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(54) Title: RAIL STOP SYSTEM FOR A SLIDING SAW

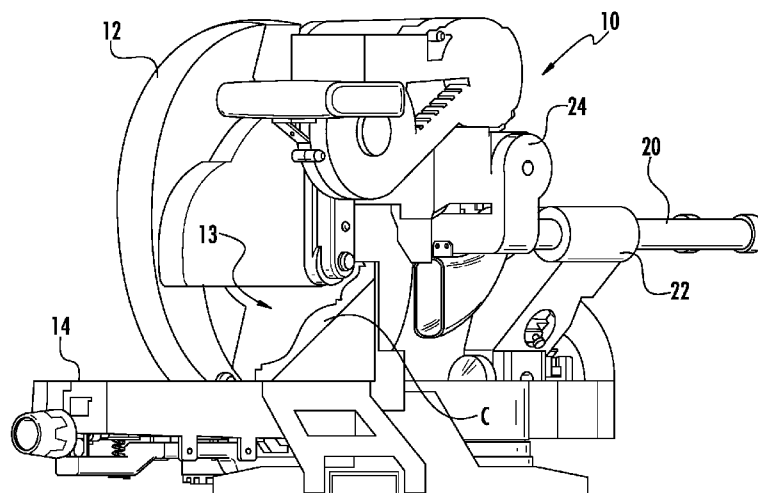


FIG. 1A

(57) Abstract: A rail system for a power tool has a base defining a work surface for supporting a workpiece, a support mounted to the base, a number of elongated rails slidably supported by the support for movement relative thereto, a yoke engaged to the number of elongated rails for movement with the elongated rails, and a power tool assembly supported by a yoke for performing an operation on the workpiece. A rail stop is movably mounted to one of the support and the yoke, the rail stop including a stop surface adapted to abut the other of the support and the yoke when the rail stop is in a first position between the yoke and the support. The rail stop is movable to a second position different from the first position.



RAIL STOP SYSTEM FOR A SLIDING SAW

Reference to Related Application and Priority Claim

[001] This application claims priority under 35 U.S.C. §119 to U.S. Provisional Application No. 61/776,932 filed March 12, 2013, the disclosure of which is incorporated herein by reference in its entirety.

Field of the Disclosure

[002] The present application present disclosure concerns power tools in which the working tool travels on rails, such as a sliding miter saw, and in particular to modifications to the rail components to accommodate large workpieces.

Background

[003] Many power tools include a working tool slidably supported on rails so that the tool can traverse a workpiece, such as the sliding miter power saw **10** shown in **FIGS. 1(a)-(b)**. The power saw includes a saw assembly **12** connected by a yoke **24** to a rail system **20**. The rails are slidably supported by a structure, such as a bevel post **22**, mounted on a base or platform **14**. The saw assembly may be supported on the yoke to be pivoted downward toward the workpiece. The rails **20** allow the saw assembly to be precisely positioned relative to the platform **14**, and particularly the workpiece, to make a chop cut for instance. In other procedures, the saw assembly can travel along the rails during to perform a slide cut.

[004] One detriment of current miter saws arises when performing mitered cuts on large workpieces, such as the crown molding **C** or large base board **B** shown in **FIGS. 1(a), 1(b)**. The height of the workpiece above the platform **14** challenges the cutting capacity of the typical miter saw because the workpiece interferes with the components of the saw assembly **12**. In order to accommodate such large workpieces it is necessary to position the saw blade **13** between the

fully extended or fully retracted extremes on the rails, but not at the extremes. Such precise positioning is very difficult to achieve and unforgiving should the rails slide away from the optimal location during the cut.

[005] What is needed is a modified rail system that allows the operator to precisely stop and hold the saw blade assembly at the optimum location for making cuts in large workpieces.

Summary

[006] A rail system for a power tool has a base defining a work surface for supporting a workpiece, a support mounted to the base, a number of elongated rails slidably supported by the support for movement relative thereto, a yoke engaged to the number of elongated rails for movement with the elongated rails, and a power tool assembly supported by a yoke for performing an operation on the workpiece. In one aspect of the present disclosure, a rail stop is movably mounted to one of the support and the yoke, the rail stop including a stop surface adapted to abut the other of the support and the yoke when the rail stop is in a first position between the yoke and the support. The rail stop is movable to a second position different from the first position.

[007] In one feature, the rail stop is an elongated plate that extends parallel to the elongated rails that includes an end portion disposed generally perpendicular to the elongated rails to define the stop surface. In certain embodiments the rail stop is pivotably mounted to pivot between a first position in which the stop surface abuts the other of the support and the yoke and a second position in which the stop surface is no longer between the support and the yoke. In other embodiments, the elongated plate defines a slot along the length of the plate and the one of the support and the yoke includes a pin projecting therefrom into the slot. In one aspect, the slot includes a notch at one end, corresponding to the first position of the rail stop, in which the notch receives the pin to hold the rail stop in the first position abutting the other of the support and the yoke.

Description of the Figures

[001] FIGS. 1(a), (b) are perspective views of a sliding miter saw with examples of large workpieces in position for a cut.

[002] FIGS. 2(a)-(d) are views of a rail stop incorporated into a sliding miter saw, such as the saw of FIGS. 1(a)-(b), with the rail stop shown in deployed and retracted positions.

[003] FIG. 3 is an enlarged perspective view of a rail stop plate according to one aspect of the present disclosure.

[004] FIGS. 4(a)-(b) are views of an alternative rail stop incorporated into a sliding miter saw, such as the saw of FIGS. 1(a)-(b), with the rail stop shown in deployed and retracted positions.

[005] FIGS. 5(a)-(c) are views of another rail stop incorporated into a sliding miter saw, such as the saw of FIGS. 1(a)-(b), with the rail stop shown in deployed and retracted positions.

[006] FIGS. 6(a)-(b) are views of yet another rail stop incorporated into a sliding miter saw, such as the saw of FIGS. 1(a)-(b), with the rail stop shown in deployed and retracted positions.

[007] FIG. 7 is an enlarged perspective view of a rail stop plate according to a further aspect of the present disclosure.

[008] FIG. 8 is a side view of a rail stop similar to the rail stop of FIGS. 6(a)-(b) but slidably with the rails top plate, as shown in FIG. 7, mounted to the yoke of the power tool.

Detailed Description

[016] For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiments illustrated in the drawings and described in the following written specification. It is understood that no limitation to the scope of the invention is thereby intended. It is further understood that the present invention includes any alterations and modifications to the illustrated embodiments and includes further applications of the principles of the invention as would normally occur to one skilled in the art to which this invention pertains.

[017] The above-described problem of making cuts on large workpieces is addressed by incorporating a selectable rail stop into the rail system **20**. In one embodiment, a rail stop **30** is mounted to the bevel post **22** at a pivot mount **32**, as shown in **FIGS. 2(a)-(d)**. The rail stop **30** may be in the form of an elongated plate **31** that terminates in a right angle end portion **34** that defines a stop surface adapted to abut the yoke **24** of the miter saw. The rail stop is pivotably mounted at the pivot mount **32** to pivot in a vertical plane relative to the base between a first position in which the end portion **34** is disposed between the yoke and the bevel post and a second position in which the end portion is no longer between the two components. The end portion **34** may define a cut-out **35** configured to extend around a portion of a rail of the rail system **20**, as illustrated in **FIGS. 2(b), 3**, so that the stop surface of the end portion can be at least partially aligned with the line of travel of the rails system.

