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(54) **IMPROVED ABRASIVE SAW**

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(57) **ABSTRACT**

An abrasive saw having an associated cutting wheel is used for cutting objects. The saw includes a base, a cutting assembly operably mounted to the base and a controller. The cutting assembly includes a pivot shaft, a drive shaft operably mounted to the pivot shaft, a drive, and a drive wheel. A flexible drive element operably connects the drive shaft and a drive wheel. The distance between the drive wheel axis of rotation and the drive shaft axis of rotation is variable to increase or decrease a tension in the flexible drive element. A feed table is operably mounted to the base and is movable forward and rearward in a direction of rotation of the associated cutting wheel. The cutting wheel is lockable in the cutting position and the feed table, with the object secured thereto, is moved, by the controller toward the associated cutting wheel to cut the object. An enclosure encloses the cutting assembly and has stationary sides and openable front and top panels hingedly mounted to one another and to a portion of one of the side panels to open as a unitary assembly for access to the cutting assembly.

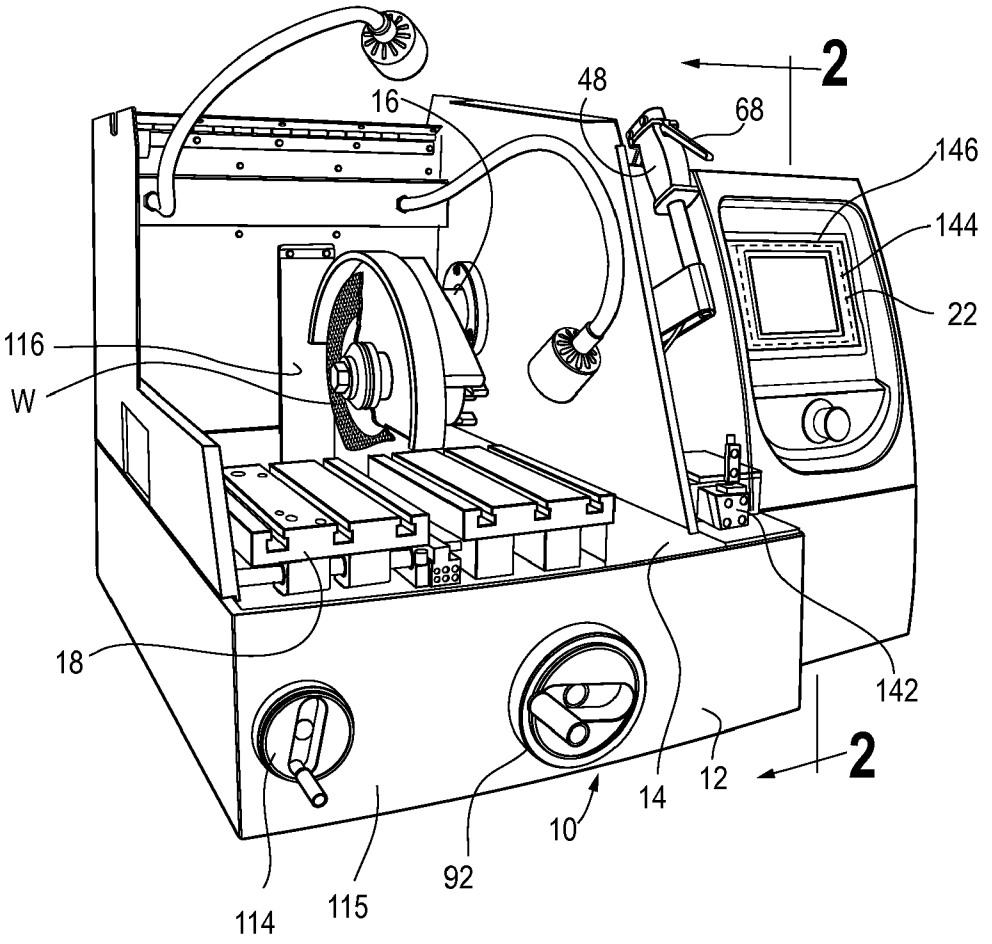


Fig. 1

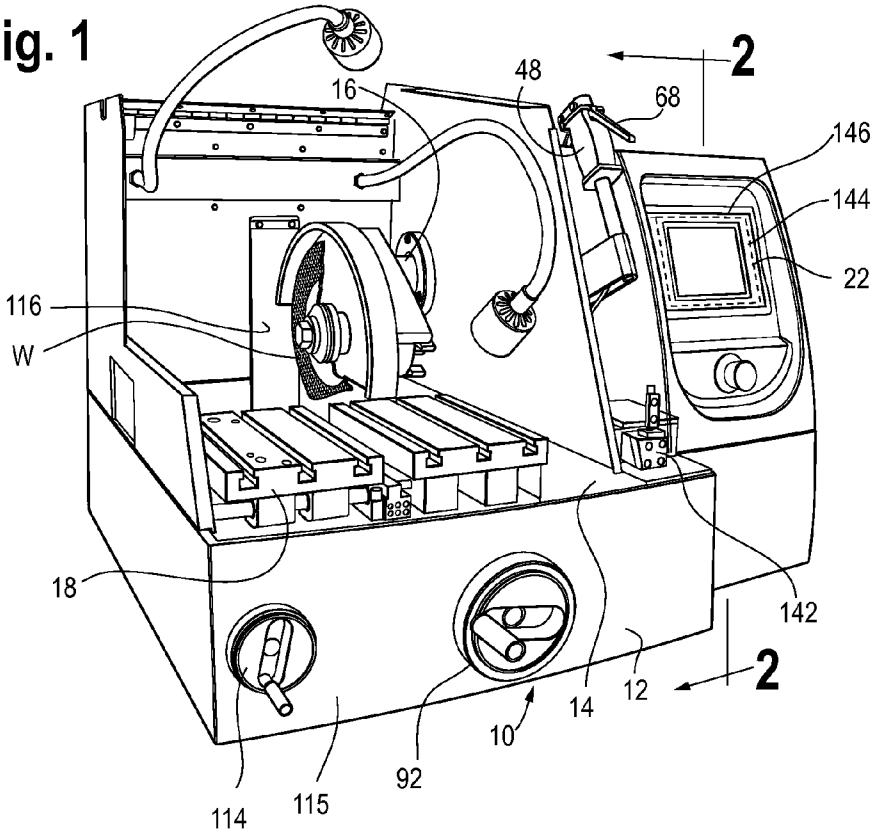

2
48
16
68
146
144
22
116
W
18
142
2
12
14
10
92
114
115

Fig. 2

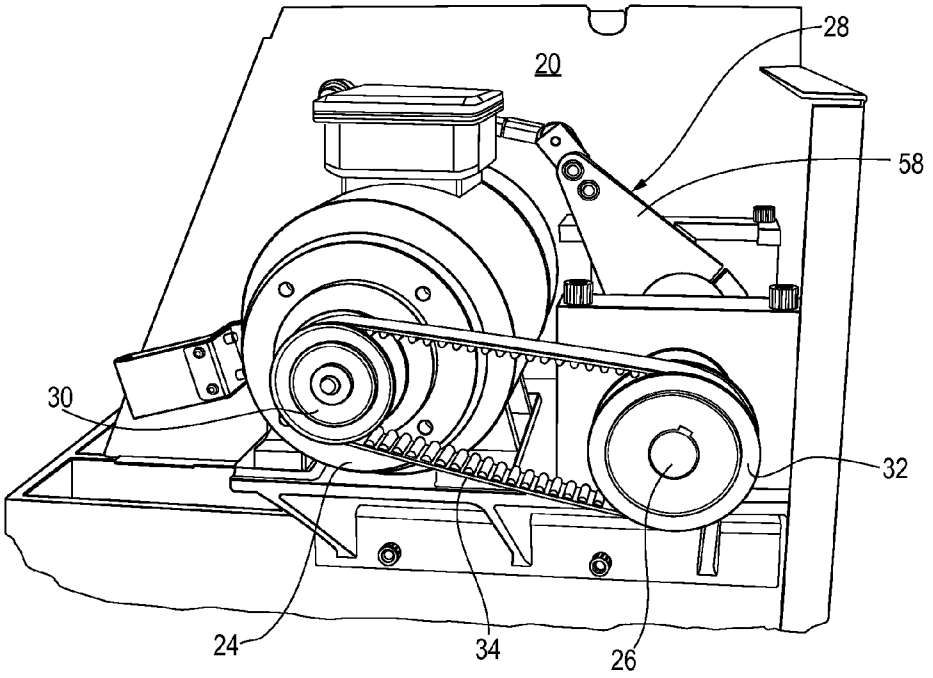

28
20
58
30
32
24
34
26

Fig. 3

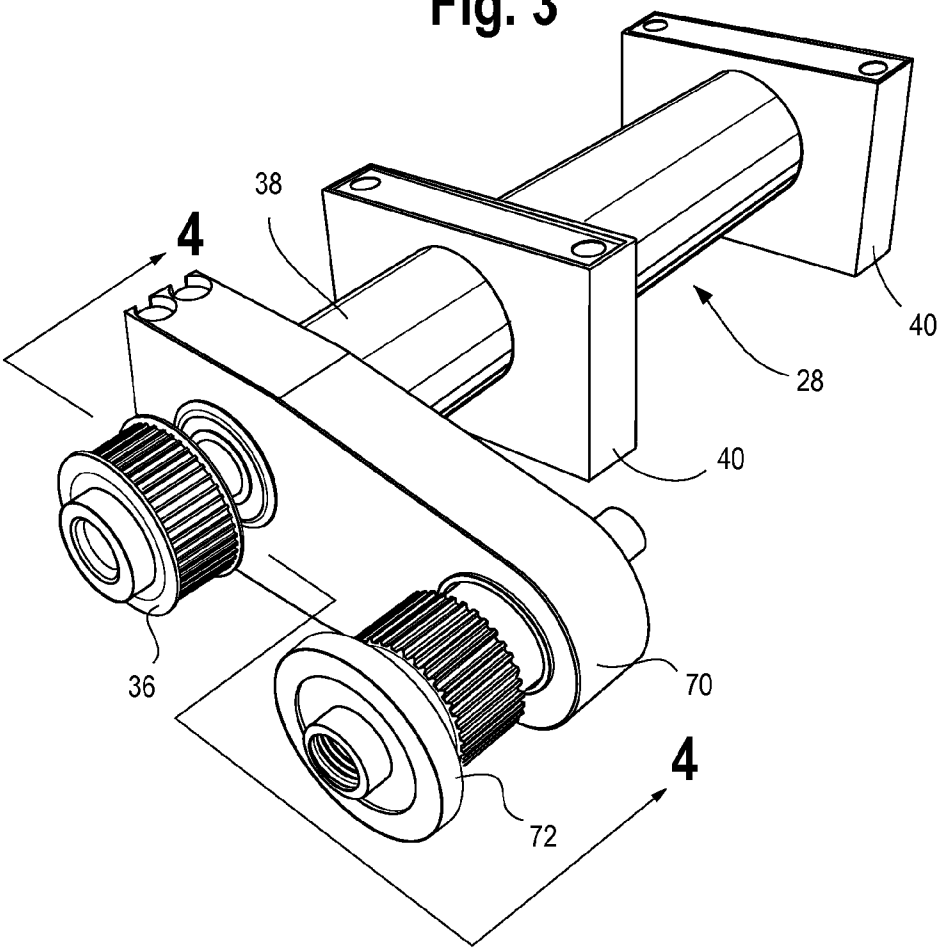


Fig. 4

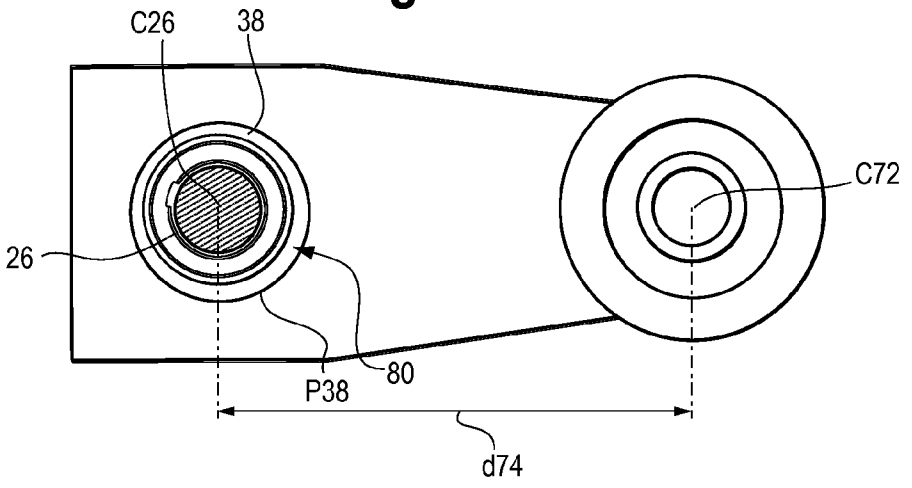


Fig. 5A

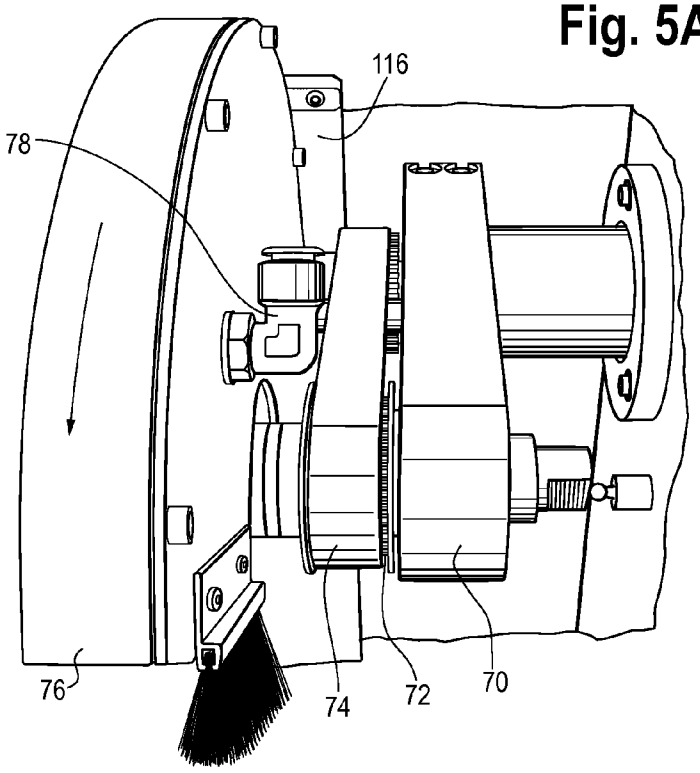


Fig. 5B

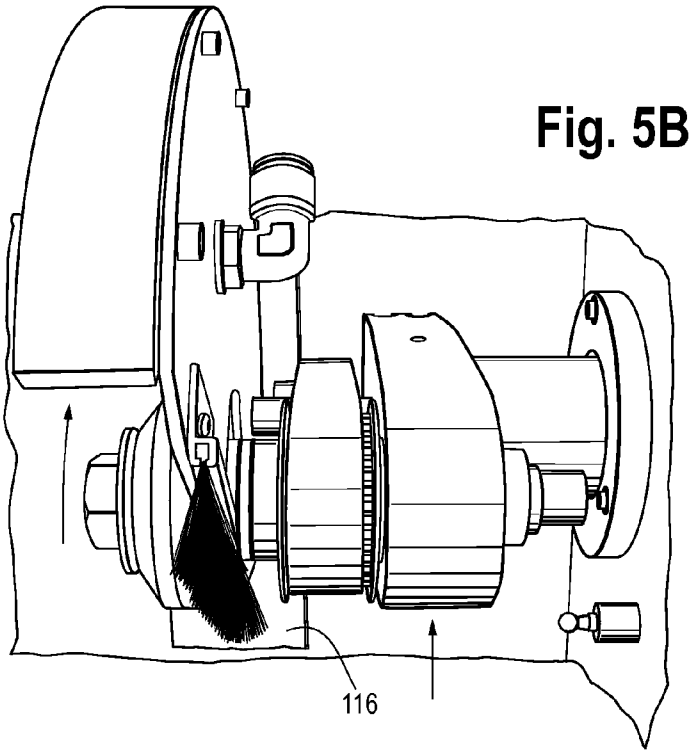


Fig. 6

