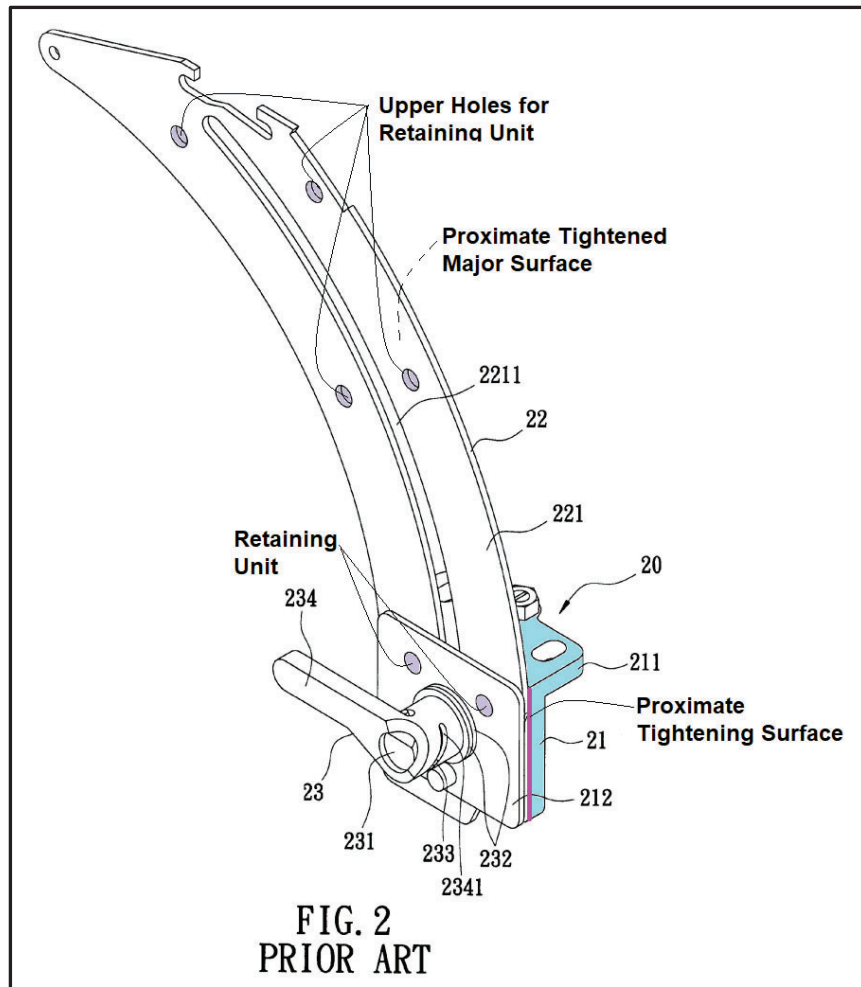
xvi. Claim 5. The supporting device according to claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member being a coil spring which is disposed to surround said shank and between said major abutment wall and said screw nut so as to acquire the increment of the biasing force.

362. Gass discloses this limitation as described in Section XII(A)(xvi).

363. Claim 5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xvii. Claim 9. The supporting device according to claim 1, further comprising a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.

364. Viewing Figure 2 of AAPA, a POSA would conclude that AAPA discloses a retaining unit (annotated below) disposed between the proximate tightening surface (magenta) and the proximate tightened major surface (annotated below) of the supporting frame 221 and which is configured to retain the supporting frame 221 in a corresponding one of the position of use (as shown in Figure 2) and the retreat position (when the retaining unit is secured in the upper holes of support frame 221).



Annotated Figure 2 of AAPA

365. Claim 9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xviii. Motivation to Combine

366. A POSA would be motivated to modify the supporting device of AAPA to include (1) the cam follower surface having first and second pressed area; and (2) the biasing member disposed on the shank as taught by Gass.