[018] The rail stop plate **30** is sized so that the movement of the saw assembly **12** and rail assembly **20** toward the bevel post **22** is limited to a pre-determined distance between the bevel post and yoke. As seen in comparing **FIG. 2(a)** with **FIG. 2(c)**, the deployed rail stop **30** holds the saw assembly at a distance **36** (**FIG. 2(a)**) from the bevel post **22**. This distance is calibrated

so that the structure of the saw assembly does not interfere with a large workpiece, such as the workpieces shown in **FIGS. 1(a)-(b)**. It can be appreciated that the rail stop **30** operates as a stop rather than as a lock so that the rail stop may be deployed prior to movement of the saw assembly **12**. With the rail stop deployed, the operator can advance the saw assembly and rail assembly **20** along the bevel post **22** without fear that the saw assembly will interfere with the workpiece on the platform **14**. Thus, the operator can perform a slide cut on the large workpiece. If a chop cut is to be performed, the moment applied to the saw assembly to make the cut will keep the yoke **24** pressed against the rail stop **30**. When the rail stop is not required it can be retracted to the position shown in **FIGS. 2(c)-(d)**.

[019] Other embodiments of the rail stop are contemplated as illustrated in **FIGS. 4-5**. The rail stop **40** shown in **FIGS. 4(a)-(b)** is mounted to the yoke **24** at a pivot mount **42**, rather than to the bevel post as in the previous embodiment. The rail stop **40** includes the same right angle end portion **44** that is configured to abut the bevel post **22** instead of the yoke as in the previous embodiment. The rail stop **40** is otherwise similar in structure and operation to the rail stop **30**.

[020] A rail stop **50** shown in **FIGS. 5(a)-(c)** is mounted to the bevel post at a pivot mount **52** that is situated on the top of the bevel post **22**, rather than on the side of the bevel post as in the first disclosed embodiment, so that the rail stop pivots in a horizontal plane relative to the base. Like the stops **30** and **40**, the rail stop **50** includes a right angle end portion **54** that abuts the yoke **24** to limit the travel of the slide rail assembly **20** and saw assembly **12** in the same manner as the prior embodiments.

[021] In a further embodiment, a rail stop **60** shown in **FIGS. 6(a)-(b)** is in the form of a flat plate **62** terminating in a right angle end portion **61** defining a stop surface similar to the end portions described above. However, rather than pivoting between deployed and retracted

positions, the rail stop **60** slides or translates relative to the bevel post **22**. The rail stop **60** includes a slot **64** extending along the length of the stop, terminating at its opposite ends in notches **65** and **66**, as shown in the detail view of **FIG. 7**. The notches are configured to receive a pin **70** projecting from the side of the bevel post **22**. In a deployed first position shown in **FIG. 6(a)** the pin **70** is disposed in the notch **66** so that the end portion **61** abuts the yoke **24** at a pre-defined first distance from the bevel post **22**. When the rail stop **60** is in its retracted second position shown in **FIG. 6(b)** the pin **70** is disposed in the notch **65** at the opposite end of the stop. In the second position the end portion **61** is at a second distance from the bevel post that is less than the first distance. In a specific embodiment, in the second position the end portion **61** is immediately adjacent the bevel post. It can be appreciated that in the second position the end portion may still abut the yoke **24** when the rail system is at one end of movement, but the second distance in this position is generally simply the thickness of the plate **62**.

[022] In a further embodiment, a rail stop **80**, shown in **FIG. 8**, is similar to the rail stop **60** depicted in **FIGS. 6a, 7** except that the rail stop is mounted to the yoke rather than to the bevel post. The rail stop **80** is in the form of a flat plate terminating in a right angle end portion **85** that abuts the bevel post and including a slot **82** extending along the length of the stop, terminating at its opposite ends in notches **83, 84** similar to the notches in **FIG. 7**. A pin **86** projects from the side of the yoke to engage the slot **82**, instead of projecting from the side of the bevel post as in the prior embodiment. In the deployed position shown in **FIG. 8**, the pin is disposed in the notch **83** farthest from the bevel post. In the retracted position (not shown), the pin **86** is situated in the notch **84** that is nearest the bevel post, so that the rail stop **80** does not interfere with the rails moving directly against the bevel post, as shown in **FIG. 6(b)**.

[023] It is contemplated that the rail stops **60, 80** may include only one notch, namely notch **66** and **86**, to hold the rail stop in its extended first position (**FIGS. 6(a), 8**). It is further contemplated that the slots **64, 82** may define intermediate notches between the ends of the slot. The intermediate notches would receive the post in the same manner as the notches **65, 66, 83, 84** but would operate to hold the rail stop at different intermediate distances as desired by the tool operator.

[024] The rail stops **30, 40, 50, 60** and **80** may be formed of a rigid material capable of withstanding pressure when the saw is used to make a chop cut, or impact when the saw is used to make a slide cut. Preferably the rail stops are formed of a metal, such as stainless steel. The rail stops may incorporate a dampening material, such as a thin foam layer to provide some damping when the stop is contacted during a slide cut. The configuration of the rail stops and their respective pivot or slide mounts may be modified according to the structure of the power tool. For instance, while the illustrated embodiments the end portions project at a right angle relative to elongated plate portion of the rail stop, the end portions may project at a non-perpendicular angle provided that the stop surface can solidly abut the yoke or bevel post during a cut.

[025] It can be appreciated that the rail stops disclosed herein may be readily retrofit to an existing power tool. For instance, the pivot mount **32** for the rail stop **30** of **FIGS. 2(a)-(d)** may be engaged to the bevel post **22** by a screw. Similarly, the pin **70** of the embodiment shown in **FIG. 6(a)-(b)** may also be a screw threaded into the bevel post, with the head of the screw holding the rail stop **60** in position relative to the bevel post.

[026] The present disclosure provides a rail stop for a slide miter saw or similar power tool in which the rail stop is movable from a retracted position in which the saw assembly and rail

assembly are free to move to their full extent, to an extended position in which the movement of the saw and rail assemblies is limited to a predetermined position that provides clearance for large workpieces. The rail stop thus allows a conventional miter saw to be used to make cuts in crown molding, large base boards and the like.

[027] While the invention has been illustrated and described in detail in the drawings and foregoing description, the same should be considered as illustrative and not restrictive in character. It is understood that only the preferred embodiments have been presented and that all changes, modifications and further applications that come within the spirit of the invention are desired to be protected.

What is claimed is:

1. A rail system for a power tool having a base defining a work surface for supporting a workpiece and a power tool assembly supported by a yoke for performing an operation on the workpiece, the rail system comprising:
 - a number of elongated rails engaged to the yoke;
 - a support mounted to the base and configured to slidably support said number of elongated rails for movement of the yoke and power tool assembly relative to the base; and
 - a rail stop movably mounted to one of the support and the yoke, the rail stop including a stop surface adapted to abut the other of the support and the yoke when the rail stop is in a first position between the yoke and the support, the rail stop movable to a second position in which the rail stop is not between the yoke and the support.
2. The rail system of claim 1, wherein the rail stop includes an elongated plate extending substantially parallel to said number of elongated rails and including an end portion extending substantially perpendicular to said number of elongated rails and defining said stop surface.
3. The rail system of claim 2, wherein said elongated plate is pivotably mounted to one of the support and the yoke at an end of said plate opposite said end portion.
4. The rail system of claim 3, wherein said elongated plate is pivotably mounted to one of the support and the yoke for pivoting in a vertical plane relative to the base.

