United States Patent

Brown, Jr. et al.

[15] **3,682,209**

[45] **Aug. 8, 1972**

[54] VERTICAL DROP TRIMMER SAWS

[72] Inventors: **William E. Brown, Jr.**, Waynesboro, Pa.; **William C. Dufton**, Hagerstown, Md.

[73] Assignee: **Frick Company**, Waynesboro, Pa.

[22] Filed: **Sept. 14, 1970**

[21] Appl. No.: **71,650**

[52] **U.S. Cl.** .....**143/41 C**, 83/433, 143/41 R, 143/49 G

[51] **Int. Cl.** **B27b 5/02**

[58] **Field of Search**.....143/41 R, 41 B, 41 C, 46 E, 143/46 F, 49 R, 49 G; 83/433, 481, 482, 563

[56] **References Cited**

UNITED STATES PATENTS

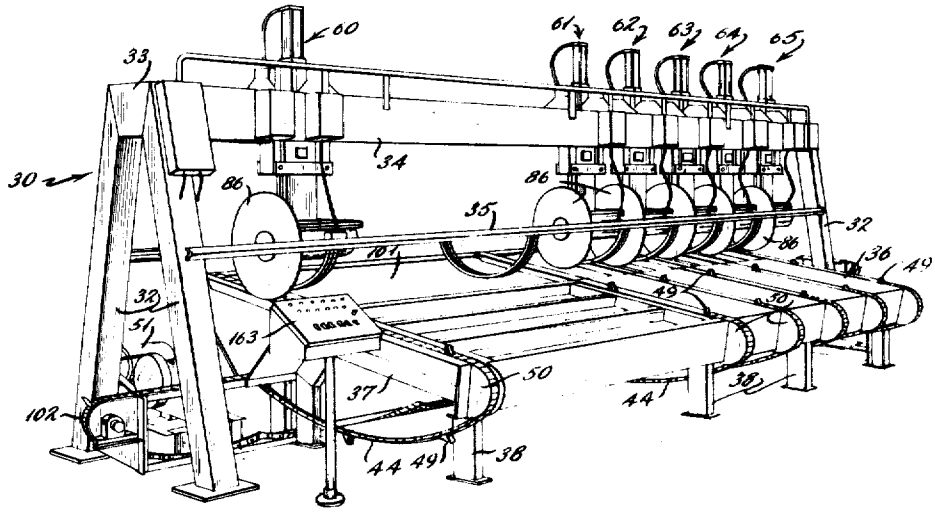
2,714,407	8/1955	Pearson	143/41 B
1,894,415	1/1933	Onstad	143/41 B
1,236,228	8/1917	St. Louis et al.	143/41 R
2,091,647	8/1937	Nicholson	143/41 B
1,062,175	5/1913	Marten et al.	143/49 F
1,977,971	10/1934	Payzant et al.	143/49 R
378,796	2/1888	Linderman	143/49 R

Primary Examiner—Andrew R. Juhasz
Assistant Examiner—James F. Coan
Attorney—A. Yates Dowell and A. Yates Dowell, Jr.

[57] **ABSTRACT**

A trimmer saw apparatus having a plurality of independently operable saws mounted on a frame for generally vertical movement and being selectively operable either automatically or manually. The trimmer saws usually are spaced 2 feet apart but can be adapted to cut lumber to standard or non-standard lengths.