367. As described in Section XII(A)(xviii), Gass and AAPA are directed to the same subject matter and in the same field of invention. EX1003, Abstract

(disclosing “[t]able saws having a mounting system configured to hold a riving knife or splitter adjacent a blade”); EX1001, 1:14-15 (disclosing “a conventional table cutting machine, such as a circular saw machine”). Further, the Gass and AAPA structures share many commonalities in that they both disclose, among other components, riving knives and blade guards. EX1003, 18:41-47, 24:47-52, 27:37-45; EX1001, 1:39-41 & Figs. 1 & 2.

368. A POSA would look to Gass’s disclosure regarding cams to provide an explanation as to the manner in which AAPA’s cam and cam follower work to translate rotational motion into linear clamping motion. Moreover, a POSA would be motivated to add a spring to AAPA because a POSA would be familiar with the utility of springs in power tools. In particular, a POSA would understand that springs are commonly used with cams to maintain contact between the cam member and the cam follower member. Further, a POSA would understand Gass to identify the loosening of the riving knife clamp during operation as a problem known in the art. A POSA, knowing that compression springs apply biasing force and absorb/release energy, would find it obvious to use a spring in a clamp assembly to improve the operation of the clamp, replicating part of Gass’s solution to the problem. A POSA would have found it obvious to separate the fixed mount from the movable and to add a nut and use a coil spring as described in Sections XII(A)(xv)-(xvi). (*Id.*)

369. Operator injury as a result of the reluctance to use riving knives was a known problem in the art exacerbated by multiple factors, including the difficulty and inconvenience of installation and removal. *See* EX1003, 2:15-20, 1:42-62, 19:37-65. AAPA provide a solution to this as it discloses a riving knife that extends and retracts without having to physically remove it from the table saw assembly.

370. Given the above-described similarities in the structures of Gass and AAPA, a POSA would have a reasonable expectation of success in combining the above features with the AAPA supporting device.

D. Ground 4: Claims 1-2, 5, and 9 are unpatentable as obvious under 35 U.S.C. §103 over Gass in view of Burke

i. Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:

371. As described in Section XII(A)(i), Gass discloses this limitation. As described in Section XII(B)(i), Burke also discloses this limitation.

372. Limitation 1.0 contains no novel or nonobvious terms as it only contains content that exists in prior art.

ii. Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;

373. As described in Section XII(A)(ii), Gass discloses this limitation.

374. Limitation 1.1 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- iii. **Limitation 1.2: a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed between said front and rear ends;**

375. As described in Section XII(A)(iii), Gass discloses this limitation.

376. Limitation 1.2 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- iv. **Limitation 1.3: a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis,**

377. As described in Section XII(A)(iv), Gass discloses this limitation. As described in Section XII(B)(iv), Burke also discloses this limitation.

378. Limitation 1.3 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- v. **Limitation 1.4: “and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end;**

379. As described in Section XII(B)(1)(v), Burke discloses this limitation.

380. Limitation 1.4 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- vi. **Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal,**

381. As described in Section XII(A)(vi), Gass discloses this limitation.

382. Limitation 1.5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- vii. **Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and**

383. As described in Section XII(A)(vii), Gass discloses this limitation.

384. Limitation 1.6 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- viii. **Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that are respectively proximate to and distal from said distal tightening surface along the tightening axis;**

385. As described in Section XII(A)(viii), Gass discloses this limitation.

386. Limitation 1.7 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- ix. **Limitation 1.8: a cam actuating member including an actuating body which is sleeved on said shank, and which has**

a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening axis such that,

387. As described in Section XII(A)(ix), Gass discloses this limitation.

388. Limitation 1.8 contains no novel or nonobvious terms as it only contains content that exists in prior art.

x. Limitation 1.9: said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position,

389. As described in Section XII(A)(x), Gass discloses this limitation.

390. Limitation 1.9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xi. Limitation 1.10: and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and

391. As described in Section XII(A)(xi), Gass discloses this limitation.

392. Limitation 1.10 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xii. Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and

393. As described in Section XII(A)(xii), Gass discloses this limitation.

394. Limitation 1.11 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xiii. Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that,

395. As described in Section XII(A)(xiii), Gass discloses this limitation.

396. Limitation 1.12 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xiv. Limitation 1.13: as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the tightening position.