5. The rail system of claim 3, wherein said elongated plate is pivotably mounted to the support for pivoting in a horizontal plane relative to the base.

6. The rail system of claim 2, wherein said end portion defines a cut-out configured to receive one of said number of elongated rails therein.

7. A rail system for a power tool having a base defining a work surface for supporting a workpiece, and a power tool assembly supported by a yoke for performing an operation on the workpiece, the rail system comprising:

a number of elongated rails engaged to the yoke;

a support mounted to the base and configured to slidably support said number of elongated rails for movement of the yoke and power tool assembly relative to the base; and

a rail stop movably mounted to one of the support and the yoke, the rail stop including a stop surface adapted to abut the other of the support and the yoke, the rail stop movable between a first position in which the stop surface is at a first distance between the yoke and the support and a second position in which the rail stop is at a different second distance between the yoke and the support.

8. The rail system of claim 7, wherein:

the rail stop includes an elongated plate defining a slot along its length, the slot including a notch in at least one end thereof; and

the one of the support and the yoke includes a pin projecting therefrom and configured for sliding engagement within the slot, the pin further configured to be disposed within the notch when the rail stop is in the first position.

9. The rail system of claim 8, wherein:

the slot includes a notch at each end thereof; and

said pin is configured to be disposed within the notch at one end when the rail stop is in the first position and disposed within the notch at the opposite end of the plate when the rail stop is in the second position.

10. In a rail system for a power tool having a base defining a work surface for supporting a workpiece, a support mounted to the base, a number of elongated rails slidably supported by the support for movement relative thereto, a yoke engaged to the number of elongated rails for movement with the elongated rails, and a power tool assembly supported by a yoke for performing an operation on the workpiece, the improvement comprising:

a rail stop movably mounted to one of the support and the yoke, the rail stop including a stop surface adapted to abut the other of the support and the yoke when the rail stop is in a first position between the yoke and the support, the rail stop movable to a second position different from said first position.

11. The improvement of claim 10, wherein the rail stop movable to a position in which the rail stop is not between the yoke and the support in said second position.

12. The improvement of claim 11, wherein the rail stop is pivotably mounted to the one of the support and the yoke for pivoting between said first and second positions.

13. The improvement of claim 12, wherein the rail stop is pivotably mounted to pivot in a vertical plane relative to the base of the power tool.

14. The improvement of claim 12, wherein the rail stop is pivotably mounted to pivot in a horizontal plane relative to the base of the power tool.

15. The improvement of claim 10, wherein the rail stop includes an elongated plate extending substantially parallel to the number of elongated rails and including an end portion extending substantially perpendicular to the number of elongated rails and defining said stop surface.

16. The improvement of claim 10, wherein the stop surface of said rail stop is at a first distance relative to the one of the support and the yoke in the first position and is at a second distance relative to the one of the support and the yoke in the second position that is different from said first distance.

17. The improvement of claim 16, wherein:
the rail stop includes an elongated plate defining a slot along its length, the slot including a notch in at least one end thereof; and

the one of the support and the yoke includes a pin projecting therefrom and configured for sliding engagement within the slot, the pin further configured to be disposed within the notch when the rail stop is in the first position.

18. The rail system of claim 17, wherein:

the slot includes a notch at each end thereof; and

said pin is configured to be disposed within the notch at one end when the rail stop is in the first position and disposed within the notch at the opposite end of the plate when the rail stop is in the second position.