14 Claims, 22 Drawing Figures

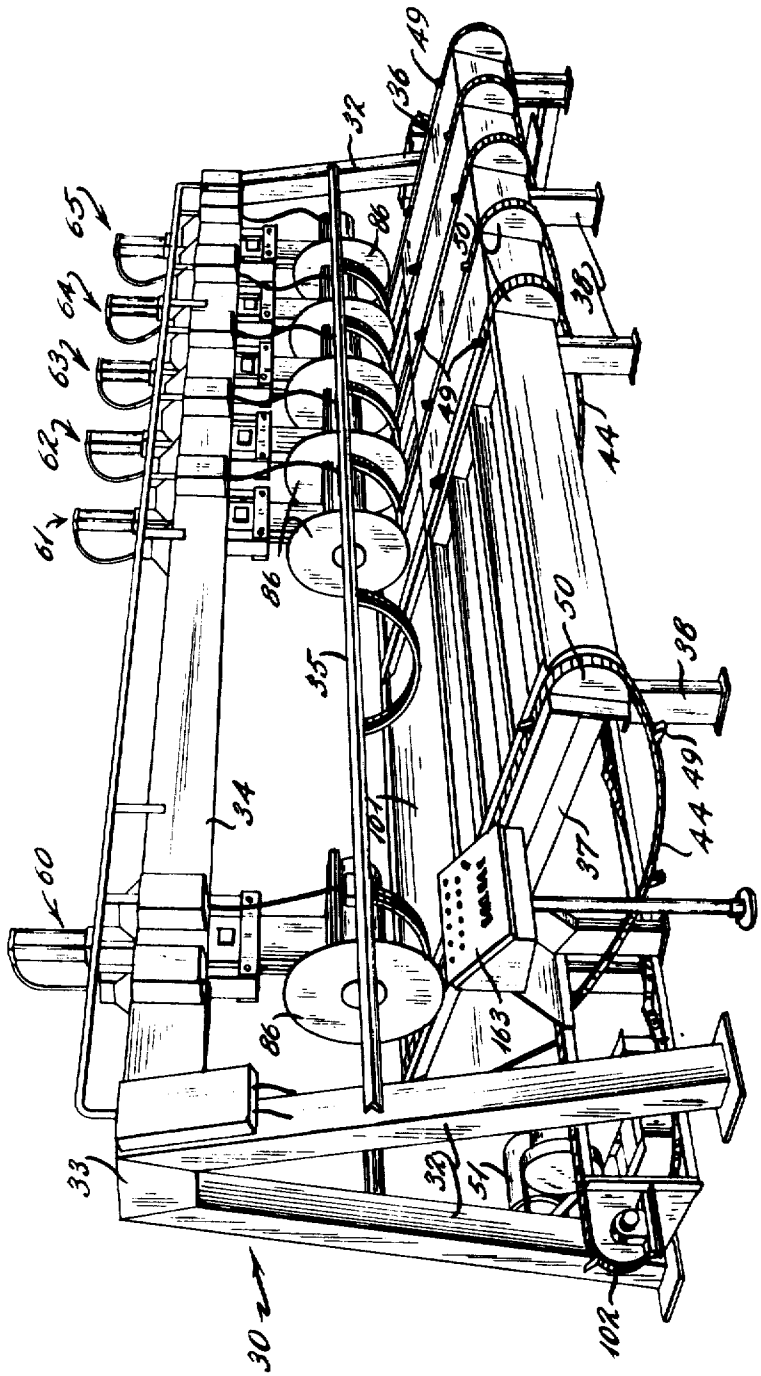


PATENTED AUG 8 1972

3,682,209

SHEET 01 OF 10

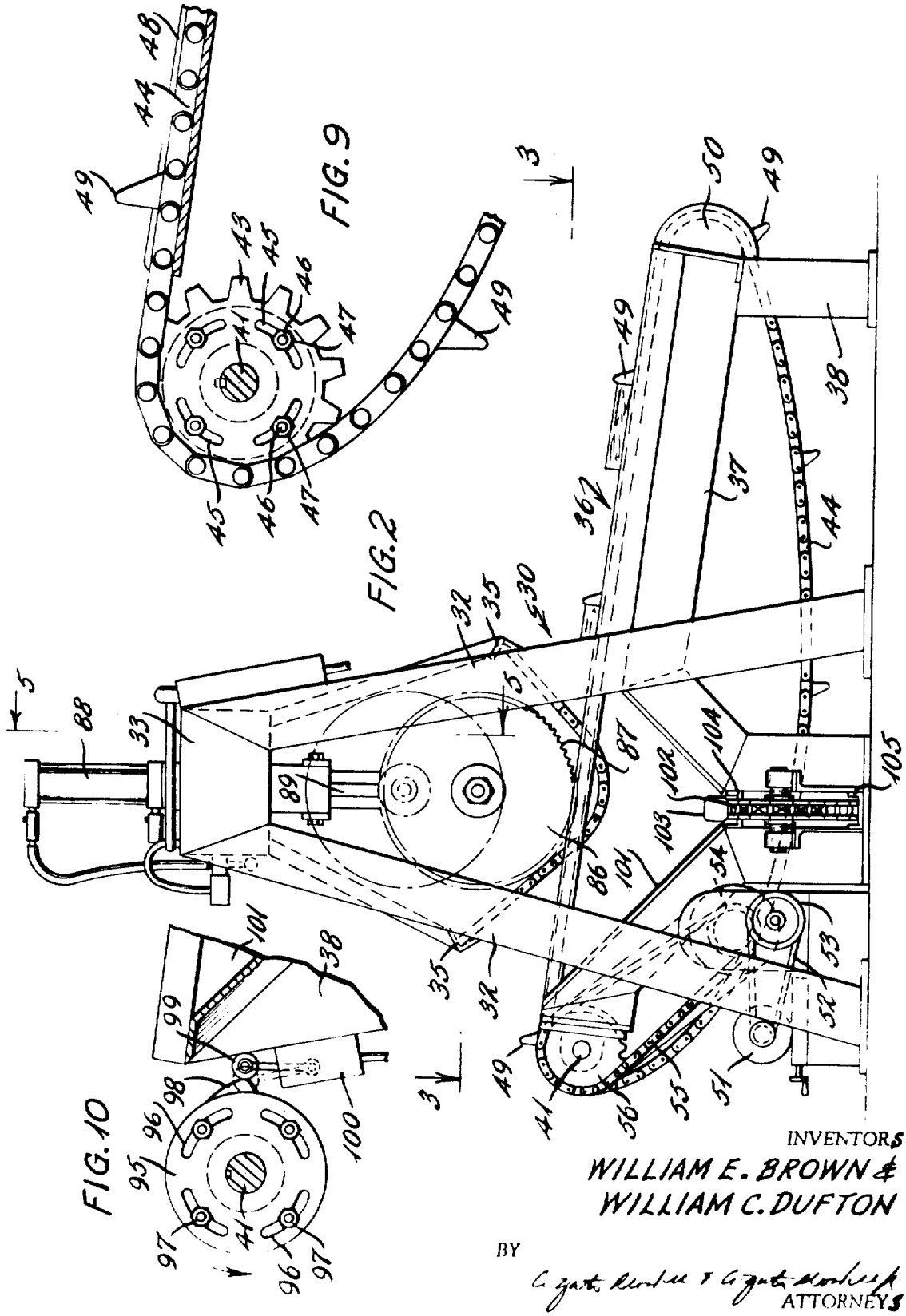
FIG. 1