397. As described in Section XII(A)(xiv), Gass discloses this limitation.

398. Limitation 1.13 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xv. Claim 2. The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable mount having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.

399. As described in Section XII(A)(xv), Gass discloses this limitation.

400. Claim 2 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xvi. **Claim 5. The supporting device according to claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member being a coil spring which is disposed to surround said shank and between said major abutment wall and said screw nut so as to acquire the increment of the biasing force.**

401. As described in Section XII(A)(xvi), Gass discloses this limitation.

402. Claim 5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xvii. **Claim 9. The supporting device according to claim 1, further comprising a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said supporting frame in a corresponding one of the position of use and the retreat position.**

403. As described in Section XII(A)(xvii), Gass discloses this limitation. As described in Section XII(B)(xvii), Burke also discloses this limitation.

404. Claim 9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xviii. **Motivation to Combine**

405. A POSA would be motivated to modify the supporting device of Gass to include the support frame having a guiding slot as taught by Burke.

406. Burke is directed to the same subject matter, in the same field of invention, and discloses a similarly structured device as Gass. *See* Section XII(B)(xviii).

407. A POSA would understand the guiding slot of Burke would allow the user to retract the riving knife below the table and extend the riving knife above the table. As stated above, a POSA would find it obvious to utilize this adjustment mechanism in other riving knife/clamp assemblies, including that disclosed by Gass. A POSA, reading Gass, would understand Gass to be concerned with the safety of table saws and the inconveniences associated with using riving knives. EX1003, 19:37-65. As also described above, a POSA would, therefore, understand that, in order to further reduce the complexity, difficulty, and inconvenience of using a riving knife, it would be desirable to design the knife so that it could be retracted below the work surface of the table saw when performing certain cuts and extended when making other cuts.

408. The guiding slot disclosed by Burke is simple, inexpensive, and easy for saw operators to use, making it an obvious solution to a known problem in the art. Moreover, a POSA would have a reasonable expectation of success in trying the adjustment method disclosed by Burke. As stated above, a POSA would find it obvious to utilize this adjustment mechanism in other riving knife/clamp assemblies, including that disclosed by Gass, and would then find it obvious to add a retention

unit such that the knife could be secured in place in the desired position, further increasing usability and safety.

409. A POSA would find it obvious that the use of a biasing spring with the arcuate slot of a riving knife as taught by Gass would eliminate the need for removal of the knife as disclosed in the prior art and improve the reliability and usability of the clamping system. Further, Burke provides explicit motivation as it discloses a compression spring for use in connection with its latch for its riving knife. EX1010, 8:27-29. This combination represents a design choice to achieve the desired outcome of increased use of the safety features of a table saw. The components are prior art elements being used according to their conventional functions.

E. Ground 5: Claims 1, 2, 5, and 9 are Obvious Under 35 U.S.C. 103(a) Over Gass in view of Garcia

- i. Limitation 1.0: A supporting device for mounting a protective cover to shield a cutting blade of a cutting machine which is driven to rotate about a rotating axis, said supporting device comprising:**

410. As described in Section XII(A)(i), Gass discloses this limitation.

411. Limitation 1.0 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- ii. Limitation 1.1: a mount unit which is adapted to be secured to the cutting machine, said mount unit including a major abutment wall which has a proximate tightening surface that**

has an axial hole extending therethrough along a tightening axis parallel to the rotating axis of the cutting blade;

412. As described in Section XII(A)(ii), Gass discloses this limitation.

413. Limitation 1.1 contains no novel or nonobvious terms as it only contains content that exists in prior art.

iii. Limitation 1.2: a tightening bolt having a shank which is configured to pass through said axial hole, and which has front and rear ends opposite to each other in the tightening axis, and an intermediate segment interposed between said front and rear ends;

414. As described in Section XII(A)(iii), Gass discloses this limitation.

415. Limitation 1.2 contains no novel or nonobvious terms as it only contains content that exists in prior art.

iv. Limitation 1.3: a supporting frame which has upper and lower ends opposite to each other, and a middle segment interposed between said upper and lower ends, said upper end being adapted to hold the protective cover, said middle segment having proximate and distal tightened major surfaces opposite to each other along the tightening axis,