1/7

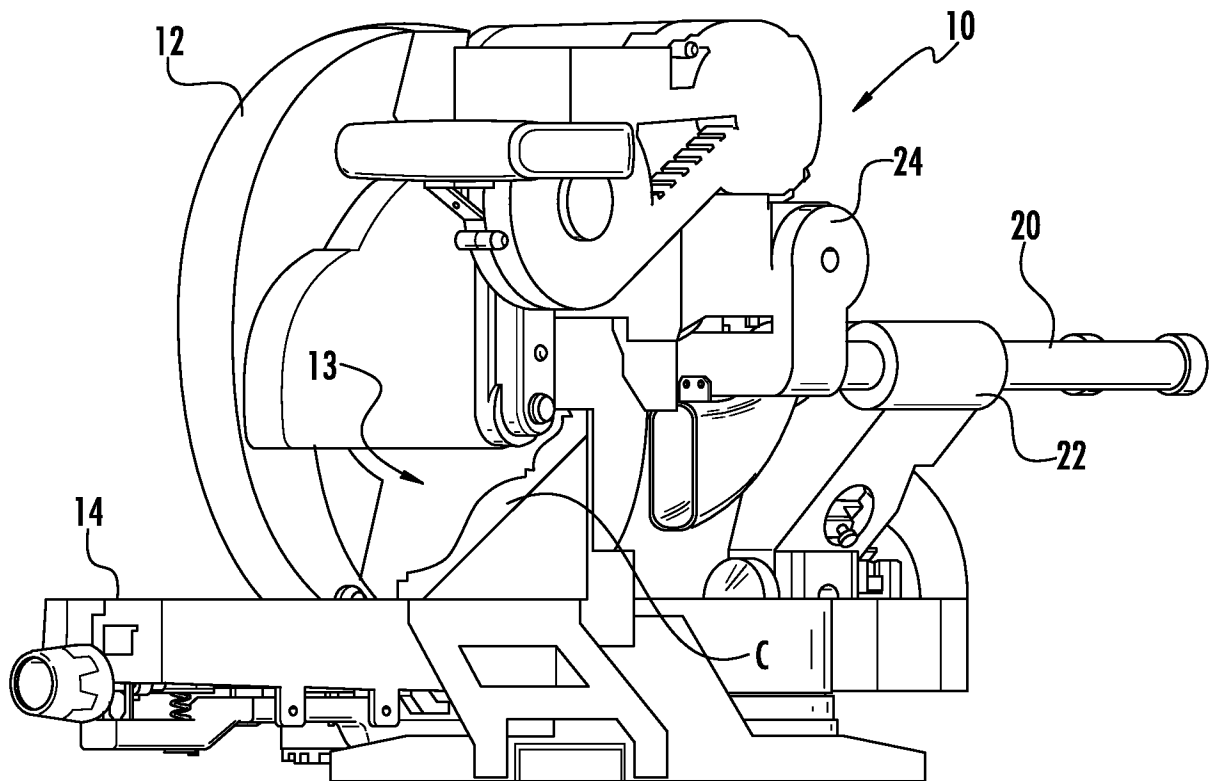


FIG. 1A

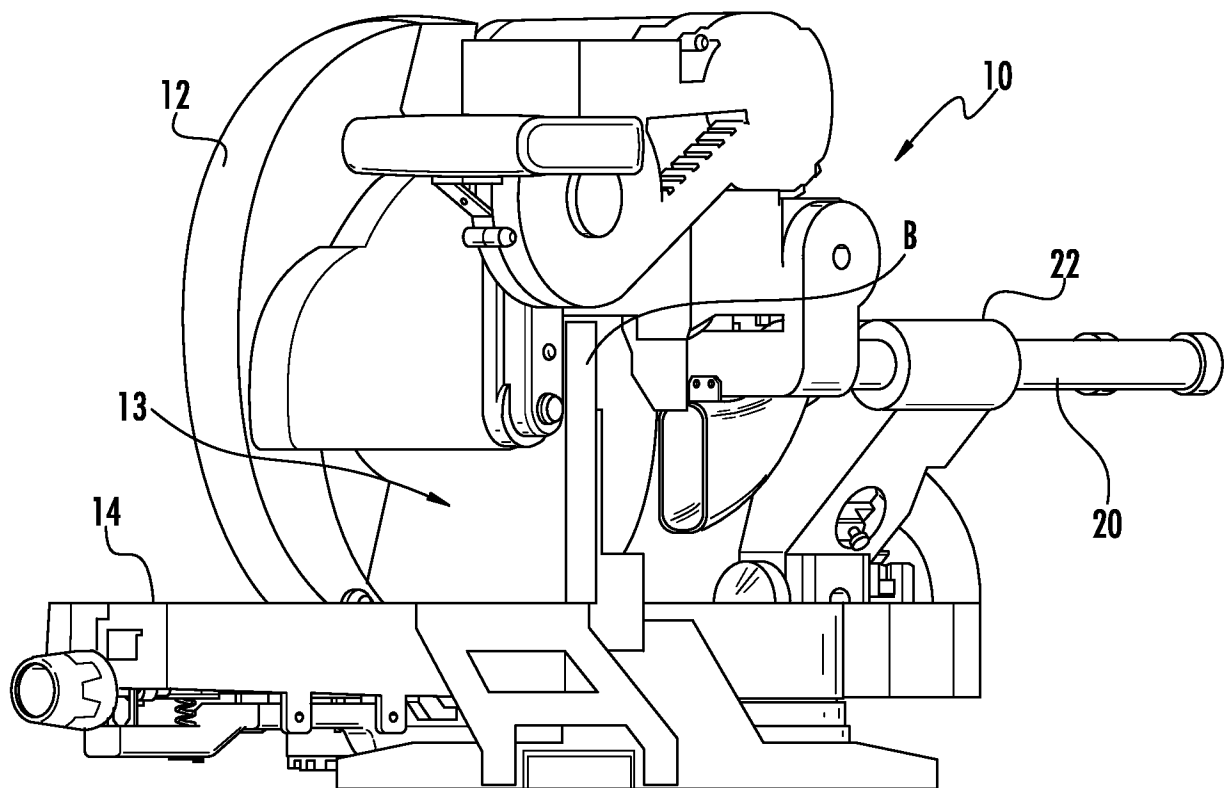


FIG. 1B

2/7