INVENTORS
WILLIAM E. BROWN
WILLIAM C. DUFTON

BY

ATTORNEYS

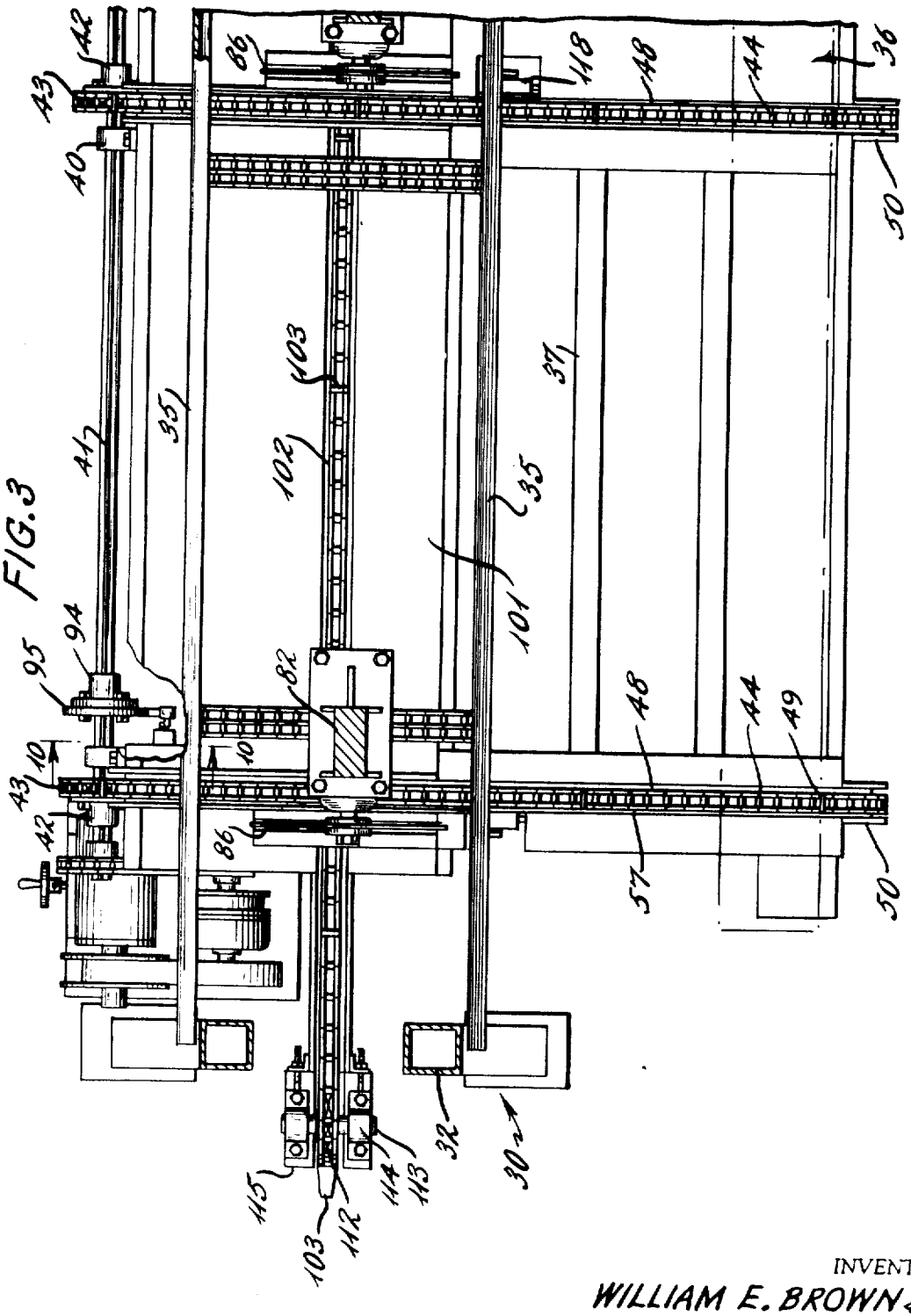


INVENTORS
WILLIAM E. BROWN &
WILLIAM C. DUFTON

BY

ATTORNEYS

FIG. 3