416. As described in Section XII(A)(iv), Gass discloses this limitation.

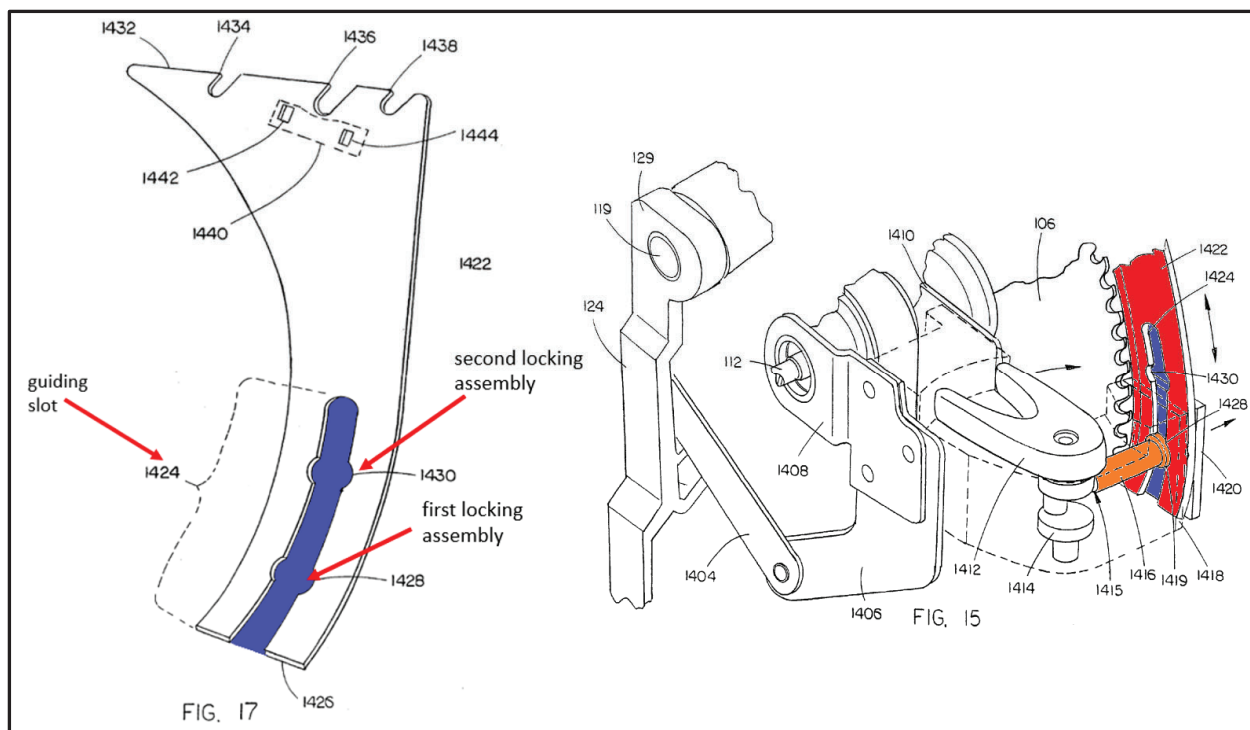
417. Limitation 1.3 contains no novel or nonobvious terms as it only contains content that exists in prior art.

v. Limitation 1.4: and a guiding slot which extends through said proximate and distal tightened major surfaces and which permits passage of said shank therethrough, said guiding slot permitting said middle segment to be movable between a position of use where said shank is remote from said upper end, and a retreat position where said shank is closer to said upper end;

418. Gass does not disclose limitation 1.4.

419. Garcia, however, discloses limitation 1.4 and is directed to a supporting device 1400 for use with a cutting machine very similar to Gass. *See* EX1009, Figs. 17 & 20, ¶0115, ¶0054.