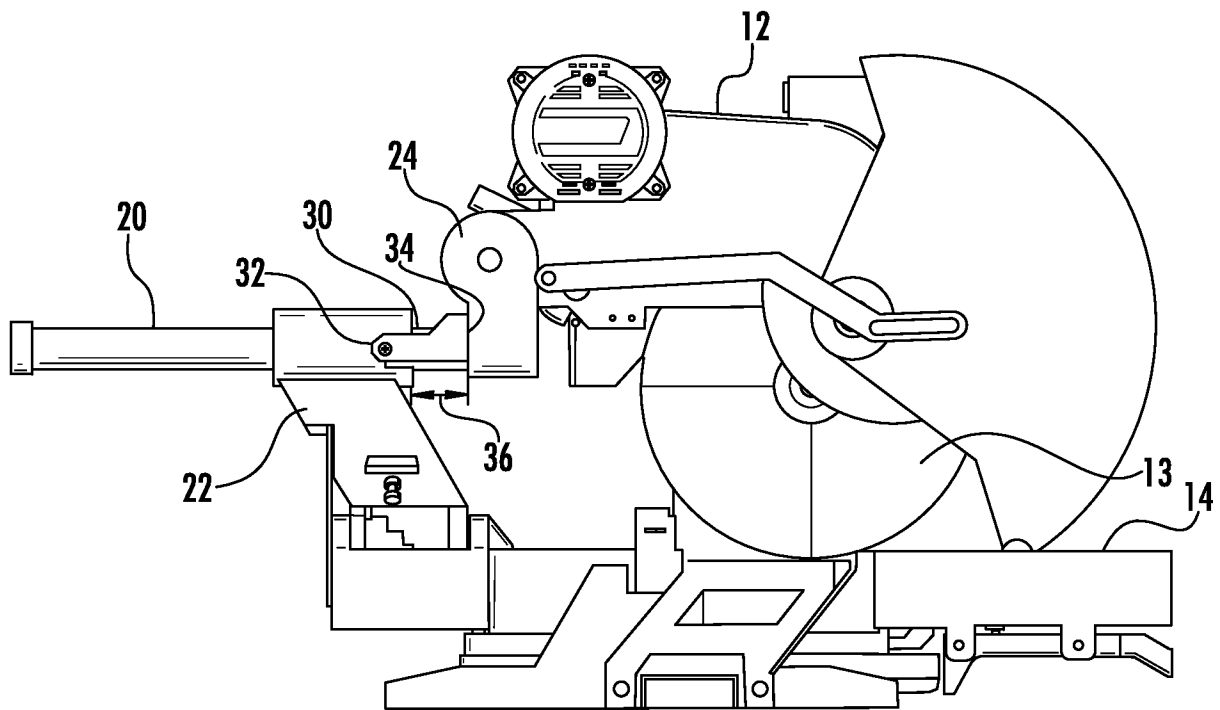


FIG. 2A

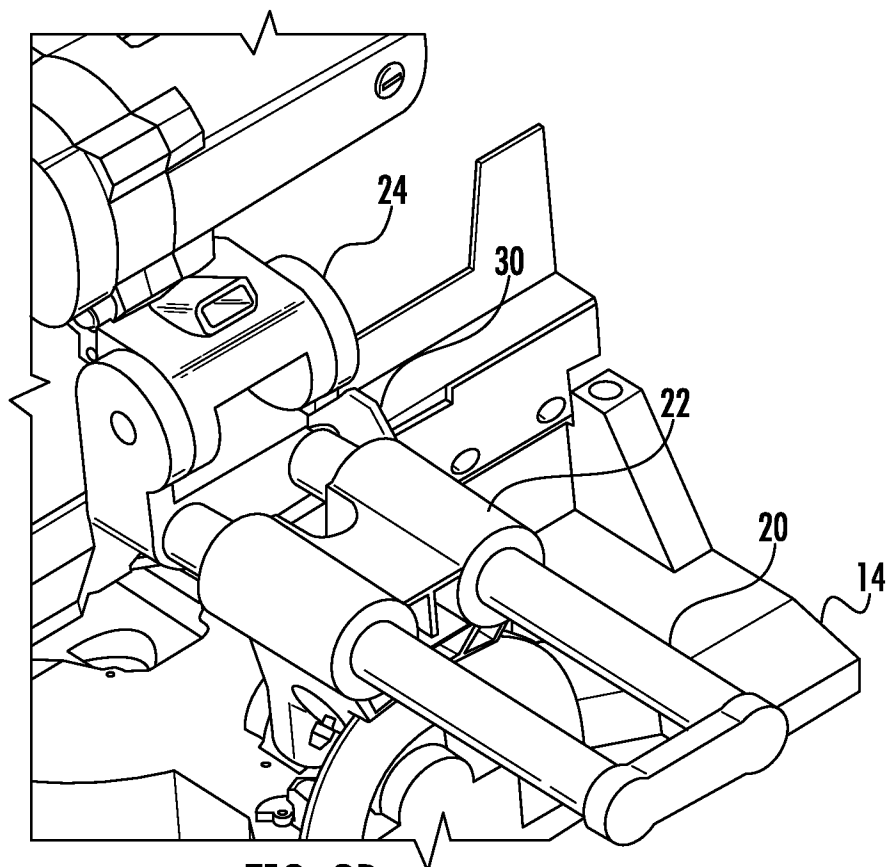


FIG. 2B

3/7

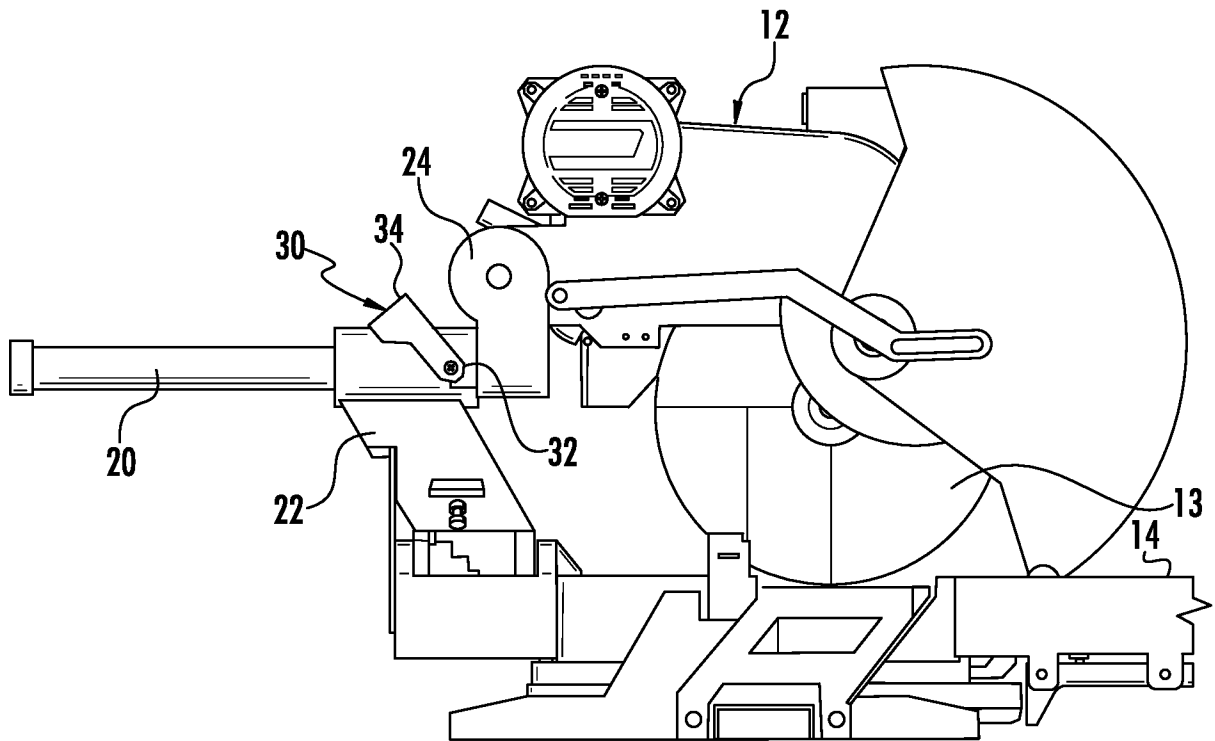