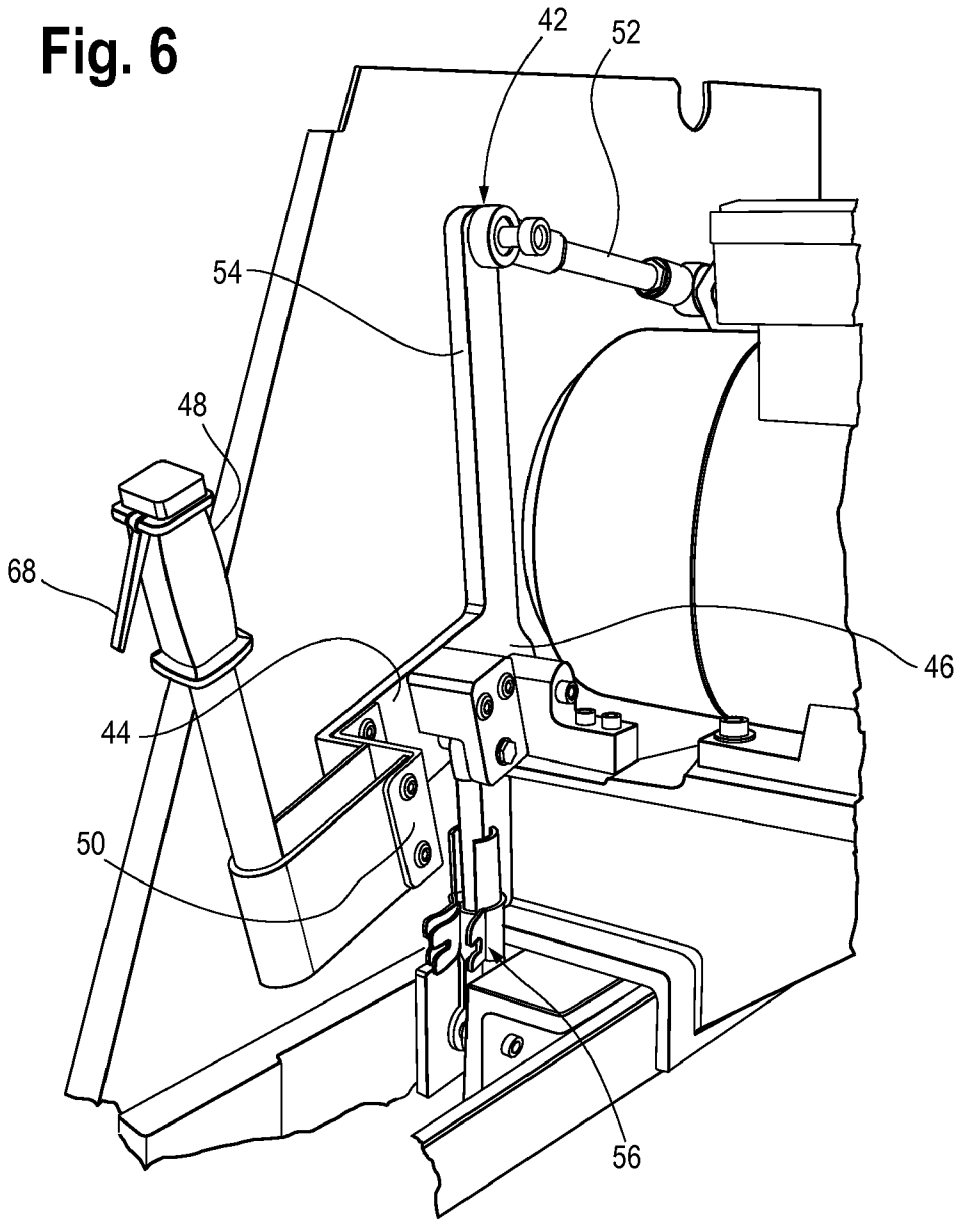


Fig. 7

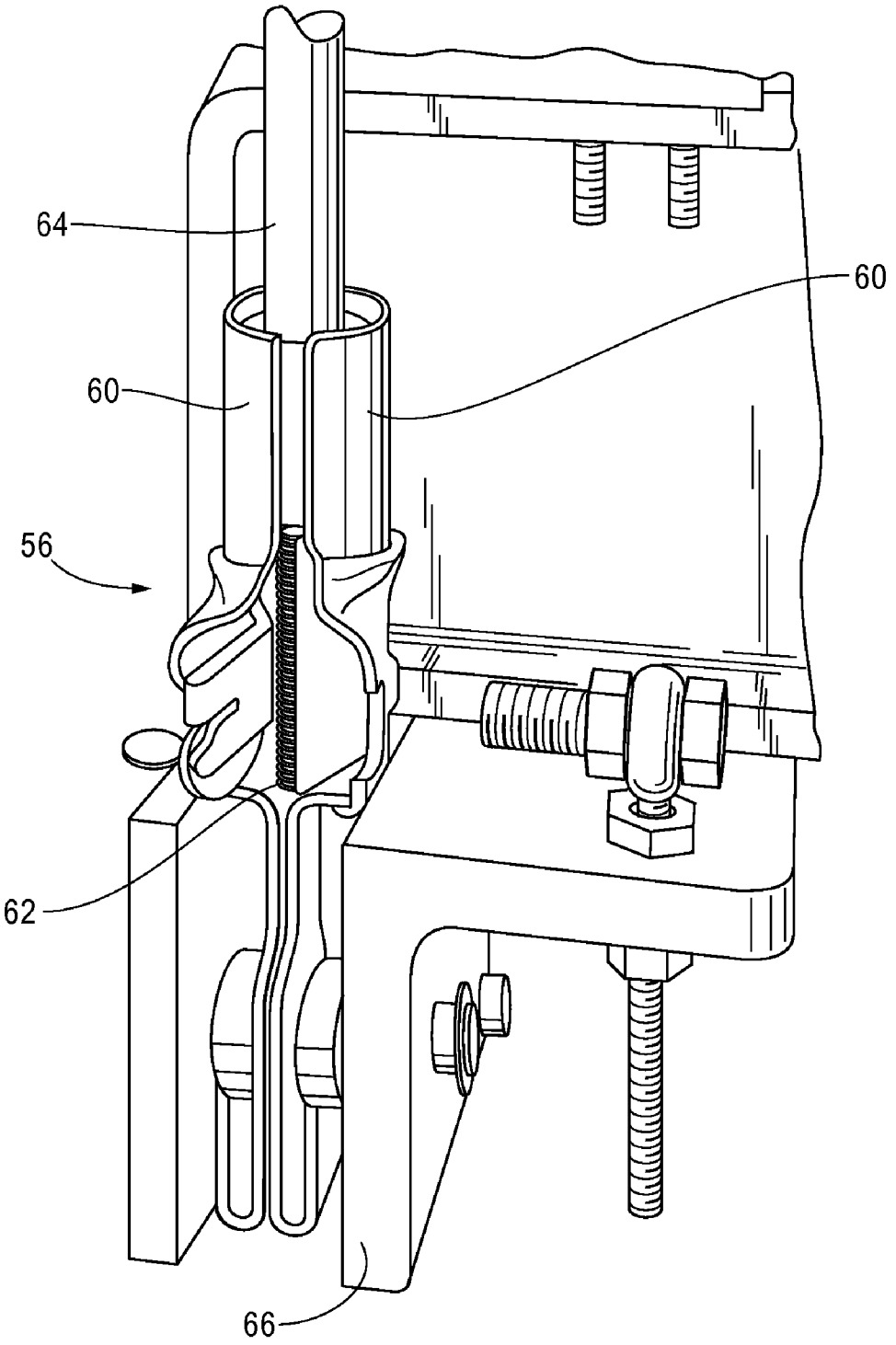


Fig. 8

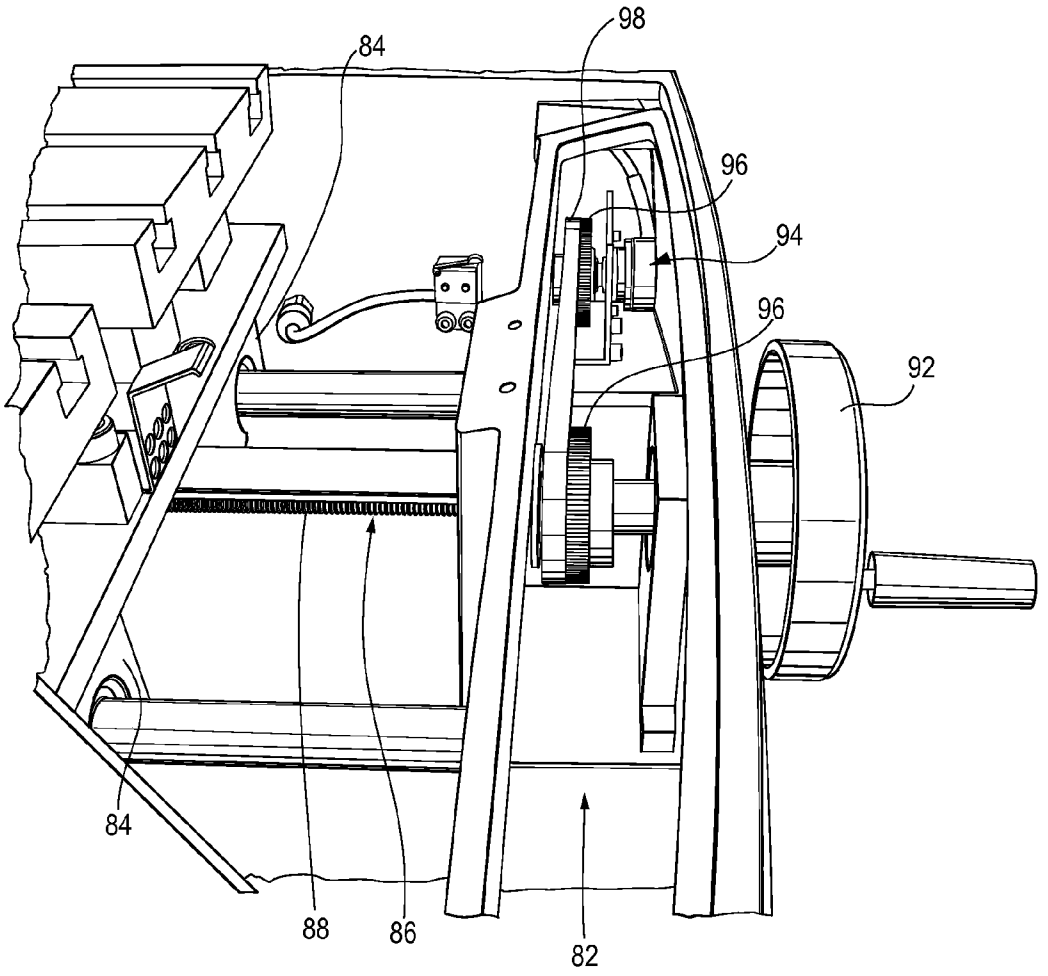


Fig. 9

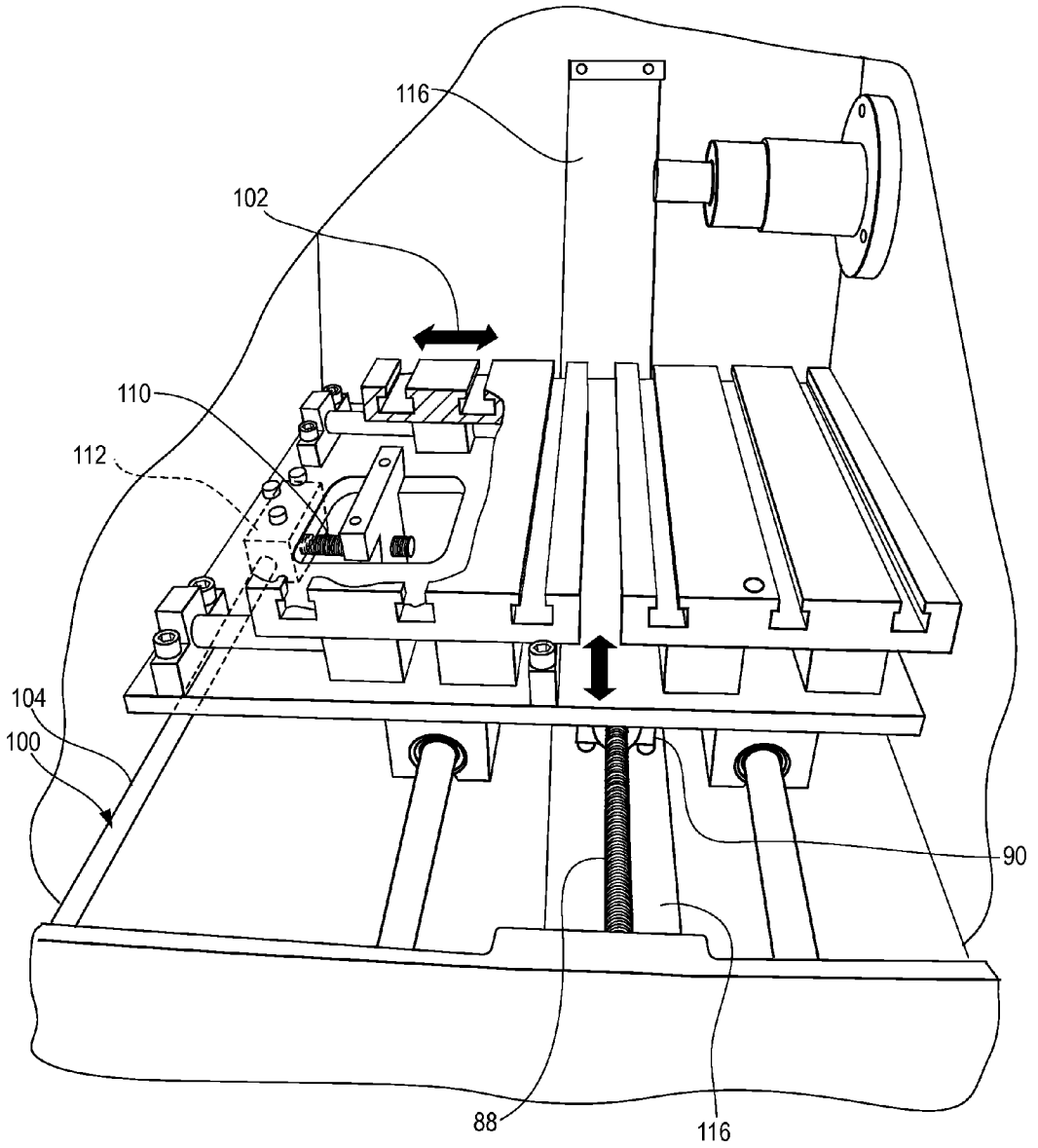


Fig. 10

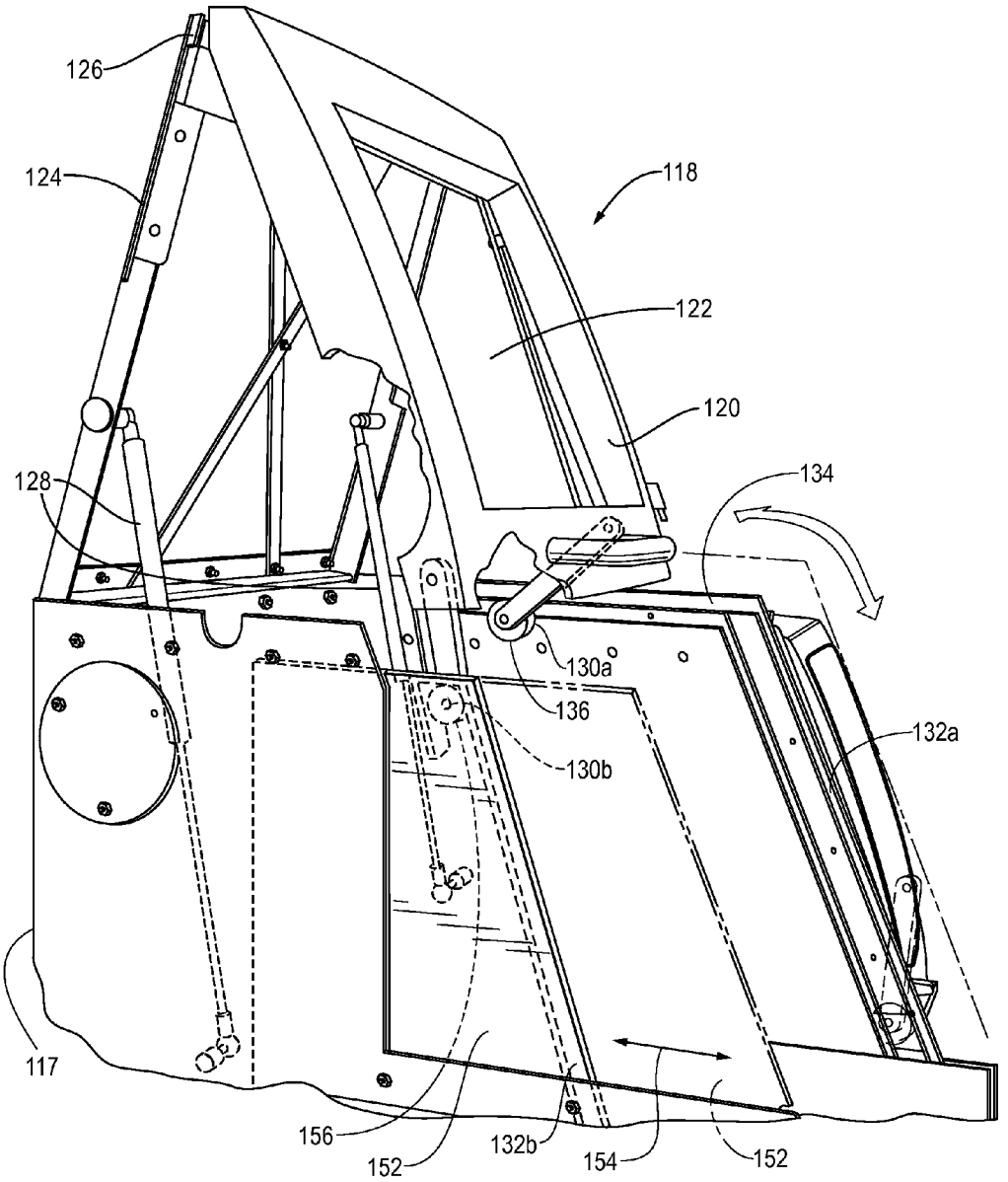

126
124
118
122
120
128
134
130a
136
132a
130b
117
156
152
132b
154
152

Fig. 11

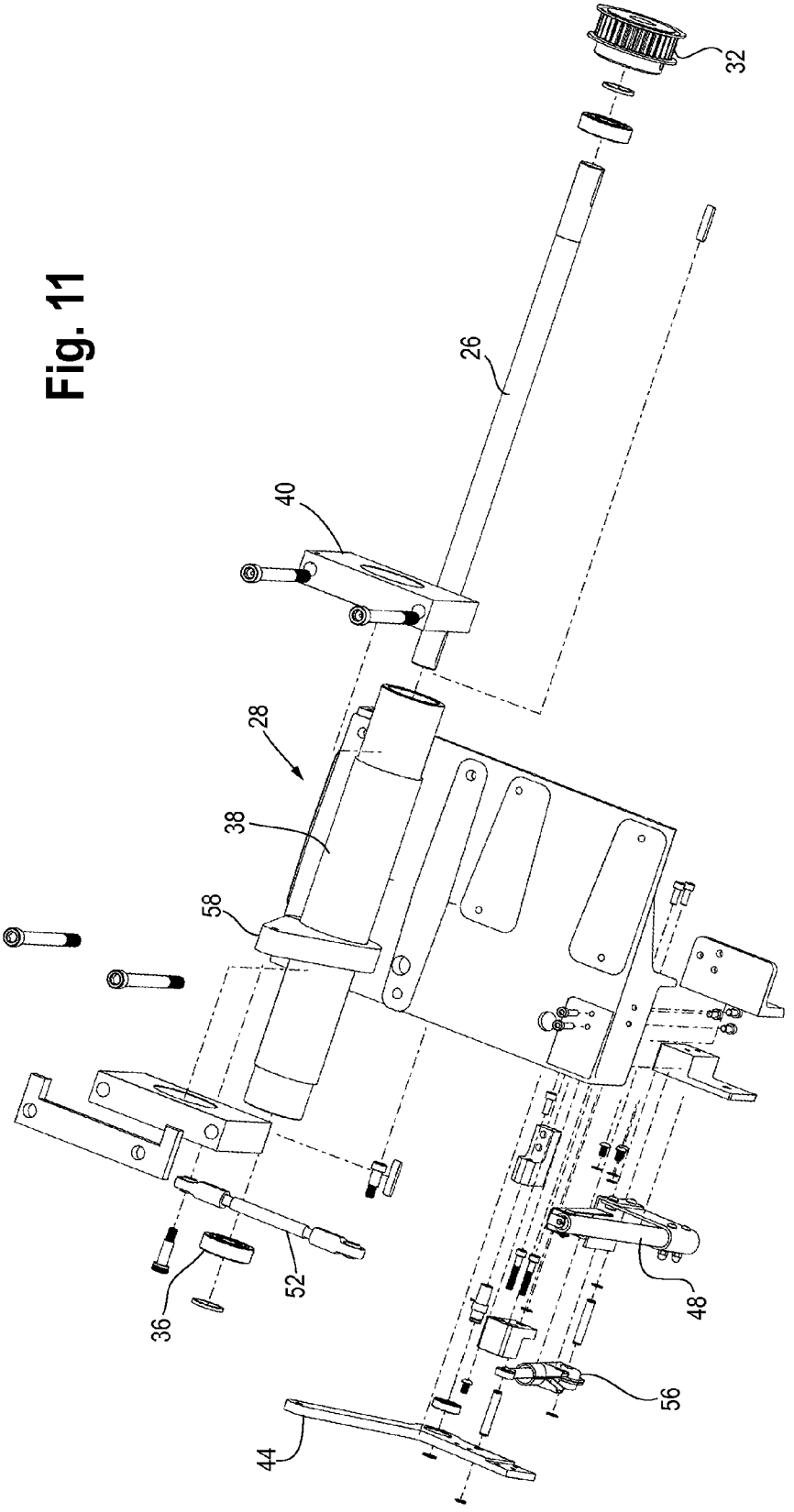


Fig. 13

Fig. 13A	Fig. 13C
Fig. 13B	Fig. 13D

Fig. 12

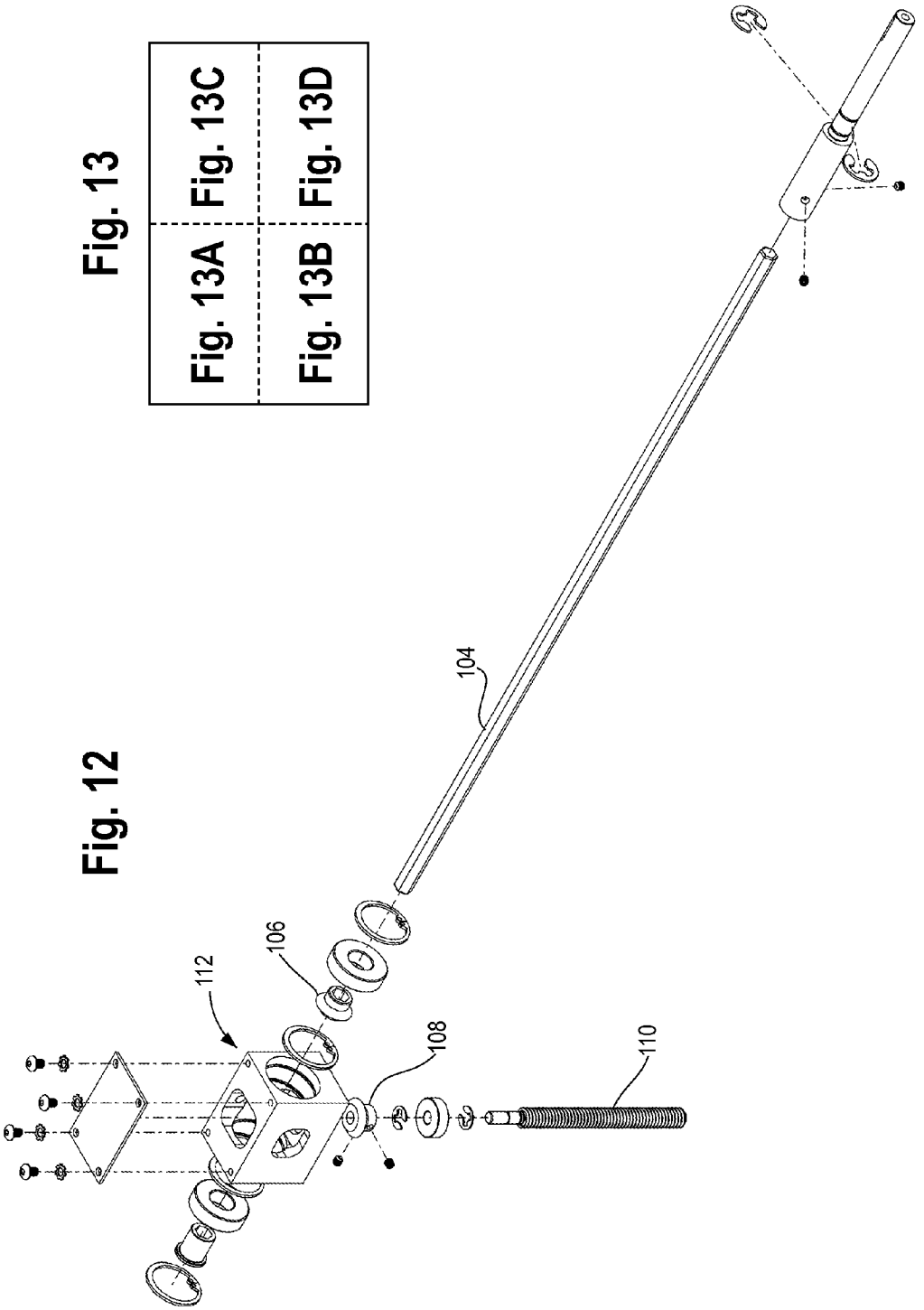


Fig. 13A

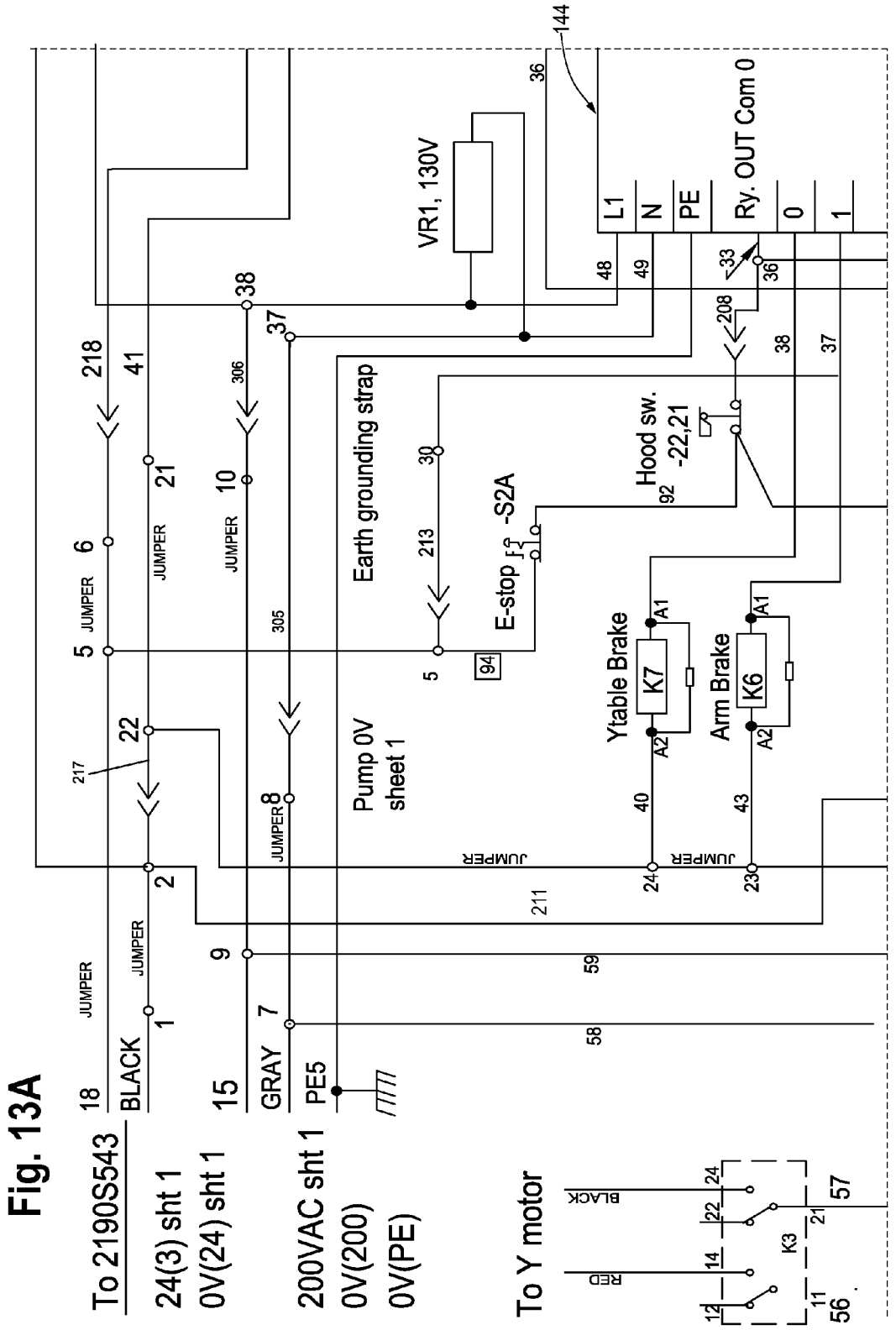
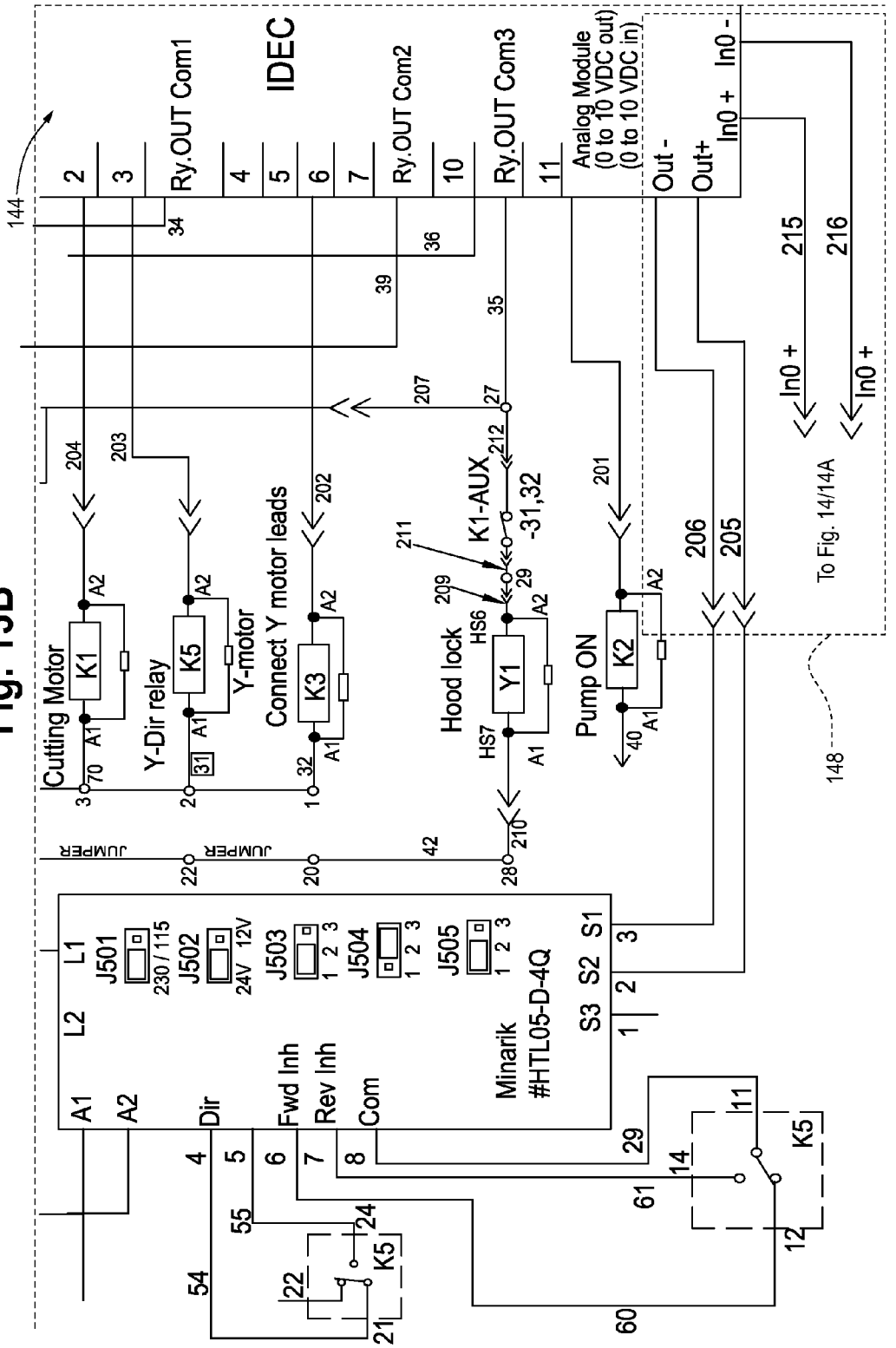

To 2190S543
24(3) sht 1
0V(24) sht 1
200VAC sht 1
0V(200)
0V(PE)
To Y motor
18
15
BLACK
GRAY
PE5
JUMPER
VR1, 130V
Earth grounding strap
Pump 0V sheet 1
E-stop -S2A
Hood sw. -22,21
Ytable Brake
Arm Brake
K7
K6
K3
L1
N
PE
Ry. OUT Com 0
0
1
144
RED
BLACK

Fig. 13B


IDEC
Ry.OUT Com1
Ry.OUT Com2
Ry.OUT Com3
Analog Module
(0 to 10 VDC out)
(0 to 10 VDC in)
Out -
Out+
In0 +
In0 -
Cutting Motor
Y-Dir relay
Y-motor
Connect Y motor leads
Hood lock
K1-AUX
-31,32
Pump ON
To Fig. 14/14A
Minarik
#HTL05-D-4Q
L1
L2
A1
A2
Dir
Fwd Inh
Rev Inh
Com
S1
S2
S3
J501
J502
J503
J504
J505
230 / 115
24V 12V
JUMPER