420. With respect to limitation 1.4, Garcia discloses a supporting frame 1422 having a guiding slot 1424 (blue below) that extends through the proximate and distal tightened major surfaces and permits passage of a shank 1415 (orange below) therethrough. *Id.*, Figs. 15-17, ¶0105 (“The locking pin 1415...[is] configured to engage the riving knife 1422. ...[T]he engagement assembly 1424 is a slot defining a recess within the riving knife 1422.”). The guiding slot permits the middle segment of the supporting frame to move between a position of use where the shank 1415 is remote from the upper end of the supporting frame 1422, and a retreat position where the shank 1416 is closer to the upper end. *Id.* (“The slot of engagement assembly 1424 further defines a first locking assembly 1428 and a second locking assembly 1430. In the current embodiment, the first and second locking assemblies are circular apertures which allow the circular engagement member 1419 of the locking pin 1415 to engage in preset locations and securely establish the position of the riving knife 1422.”).



Annotated Figs. 17 & 15 of Garcia

421. Limitation 1.4 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- vi. **Limitation 1.5: a movable tightening member which is sleeved on said shank, and which has a thrust major wall to which the tightening axis is normal,**

422. As described in Section XII(A)(vi), Gass discloses this limitation.

423. Limitation 1.5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- vii. **Limitation 1.6: said thrust major wall having a distal tightening surface which confronts and which is to be brought to press said distal tightened major surface so as to force said proximate tightened major surface to abut against said proximate tightening surface, and**

424. As described in Section XII(A)(vii), Gass discloses this limitation.

425. Limitation 1.6 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- viii. Limitation 1.7: a cam follower surface which is opposite to said distal tightening surface along the tightening axis, and which has first and second pressed areas that are angularly displaced from each other about the tightening axis, and that are respectively proximate to and distal from said distal tightening surface along the tightening axis;**

426. As described in Section XII(A)(viii), Gass discloses this limitation.

427. Limitation 1.7 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- ix. Limitation 1.8: a cam actuating member including an actuating body which is sleeved on said shank, and which has a cam surface and an outmost major surface opposite to each other in the tightening axis, said cam surface having first and second pressing spots which are angularly displaced from each other about the tightening axis such that,**

428. As described in Section XII(A)(ix), Gass discloses this limitation.

429. Limitation 1.8 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- x. Limitation 1.9: said first and second pressing spots are brought into contact with said first and second pressed areas respectively when said cam surface is brought to mate with said cam follower surface in a loosened position,**

430. As described in Section XII(A)(x), Gass discloses this limitation.

431. Limitation 1.9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xi. Limitation 1.10: and such that, when said actuating body is turned about the tightening axis to a tightening position, said first pressing spot is displaced to contact said second pressed area with an axial frictional force so as to move said distal tightening surface to press said distal tightened major surface, thereby forcing said proximate tightened major surface to abut against said proximate tightening surface, and**

432. As described in Section XII(A)(xi), Gass discloses this limitation.

433. Limitation 1.10 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xii. Limitation 1.11: a handgrip disposed to extend from said actuating body radially so as to turn said actuating body about the tightening axis between the loosened and tightening positions; and**

434. As described in Section XII(A)(xii), Gass discloses this limitation.

435. Limitation 1.11 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xiii. Limitation 1.12: a biasing member disposed on said shank adjacent to said rear end of said shank such that,**

436. As described in Section XIIA(xiii), Gass discloses this limitation.

437. Limitation 1.12 contains no novel or nonobvious terms as it only contains content that exists in prior art.

- xiv. Limitation 1.13: as a result of displacement of said actuating body to the tightening position, said biasing member acquires an increment of a biasing force which biases said front end of said shank towards said supporting frame so as to counteract the axial frictional force to thereby keep said actuating body in the tightening position.”**

438. As described in Section XII(A)(xiv), Gass discloses this limitation.

439. Limitation 1.13 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xv. **Claim 2. The supporting device according to claim 1, wherein said mount unit includes a fixed mount adapted to be secured to the cutting machine, and having a throughbore which extends along the tightening axis for passage of said shank, and a movable mount having said major abutment wall, which is disposed forwardly of said fixed mount along the tightening axis to permit said throughbore to be coaxial with said axial hole.**