FIG. 2C

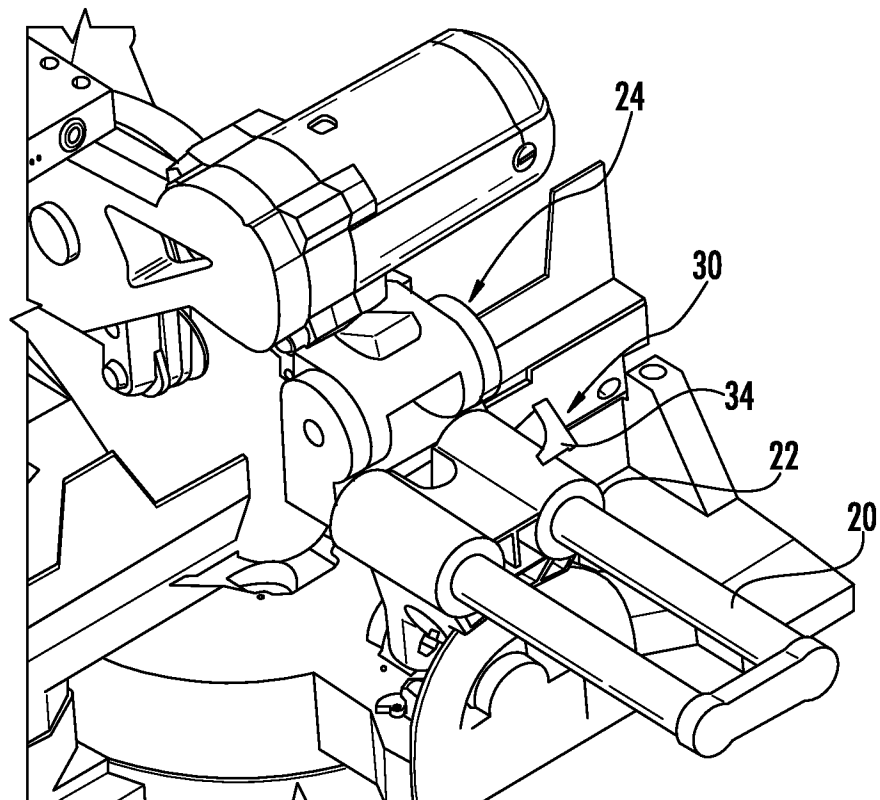
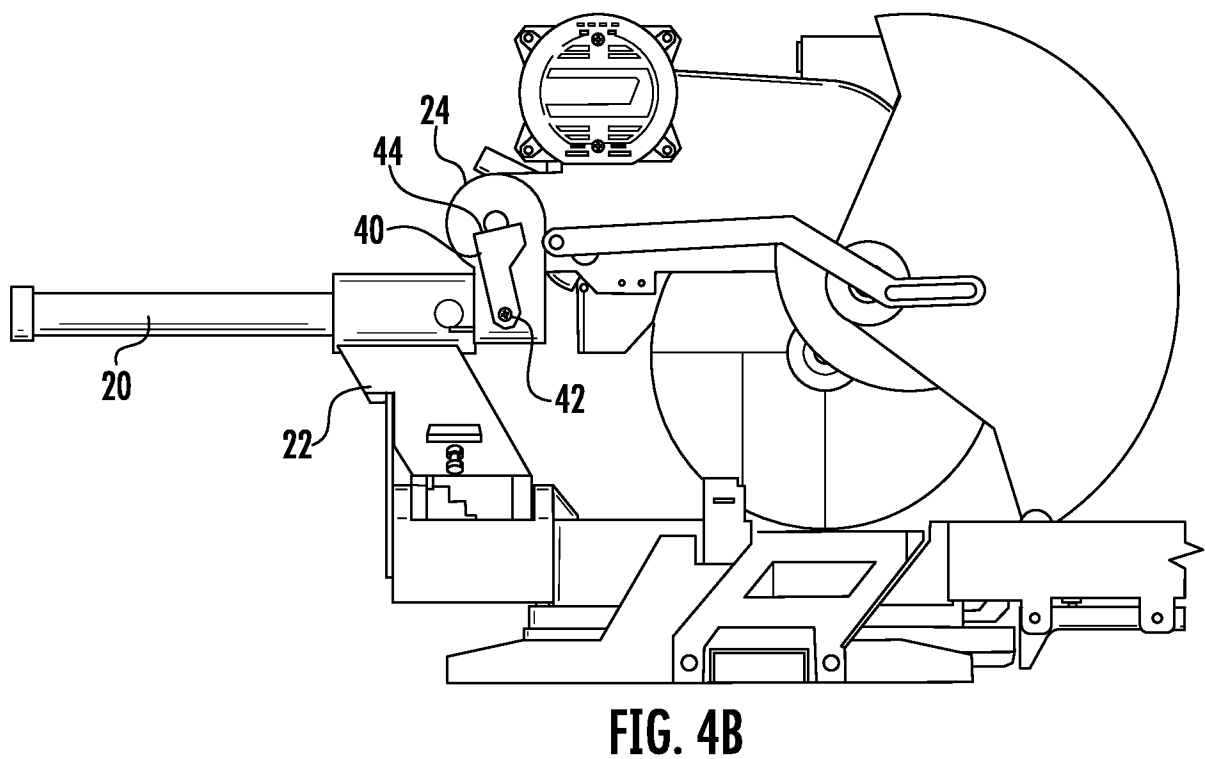
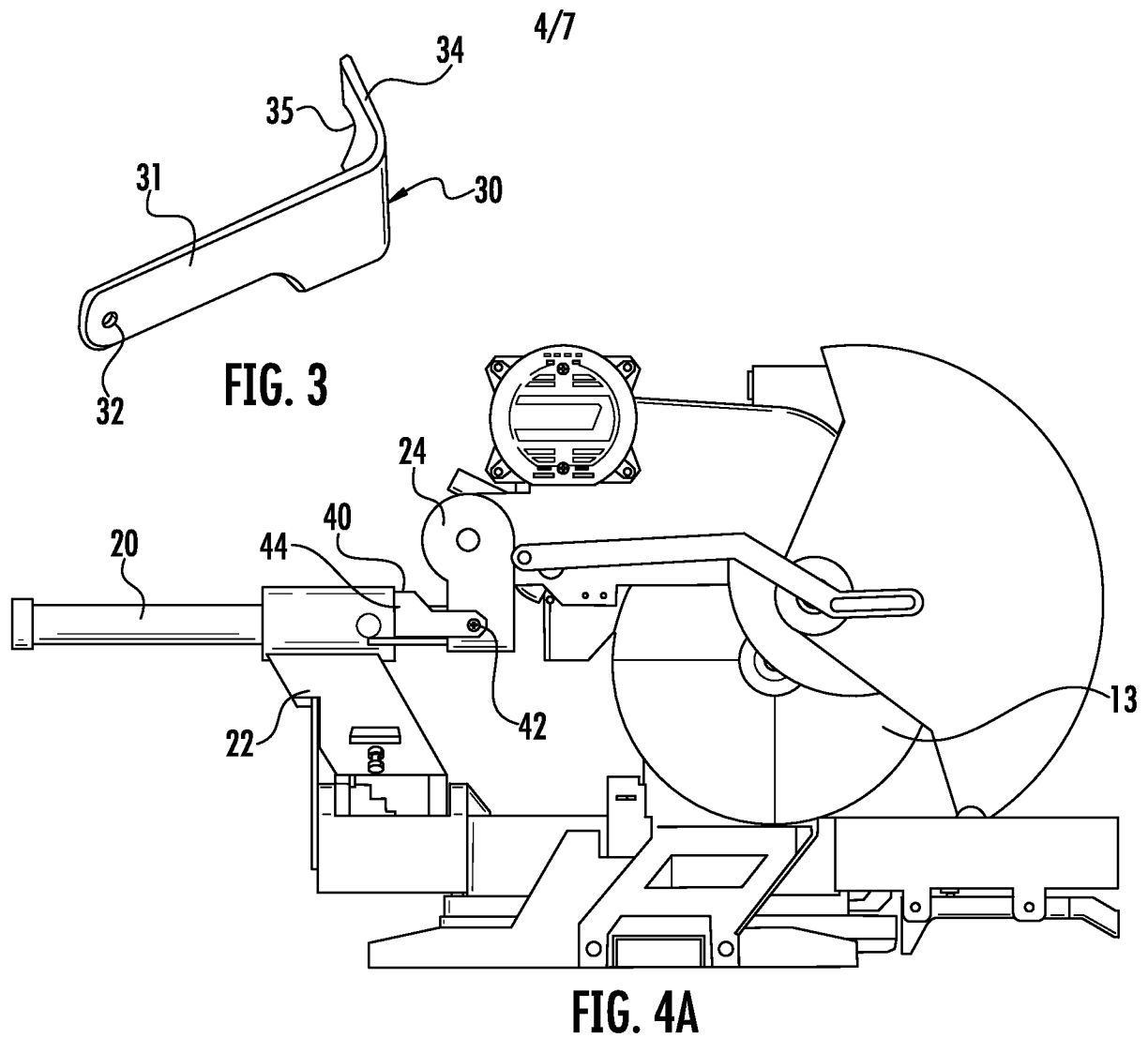