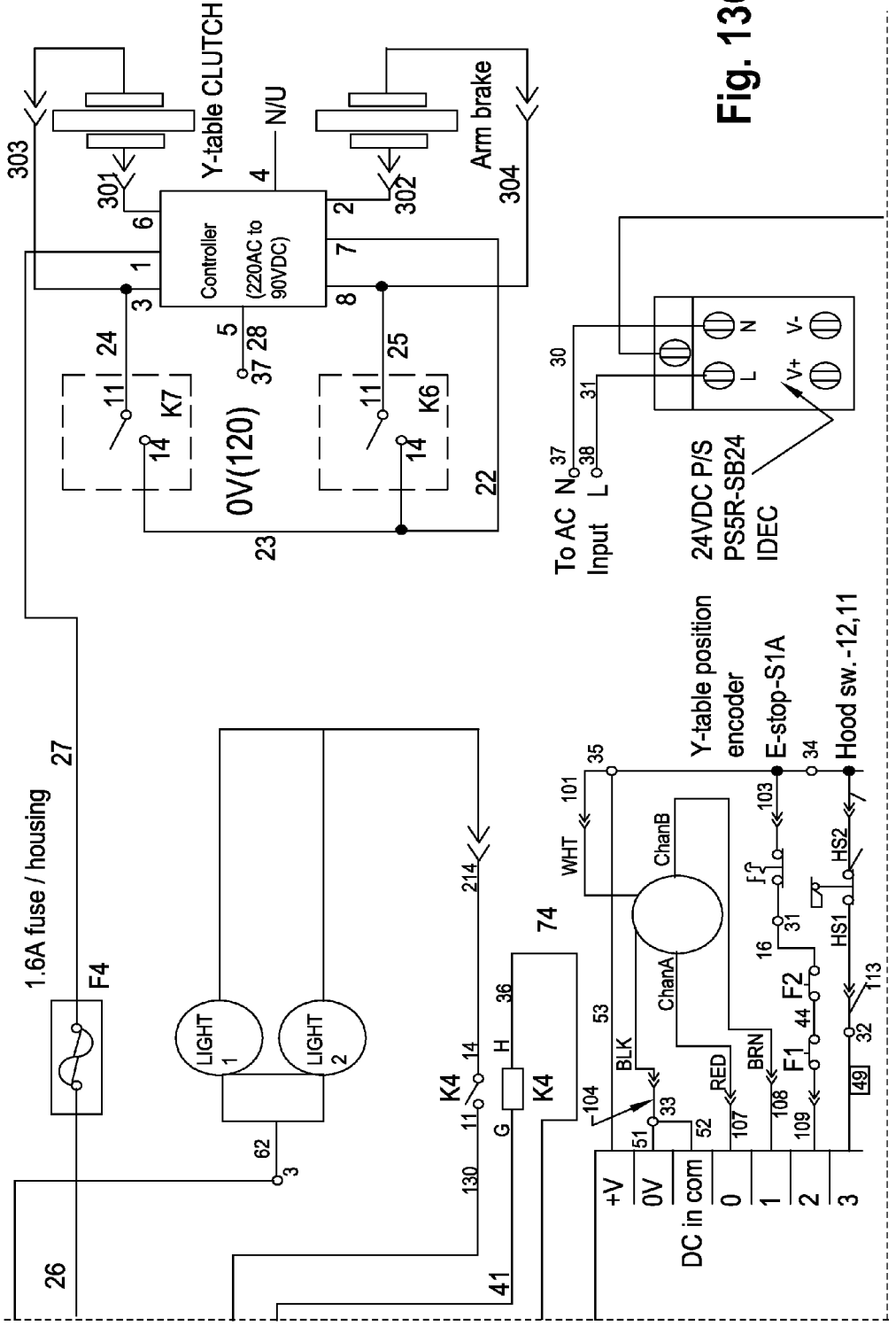

303
301
Y-table CLUTCH
4
N/U
302
Arm brake
304
Controller
(220AC to 90VDC)
6
1
3
2
7
8
5
37
28
24
25
11
K7
K6
14
0V(120)
23
22
30
31
To AC Input
N
L
37
38
24VDC P/S
PS5R-SB24
IDEC
V+
V-
1.6A fuse / housing
27
F4
LIGHT 1
LIGHT 2
62
3
214
74
K4
14
11
H
G
36
130
41
26
35
101
WHT
ChanB
ChanA
BLK
RED
BRN
53
104
33
51
52
107
108
109
103
F2
F1
16
31
44
HS2
HS1
34
Hood sw.-12,11
Y-table position encoder
E-stop-S1A
49
32
113
+V
0V
DC in com
0
1
2
3

Fig. 13C

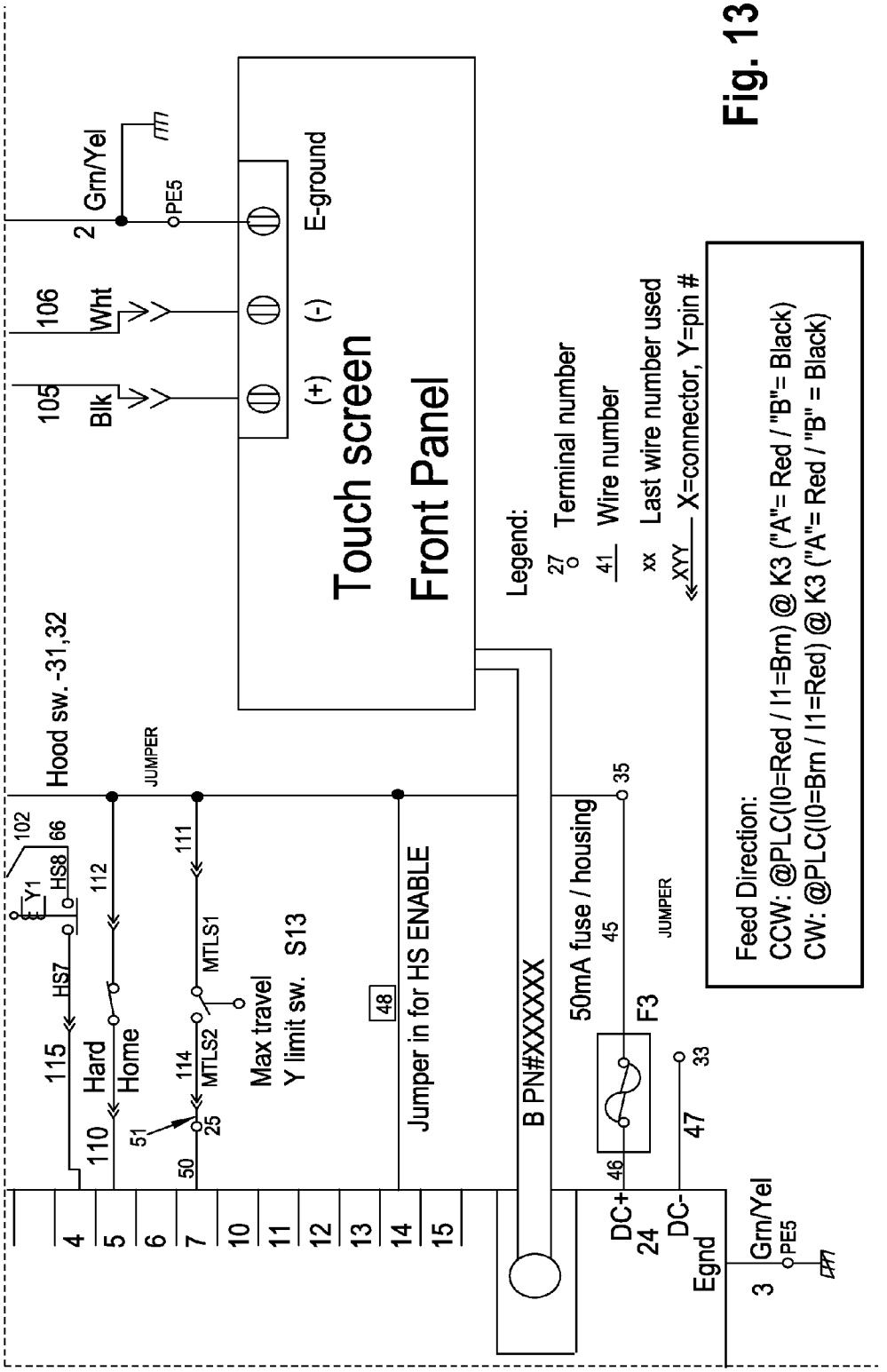

Touch screen
Front Panel
(+)
(-)
E-ground
105
Blk
106
Wht
2
Grn/Yel
PE5
Hood sw. -31,32
JUMPER
Y1
HS8
66
102
HS7
115
Hard
Home
112
110
51
MTLS2
114
25
50
MTLS1
111
Max travel
Y limit sw. S13
Jumper in for HS ENABLE
48
B PN#XXXXXX
50mA fuse / housing
45
35
F3
JUMPER
46
47
33
DC+
24
DC-
Egnd
3
Grn/Yel
PE5
4
5
6
7
10
11
12
13
14
15
Legend:
27 Terminal number
41 Wire number
xx Last wire number used
XYY X=connector, Y=pin #
Feed Direction:
CCW: @PLC(I0=Red / I1=Brn) @ K3 ("A"= Red / "B"= Black)
CW: @PLC(I0=Brn / I1=Red) @ K3 ("A"= Red / "B" = Black)

Fig. 13D

Fig. 14A

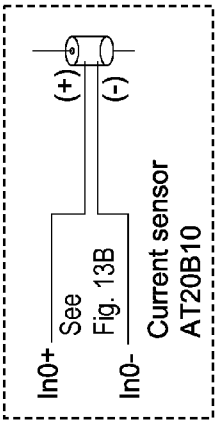


Fig. 14

IMPROVED ABRASIVE SAW

CROSS-REFERENCE TO RELATED APPLICATION DATA

[0001] This application is national phase of PCT/US2010/029619 filed Apr. 1, 2010, and claims the benefit of priority of Provisional U.S. Patent Application Ser. No. 61/174,560, filed May 1, 2009.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to an abrasive saw. More particularly, the present invention relates to an improved abrasive saw having novel blade and sample drive systems, improved working area/sample access, wear components, and sensor and control features.

[0003] Abrasive saws are used in various industries, but in particular are used in the rough or gross preparation of samples/specimens for examination. For example, specimens such as metals or aggregates (concrete) are often microscopically examined to determine grain structure, composition, failures and the like.

[0004] In preparing samples, the samples typically must be cut, polished and mounted for examination. The first part of that preparation process, the cutting, is carried out using a saw. Often, the saw is of the abrasive type (that is, it uses an abrasive wheel in lieu of a toothed blade) and is carried out in a wet process to lubricate, cool and flush the sample and abrasive wheel.

[0005] Known saws uses a wheel that is mounted to a pivoting arm that is pulled or urged downward into the sample to perform the cut. The sample is fixedly mounted and secured to a plate or bed of the saw. Among other things, this can result in too great of a force being exerted on the sample (and the blade) which can overheat the sample and blade. This can also result in excessive stress on the saw motor.

[0006] In known saws, if serial samples are required to be cut from the same specimen, the specimen must be unsecured (unclamped) from the bed, moved to a proper location beneath the saw blade, and resecured (reclamped) to the bed to carry out the next serial or sequential cut.

[0007] In addition, such known saws are often belt driven, but do not have ready means for adjusting the belt to assure proper tension for blade drive.

[0008] Accordingly, there is a need for an improved abrasive saw. Such a saw has novel wheel and samples drive systems to improve the mobility of the specimen on the saw bed and to assure good and smooth contact between the abrasive wheel and the sample. Desirably, such a saw also has improved working area/sample access, wear components, and sensor and control features.

SUMMARY OF THE INVENTION

[0009] An abrasive saw has a cutting wheel for cutting objects mounted thereto, The saw includes a base, a cutting assembly operably mounted to the base and a controller. The cutting assembly includes a pivot shaft, a drive shaft operably mounted to the pivot shaft, a drive, and a drive wheel. The drive is operably connected to the drive shaft and the drive shaft is operably connected to the drive wheel by a flexible drive element or belt to rotate the drive wheel. The drive wheel has the cutting wheel mounted thereto. The pivot shaft is pivotable to move the cutting wheel between a cutting position and a disengaged position.