440. As described in Section XII(A)(xv), Gass discloses this claim.

441. Claim 2 contains no novel or nonobvious terms as it only contains content that exists in prior art.

i. **Claim 5. The supporting device according to claim 2, wherein said tightening bolt has a screw nut which is threadedly engaged with said rear end of said shank, said biasing member being a coil spring which is disposed to surround said shank and between said major abutment wall and said screw nut so as to acquire the increment of the biasing force.**

442. As described in Section XII(A)(xvi), Gass discloses this claim.

443. Claim 5 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xvi. **Claim 9. The supporting device according to claim 1, further comprising a retaining unit which is disposed between said proximate tightening surface and said proximate tightened major surface and which is configured to retain said**

supporting frame in a corresponding one of the position of use and the retreat position.

444. As described in Section XII(A)(xvii), Gass discloses this claim.

445. Garcia also discloses the limitations of claim 9. Particularly, as shown in Figure 15 (reproduced above), Garcia discloses a retaining unit 1419 disposed between the proximate tightening surface and the proximate tightened major surface of the supporting frame 1422 and which is configured to retain the supporting frame 1422 in a corresponding one of the position of use (when pin 1415 is secured in first locking assembly 1428) and the retreat position (when pin 1415 is secured in second locking assembly 1430). *Id.*, Figs. 15-17, ¶0104-0105.

446. Claim 9 contains no novel or nonobvious terms as it only contains content that exists in prior art.

xvii. Motivation to Combine

447. A POSA would be motivated to modify supporting device of Gass to include the support frame having a guiding slot as taught by Garcia. Garcia is directed to the same subject matter, is in the same field of invention, and discloses similar devices as Gass. *See* EX1003, Abstract; EX1009, ¶0002. Both Garcia and Gass disclose riving knives and blade guards. EX1003, 18:41-47, 24:47-52, 27:37-45; EX1009, ¶0115.

448. A POSA would understand the guiding slot of Garcia would allow the user to retract the riving knife below the table and extend the riving knife above the

table. As stated above, a POSA and would find it obvious to utilize this adjustment mechanism in other riving knife/clamp assemblies - including that disclosed by Gass. A POSA, reading Gass, would understand Gass to be concerned with the safety of table saws and the inconveniences associated with using riving knives. EX1003, 19:37-65. As also described above, a POSA would, therefore, understand that in order to further reduce the complexity, difficulty, and inconvenience of using a riving knife, it would be desirable to design the knife so that it could be retracted below the work surface of the table saw when performing certain cuts and extended when making others.

449. The guiding slot disclosed by Garcia is simple, inexpensive, and easy for saw operators to use, making it an obvious solution to a known problem in the art. Moreover, a POSA would have a reasonable expectation of success in trying the adjustment method disclosed by Garcia and would then find it obvious to add a retention unit such that the knife could be secured in place in the desired position, further increasing usability and safety.

450. As described, Gass teaches quick and easy removal and placement of a riving knife/splitter in order to increase a user's tendency to use the device and increase operator safety. EX1003, 19:37-65. Garcia teaches a vertically adjustable riving knife. EX1009, ¶¶0105, 0107, Fig. 17. A POSA would recognize that Garcia's adjustable riving knife would further the objective of Gass as it would

minimize the effort needed to use a riving knife. Given the above-described similarities in the structure of the Gass and Garcia, a POSA would have a reasonable expectation of success in combining the references._

451. Further, a POSA would understand that the eccentric shaft of Garcia could be swapped out for Gass's cams. A POSA would understand that eccentric shafts provide one way to translate rotary motion into linear motion, but that the Gass cams provide a more compact, less expensive, and more durable way to achieve this.

XIII. CONCLUSION

452. For the above reasons, it is my opinion that each of the Challenged Claims of the '622 patent is invalid over the grounds set forth in the Petition and accompanying documents.

I declare under penalty of perjury under the law of the United States that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on the ____8th ____ day of __January_____, 2024, by:

A handwritten signature in black ink that reads "Bruce W. Main". The signature is written in a cursive style with a large, stylized 'B' and 'M'.

Bruce W. Main, PE, CSP