FIG. 2D



5/7

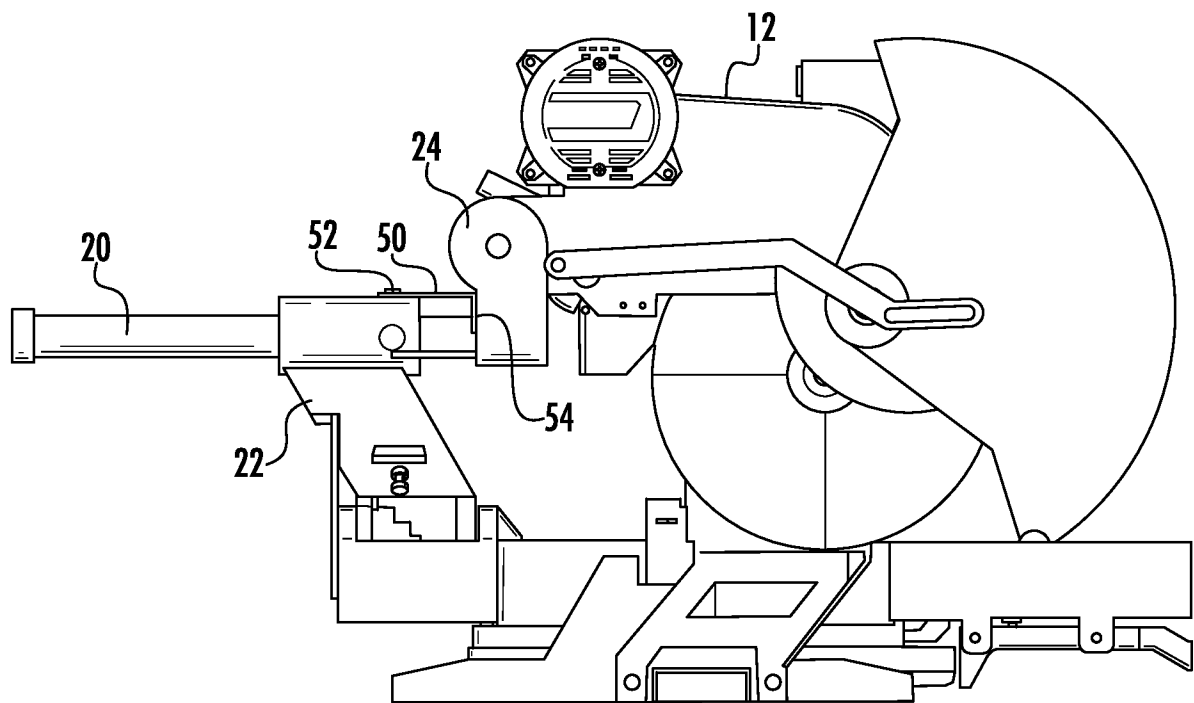


FIG. 5A

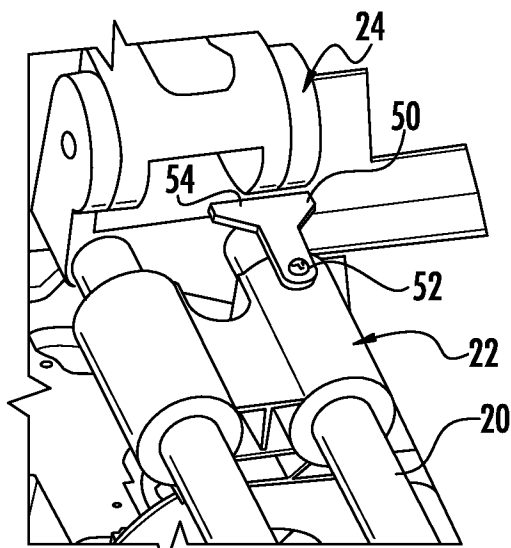


FIG. 5B

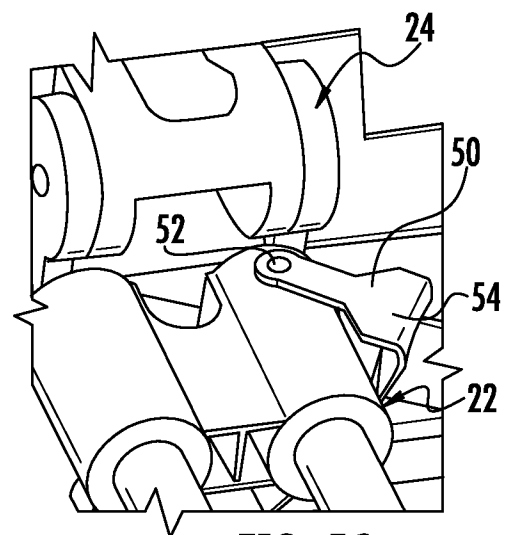


FIG. 5C

6/7

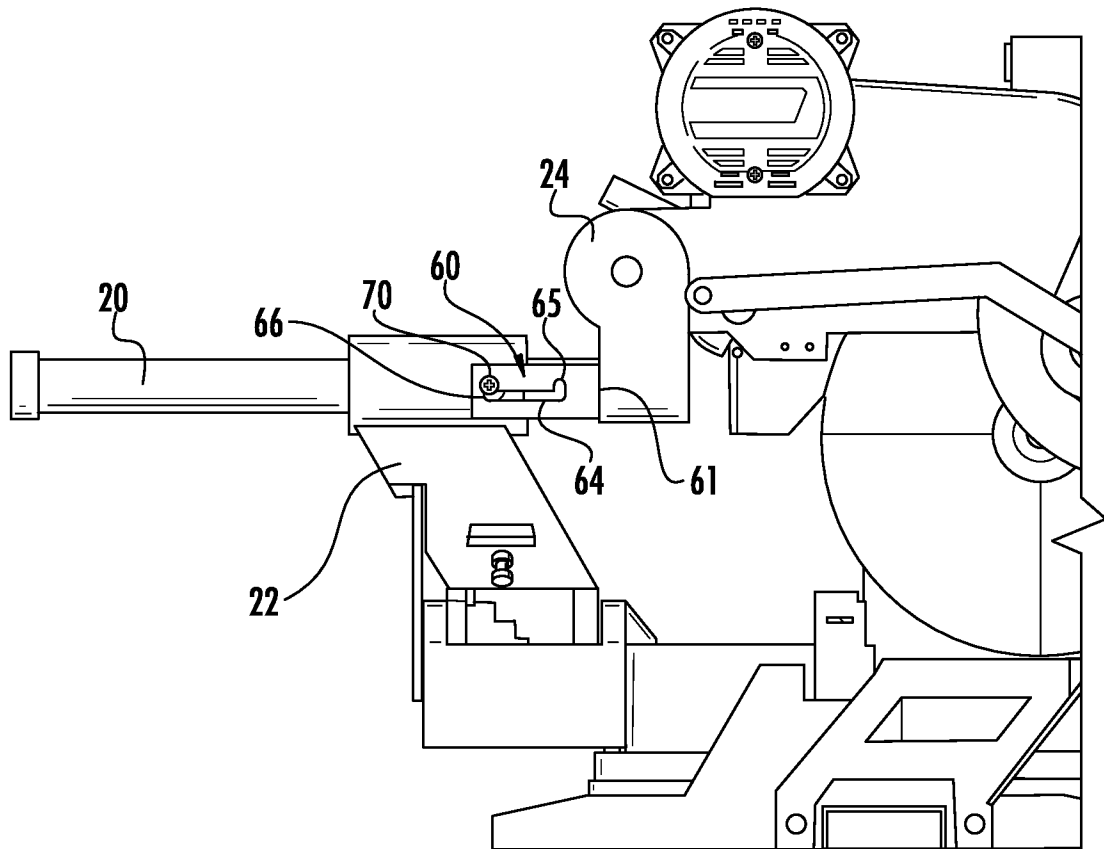


FIG. 6A

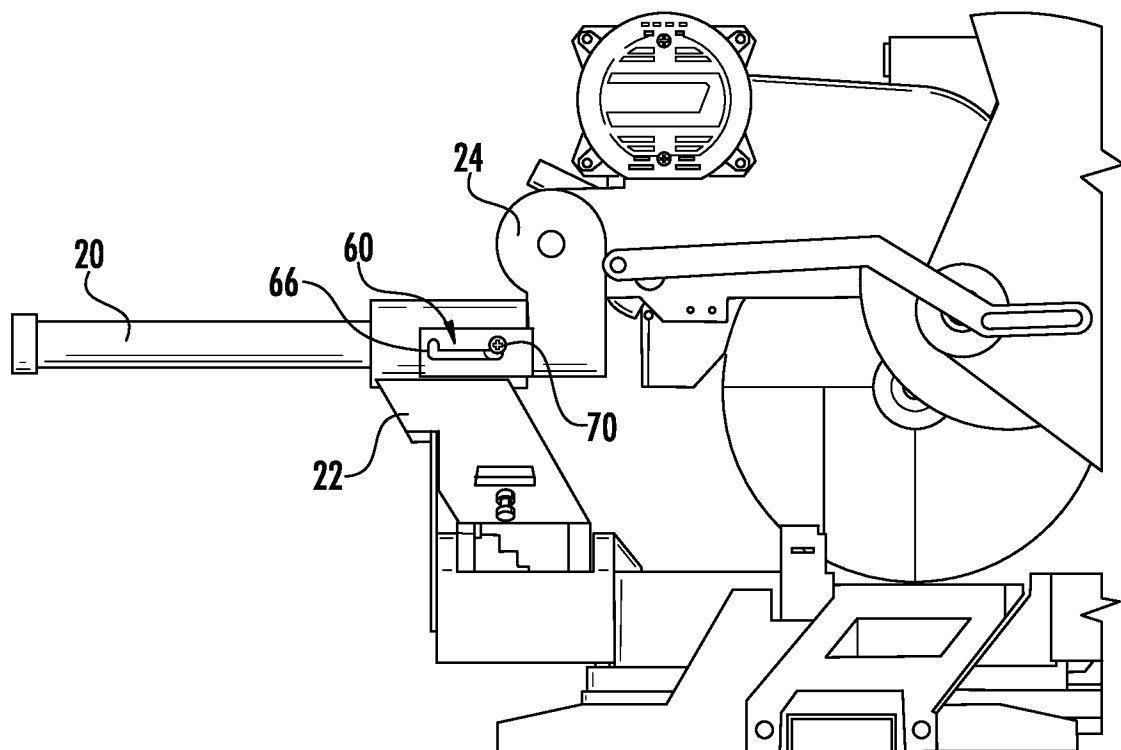
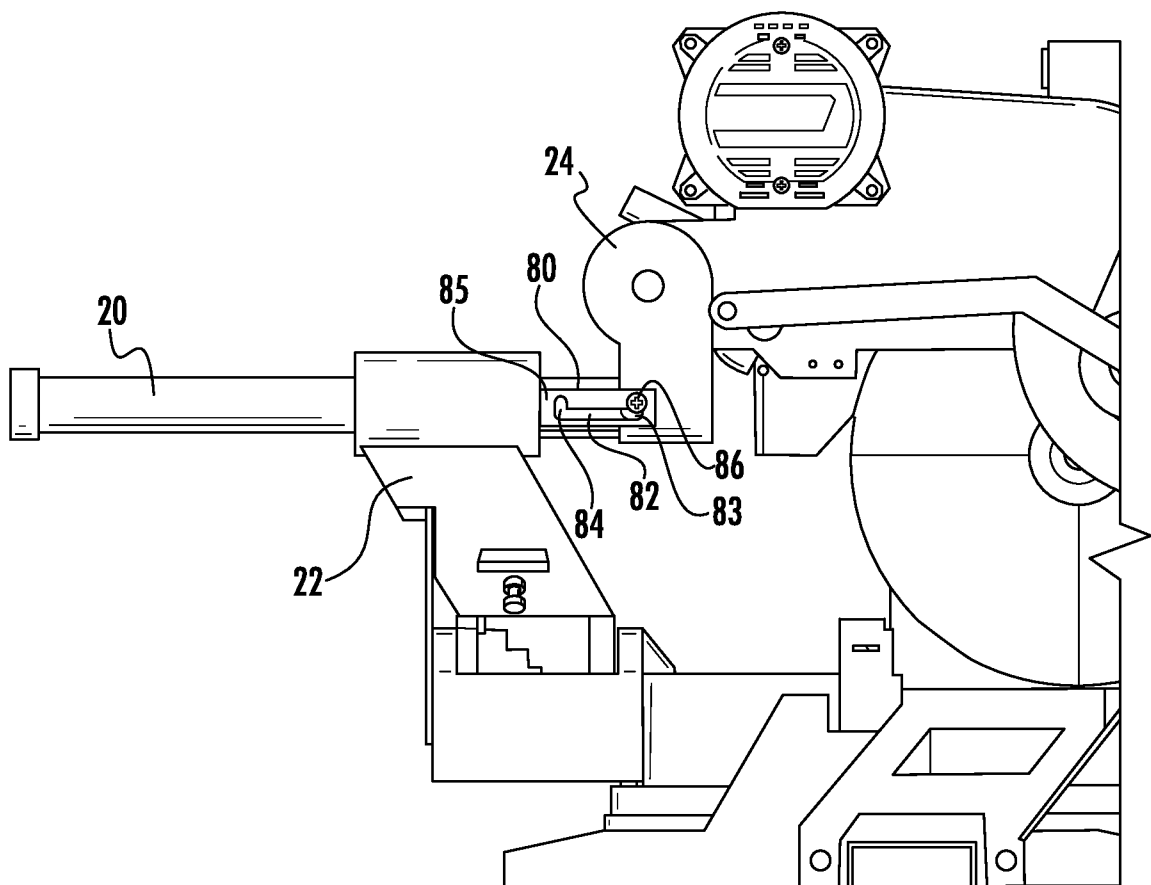
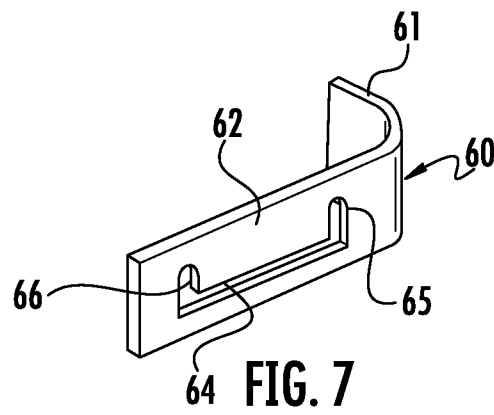


FIG. 6B

7/7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/021580**A. CLASSIFICATION OF SUBJECT MATTER****B23D 47/02(2006.01)i, B23D 45/02(2006.01)j**

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B23D 47/02; B23D 45/02; B27B 9/02; B23D 45/04; B26D 5/00; B26D 1/14

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: meter saw, sliding saw, rail, guide, stop, abutment, lock, limiter, and yoke

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009-0235794 A1 (INAI, MASAHIKO) 24 September 2009 See paragraphs [0030], [0036], [0055], [0057]-[0061], and figures 3, 10-12.	1-5, 10-15
Y		7, 16
A		6, 8-9, 17-18
Y	US 2009-0301278 A1 (AGAN, K. S. et al.) 10 December 2009 See paragraphs [0046], [0056], [0057], [0060], [0070], and figures 5, 7A-7C, 15A, 15B.	7, 16
A	US 2010-0242699 A1 (SASAKI, K. et al.) 30 September 2010 See abstract, paragraphs [0038]-[0040], and figures 1, 3.	1-18
A	US 2003-0088986 A1 (USHIWATA, S. et al.) 15 May 2003 See abstract, paragraphs [0025]-[0030], and figure 1.	1-18
A	US 2008-0210072 A1 (CHANG, Y. C. et al.) 04 September 2008 See abstract, paragraphs [0015], [0016], and figure 1.	1-18



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

05 June 2014 (05.06.2014)

Date of mailing of the international search report

19 June 2014 (19.06.2014)

Name and mailing address of the ISA/KR

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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