[0010] The drive shaft has an axis of rotation and the drive wheel has an axis of rotation spaced a distance from the drive shaft axis of rotation. The flexible drive element spans the distance between the drive wheel axis of rotation and the drive shaft axis of rotation. The distance between the drive wheel axis of rotation and the drive shaft axis of rotation is variable to increase or decrease a tension in the drive belt.

[0011] In a present saw, the drive shaft is disposed within the pivot shaft and rotation of the pivot shaft varies the distance between the drive wheel axis of rotation and the drive shaft axis of rotation. The pivot shaft has a longitudinal axis and the distance between the pivot shaft longitudinal axis and the drive wheel axis of rotation is fixed. The drive shaft is eccentrically disposed within the pivot shaft. Varying the distance between the drive wheel axis of rotation and the drive shaft axis of rotation varies the tension in the belt.

[0012] In a present embodiment, the saw includes a feed table operably mounted to the base. A drive is operably connected to the feed table. The feed table is movable forward and rearward in a direction of rotation of the associated cutting wheel to move the object toward and away from the cutting wheel. The cutting wheel is lockable in the cutting position and the feed table, with the object secured thereto, is moved, manually or by operation of the controller, toward the cutting wheel to cut the object.

[0013] The saw includes a current sensor circuit that generates a signal to the controller and, upon sensing a predetermined current, the controller slows and/or stops the drive to slow and/or stop movement of the table toward the associated cutting wheel. The controller includes an input for inputting the speed of the table moving toward the associated cutting wheel.

[0014] The saw also includes a transverse drive to move the feed table transverse to the direction of rotation of the associated cutting wheel for serially cutting objects. The transverse drive is manually operated.

[0015] The saw includes an enclosure enclosing the cutting assembly. A present enclosure has a fully stationary side and an openable front and top panel. A portion of one of the side panels is movable and is operably connected to the front and top panels. The front and top panels are hingedly mounted to one another to open as a unitary assembly along with the portion of the side panel. The assembly is openable to provide access to the cutting assembly.

[0016] The enclosure includes at least one wear element disposed on the inside of the enclosure, aligned with the direction of rotation of the associated cutting wheel, to prevent erosion of the enclosure.

[0017] One or more interlocks prevent operation of the abrasive saw when the enclosure is open. A fluid feed is provided to feed fluid to a shroud covering the cutting wheel.

[0018] These and other features and advantages of the present invention will be apparent from the following detailed description, in conjunction with the appended claims.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0019] The benefits and advantages of the present invention will become more readily apparent to those of ordinary skill in the relevant art after reviewing the following detailed description and accompanying drawings, wherein:

[0020] FIG. **1** is a perspective front view of the improved abrasive saw embodying the present invention, the saw shown with the viewing hood removed for clarity of illustration;

[0021] FIG. **2** is a side view of the saw with a portion of the cover removed to show the drive system;

[0022] FIG. **3** is a perspective view of the saw wheel arm and drive components;

[0023] FIG. **4** is side view of the saw wheel arm showing the eccentric relationship between the drive shaft, pivot shaft and final drive wheel;

[0024] FIG. **5**A is an enlarged front view of the saw, showing the saw wheel arm in the engaged or cutting position;

[0025] FIG. **5**B is a view similar to that if FIG. **5**A with arm in the disengaged position;

[0026] FIG. **6** is a view looking into the drive region and showing the actuating handle and linkage for moving the saw wheel arm between the engaged and disengaged positions;

[0027] FIG. **7** is an enlarged view of the arm lock assembly;

[0028] FIG. **8** is a view looking transverse along the front of the saw illustrating the feed drive system;

[0029] FIG. **9** is a view looking into the saw front and showing the screw drive assembly for the table;

[0030] FIG. **10** is a perspective view of the viewing/protective hood in the open position;

[0031] FIG. **11** in an exploded view showing the pivot shaft, drive shaft and pivot arm linkage;

[0032] FIG. **12** is an exploded view of the X-drive;

[0033] FIGS. **13**A-D show an electrical line drawing for the saw;

[0034] FIG. **14** is a wiring diagram for the saw showing the current sensor; and

[0035] FIG. **14**A is an enlarged view of a part of FIG. **14**.

DETAILED DESCRIPTION OF THE INVENTION

[0036] While the present invention is susceptible of embodiment in various forms, there is shown in the drawings and will hereinafter be described a presently preferred embodiment with the understanding that the present disclosure is to be considered an exemplification of the invention and is not intended to limit the invention to the specific embodiment illustrated.

[0037] It should be further understood that the title of this section of this specification, namely, "Detailed Description Of The Invention", relates to a requirement of the United States Patent Office, and does not imply, nor should be inferred to limit the subject matter disclosed herein.

[0038] Referring now to the figures and in particular, to FIG. **1**, there is shown an improved abrasive saw **10** embodying the principles of the present invention. In this illustration, the saw is shown with the hood and abrasive wheel removed for clarity of illustration. The saw **10** includes, generally, a base **12**, a cutting region **14** with an abrasive wheel arm assembly **16** and a feed bed **18**, a drive region **20** and a control panel **22**.

[0039] The drive region **20** is shown in FIG. **2**. A wheel drive motor **24** (cutting wheel motor) is connected to a drive shaft **26** that is mounted within a pivot arm assembly **28**. A pair of toothed wheels **30**, **32** (one on the motor **24** and the other on the shaft **26**) and a toothed drive belt **34** permit the transfer of power from the motor **24** to the drive shaft **26**. A drive wheel **36** (also toothed) is mounted to the opposite end of the drive shaft **26**.

[0040] Referring also to FIGS. **2**-**4** and **6**, the drive shaft **26** is mounted within a pivot shaft **38**. The pivot shaft **38** is held within a set of bearings **40** to allow the shaft **38** to pivot (rotate) to move the saw wheel W between the disengaged and engaged (cutting) positions. A linkage **42** is used to move (pivot) the shaft **38**. An L-shaped arm **44** is mounted at about the heel **46** to pivot. A handle **48** is mounted to one leg **50** of the L-arm **44** and a link bar **52** is mounted to the other leg **54**. A lock or brake system **56** is mounted between the saw frame or base **12** and the handle leg **50** of the L-arm **44**. The brake **56** is used to lock the linkage **42** into any position once the brake **56** is engaged.

[0041] Mounted to the opposite end of the link bar **52** is a pivot shaft clamp **58**. The pivot shaft clamp **58** is secured to the pivot shaft **38** and provides the motive force and leverage to pivot the shaft **38** (as the handle **48** is pulled or pushed to engage or disengage the abrasive wheel W, respectively).

[0042] As seen in FIGS. **6** and **7**, the lock or brake system **56** includes a split sleeve **60** that is biased (as by a spring **62**) inward onto a shaft **64**. One end of the shaft **64** is mounted to the L-arm **44** and the other end is mounted in the split sleeve **60**. The sleeve **60** is operably mounted to the saw frame or base **12** as indicated at **66**. The lock **56** is configured so that when the sleeve **60** is urged opened, the shaft **64** slides or reciprocates within the sleeve **60** and when the sleeve **60** closes, the shaft **64** is secured in the sleeve **60** and prevented from reciprocating (moving). A trigger or grip **68** on the handle **48** is operably connected to the lock **56** to engage and disengage the lock **56**.

[0043] Referring to FIGS. **2**-**5**, as seen in the cutting region **14**, the drive wheel **36** is mounted to the end of the drive shaft **26**. A saw wheel arm **70** is mounted to the end of the pivot shaft **38**. A final drive toothed drive wheel **72** is mounted to an opposite end of the saw wheel arm **70** and a wheel drive belt **74** is positioned around the two drive wheels **36**, **72** to transfer power from the drive shaft **26** to the final drive wheel **72**. The abrasive wheel W (not shown) is mounted to the final drive wheel **72**. FIGS. **5**A and **5**B show the wheel shroud or cover **76** in place on the saw wheel arm **70**. A water nozzle **78** is shown on the shroud **76** to provide a water feed to the wheel W during the cutting operation. A water pump and motor (not shown) supply water to the water nozzle **78**.

[0044] The present saw **10** includes a novel arrangement for providing the proper tension in the wheel drive belt **74**. As can be seen in FIGS. **3**-**4** and **11** (as indicated at **80** in FIG. **4**) the drive shaft **26** is eccentrically set within the pivot shaft **38**. In this arrangement, the distance d_{74} from the center of the drive shaft C_{26} (the position of the center of the drive shaft **26** remains fixed) to periphery of the pivot shaft P_{38} varies depending upon where the eccentricity lies relative to the center C_{26} of the drive shaft **26**. In effect, the eccentrically mounted shafts **26**, **38** serve as a cam surface to increase or decrease the distance d_{74} between the center of the drive shaft C_{26} and the center of the final drive wheel C_{72}. This variation or change in distance serves to permit adjusting the tension in the wheel drive belt **74**.

[0045] The present saw **10** also includes a novel bed **18** and feed system **82** as seen in FIGS. **1** and **8**-**9**. It will be appreciated that the bed **18** is used to support specimens as they are cut. In a typical saw configuration, the bed is fixed and the saw is brought down (pivoted) into the specimen to carry out the cut. In the present saw **10**, in an auto-feed mode of operation (discussed in more detail below), the abrasive wheel W is locked in a cutting position, and the feed system **82** moves the bed **18** with the specimen mounted thereto into the wheel W.

[0046] The bed **18** is set on a set of bearings **84** to move toward and away from the wheel W, or into and out of the cutting zone. A screw drive **86** provides the motive force to move the bed **18**. This is referred to as a Y-drive (the y-direction of feeding into the wheel W). A worm gear (or screw) **88** is mounted to the saw frame **12** and a receiver gearbox **90** is mounted to the bed **18**. To permit manual movement or adjustment of the bed **18** position, a hand crank **92** is mounted

to the saw base **12** and is operably connected to the worm gear **88**. As will be discussed below, the saw **10** includes a motor and drive assembly **94** (wheels/gears **96** and belts **98**) for operation in the auto-feed mode.

[0047] The saw **10** also includes a transverse or X-drive **100** as seen in FIGS. **9** and **12** that moves the bed **18** (and the specimen) transverse to the direction of cutting (as indicated by the arrow at **102**). The X-drive assembly **100** includes a shaft **104** (that extends from the front of the saw **10**) having a bevel gear **106** mounted to an end thereof. A second bevel gear **108** transfers power to a worm gear **110** to which a gear box **112** (on the bed **18**) is meshed. A hand crank **114** on the front **115** of the saw **10** is used to drive or move the bed **18** in the transverse (X) direction. In this manner, sections of specimens can be serially or sequentially cut from a single sample. This eliminates the need to clamp a sample, cut the specimen, unclamp, move and re-clamp the sample, and cut the next specimen. This can be quite time consuming and labor intensive if a number of specimens are needed. The present X-drive **100** permits carrying out multiple cuts from a single clamping of the sample and also permits better and more precise control of the size of the specimen that is cut.

[0048] As seen in FIGS. **1**, **5**A and **9**, the present saw **10** includes one or more wear strips **116** mounted to the saw case **117**. The wear strips **116** are mounted in alignment with the cutting (saw) wheel W to prevent debris that is generated and ejected from the wheel W during the cutting operation from impinging on the case or housing **117**. The wear strips **116** are replaceable and in this manner the wear strip **116** serves as a sacrificial element to prevent excessive damage to or wear of the case **117**. In the present saw **10**, the wear strip **116** extends up the rear of the case **117** and along the bottom, where debris impingement would be most severe.

[0049] The viewing/protective hood **118** is shown in FIG. **10**. The hood **118** includes a front **120** wall having a viewing window **122** and a top wall **124**. The front and top walls **120**, **124** are hinged **126** to one another. One or more cylinders **128** extend between the hood **118** and the case **117** and are used to assist lifting and lowering, and to dampen movement of the hood **118**.

[0050] The hood **118** includes guide rollers **130***a,b* on the front wall **120** that engage tracks **132***a,b* in the front/side of the case **118**. One of the rollers **130***a* (on the left-hand side) also engages a track **134** along the top of the case **117**. The tracks **132***a,b* and **134** have a T-slot (not shown) formed in them to capture their respective rollers **130***a,b*. The rollers **130***a,b* are thus maintained or captured in the front/side tracks **132** to allow the front wall **120** and the top **124** to be rotated up and rearward. A recess **136** in the track **134** is positioned so that the roller guide **130***a* can reside in the recess **136** to maintain the hood **118** open for access to the cutting region **14**. An interlock system **138** (key **140** and receiver **142**) isolates power to the saw **10** when the key **140** is removed from the receiver **142**, that is, when the hood **118** is open. A portion **152** of the left side panel is configured to slide forward and rearward (as indicated by the arrow at **154**) along with the movement of the hood **118**. Roller **130***b*, which resides in track **132***b*, is, at it reaches the top of the track **132***b*, captured in a receiver **156** in the panel portion **152**. As the front wall **120** is moved rearward, the roller **130***b*, captured in the receiver **156**, moves the panel portion **152** rearward to provide increased access to the cutting region **14**. When the hood **118** is closed, the roller **130***b* (in the receiver **156**) moves the panel portion **152** forward to close the panel portion **152**.

[0051] The saw **10** includes a control system **144** having a touch-pad control panel **22**. The control system **144** is microprocessor based and includes a standard (e.g., USB) slot (as at **146**) so that new/modified control schemes can be readily installed in the system **144**. The touch-pad control panel **22** is configured so that only icons that are needed for any particular mode of operation are displayed. It will be appreciated that any number of different types of control systems **144**, panels **22**, and the like can be used.

[0052] Those skilled in the art will recognize the need to monitor the power that is drawn by the saw **10** (specifically, the wheel motor **24**) as one indication of the strain on the motor **24**. The present saw **10** includes a powerless or self-powered sensor **148** for monitoring the current drawn by the motor **24**. The sensor **148** includes a circuit **150** to convert the current drawn (e.g., 0 to 15 A) to a corresponding voltage (e.g. 0-10V) and provides indication of the current. The current drawn by the wheel drive motor **24** is an indicator of whether the wheel W is being too quickly brought into contact with the specimen.

[0053] In auto-feed mode, the feed rate of the specimen is programmed into the controller, **144**, as is the length or distance of the cut. In a preferred embodiment, then the sensor **148** senses that the current drawn by the motor **24** is greater than a predetermined level, the table motor **94** is slowed or stopped to prevent damage to the motor **94** or wheel W.

[0054] As set forth above, the saw **10** can be operated in manual mode. The specimen is clamped to the bed **18** and the specimen position is adjusted (using the hand cranks to adjust the X and Y directions). Similar to known saws, the wheel W is manually brought down into contact with the specimen by pulling the handle **48** downward. Moving (pivoting) the handle **48** upward disengages the wheel W from the specimen. The hood **118** can then be opened and the specimen removed.

[0055] In an auto-feed mode, the specimen is clamped to the bed **18** with the bed in a home position, and the wheel W is pulled downward so that the periphery of the wheel extends below the bed **18** top surface. The lock or brake **56** to maintain the wheel W in this (cutting) position. The saw **10** is set in auto-feed mode by setting the feed rate of the specimen on the control panel **22**. The brake **56** prevents the wheel W from "jumping" upward when the specimen contacts the wheel W. The bed **18** then moves from the home position toward the wheel W to feed the specimen into the wheel W. If during cutting the current drawn by the motor **24** is too high, the bed **18** can slow and/or stop (by automatic/controlled operation of the motor and drive assembly **94**) to protect the abrasive wheel W and/or motor **24**. When the cut is complete, the bed **18** automatically returns to the home position. If the specimen is to be cut serially, the X-drive **100** can be actuated and the specimen repositioned (transversely). The auto-feed sequence can then be reinitiated to perform the next sequential cut.

[0056] All patents referred to herein, are hereby incorporated herein by reference, whether or not specifically done so within the text of this disclosure.

[0057] In the present disclosure, the words "a" or "an" are to be taken to include both the singular and the plural. Conversely, any reference to plural items shall, where appropriate, include the singular.

[0058] From the foregoing it will be observed that numerous modifications and variations can be effectuated without departing from the true spirit and scope of the novel concepts of the present invention. It is to be understood that no limitation with respect to the specific embodiments illustrated is

intended or should be inferred. The disclosure is intended to cover all such modifications as fall within the scope of the invention.

What is claimed is:

1. An abrasive saw having an associated cutting wheel for cutting objects mounted thereto, comprising:

a base; and

a cutting assembly operably mounted to the base, the cutting assembly including a pivot shaft, a drive shaft operably mounted to the pivot shaft, a drive, and a drive wheel, the drive being operably connected to the drive shaft, the drive shaft being operably connected to the drive wheel by a flexible drive element to rotate the drive wheel, the drive wheel having the associated cutting wheel mounted thereto, the pivot shaft being pivotable to move the associated cutting wheel between a cutting position and a disengaged position,

wherein the drive shaft has an axis of rotation and the drive wheel has an axis of rotation spaced a distance from the drive shaft axis of rotation, and wherein the flexible drive element spans the distance between the drive wheel axis of rotation and the drive shaft axis of rotation, and wherein the distance between the drive wheel axis of rotation and the drive shaft axis of rotation is variable to increase or decrease a tension in the flexible drive element.

2. The abrasive saw in accordance with claim **1** wherein the drive shaft is disposed within the pivot shaft and wherein rotation of the pivot shaft varies the distance between the drive wheel axis of rotation and the drive shaft axis of rotation.

3. The abrasive saw in accordance with claim **2** wherein the pivot shaft has a longitudinal axis and wherein a distance between the pivot shaft longitudinal axis and the drive wheel axis of rotation is fixed.

4. The abrasive saw in accordance with claim **3** wherein the drive shaft is eccentrically disposed within the pivot shaft.

5. The abrasive saw in accordance with claim **1** wherein the flexible drive element is a drive belt, and wherein varying the distance between the drive wheel axis of rotation and the drive shaft axis of rotation varies the tension in the belt.

6. The abrasive saw in accordance with claim **5** wherein the drive belt is a toothed belt and wherein a toothed wheel is mounted to the drive shaft and the drive wheel is a toothed wheel.

7. An abrasive saw having an associated cutting wheel for cutting objects mounted thereto, comprising:

a base;

a cutting assembly operably mounted to the base, the cutting assembly including a pivot shaft, a drive shaft operably mounted to the pivot shaft, a drive, and a drive wheel, the drive being operably connected to the drive shaft and the drive wheel to rotate the drive wheel, the drive wheel having the associated cutting wheel mounted thereto, the pivot shaft being pivotable to move the associated cutting wheel between a cutting position and a disengaged position, the cutting assembly including a lock to lock the associated cutting wheel in the cutting position;

a feed table operably mounted to the base, the feed table movable forward and rearward in a direction of rotation of the associated cutting wheel; and

a controller,

wherein the associated cutting wheel is lockable in the cutting position and the feed table, with the object secured thereto, is moved toward the associated cutting wheel to cut the object.

8. The abrasive saw in accordance with claim **7** including a drive for moving the feed table.

9. The abrasive saw in accordance with claim **8** wherein the drive is a manually operated drive.

10. The abrasive saw in accordance with claim **8** wherein the drive is a motor.

11. The abrasive saw in accordance with claim **10** wherein the controller controls the drive to move the table toward the associated cutting wheel.

12. The abrasive saw in accordance with claim **11** including a current sensor circuit, and wherein the current sensor circuit generates a signal to the controller and, upon sensing a predetermined current, the controller slows and/or stops the drive to slow and/or stop movement of the table toward the associated cutting wheel.

13. The abrasive saw in accordance with claim **11** wherein the controller includes an input for inputting the speed of the table moving toward the associated cutting wheel.

14. The abrasive saw in accordance with claim **7** including a transverse drive to move the feed table transverse to the direction of rotation of the associated cutting wheel.

15. An abrasive saw having an associated cutting wheel for cutting objects mounted thereto, comprising:

a base;

a cutting assembly operably mounted to the base, the cutting assembly configured to move the associated cutting wheel between a cutting position and a disengaged position, the cutting assembly including a lock to lock the associated cutting wheel in the cutting position;

a feed table operably mounted to the base, the feed table movable forward and rearward in a direction of rotation of the associated cutting wheel; and

an enclosure enclosing the cutting assembly, the enclosure having at least one stationary side and an openable front panel and top panel, the front panel and the top panel being hingedly mounted to one another to open as a unitary assembly, the assembly openable to provide access to the cutting assembly.

16. The abrasive saw in accordance with claim **15** including at least one wear element disposed on the enclosure aligned with the direction of rotation of the associated cutting wheel.

17. The abrasive saw in accordance with claim **15** including a controller and at least one interlock, wherein when the interlock is open, the controller prevents operation of the abrasive saw.

18. The abrasive saw in accordance with claim **17** wherein the at least one interlock is located on the enclosure.

19. The abrasive saw in accordance with claim **15** including a fluid feed to feed fluid to a shroud covering the associated cutting wheel.

20. The abrasive saw in accordance with claim **15** wherein a portion of a side panel is operably connected to the front panel and the top panel to open therewith as a unitary assembly.

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