INVENTORS
WILLIAM E. BROWN &
WILLIAM C. DUFTON

BY

ATTORNEYS

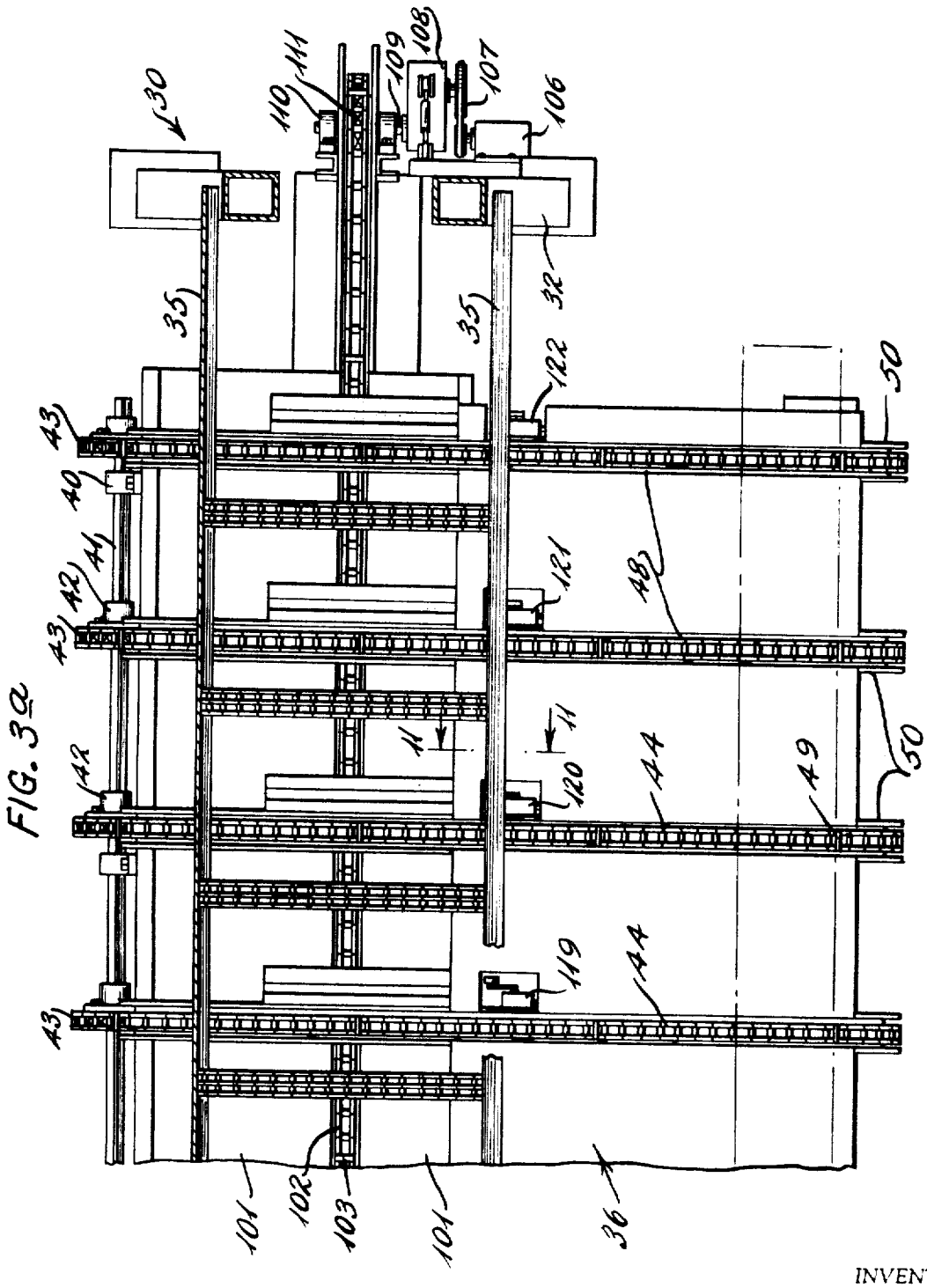


FIG. 3a

INVENTORS
WILLIAM E. BROWN &
WILLIAM C. DUFTON

BY

ATTORNEYS

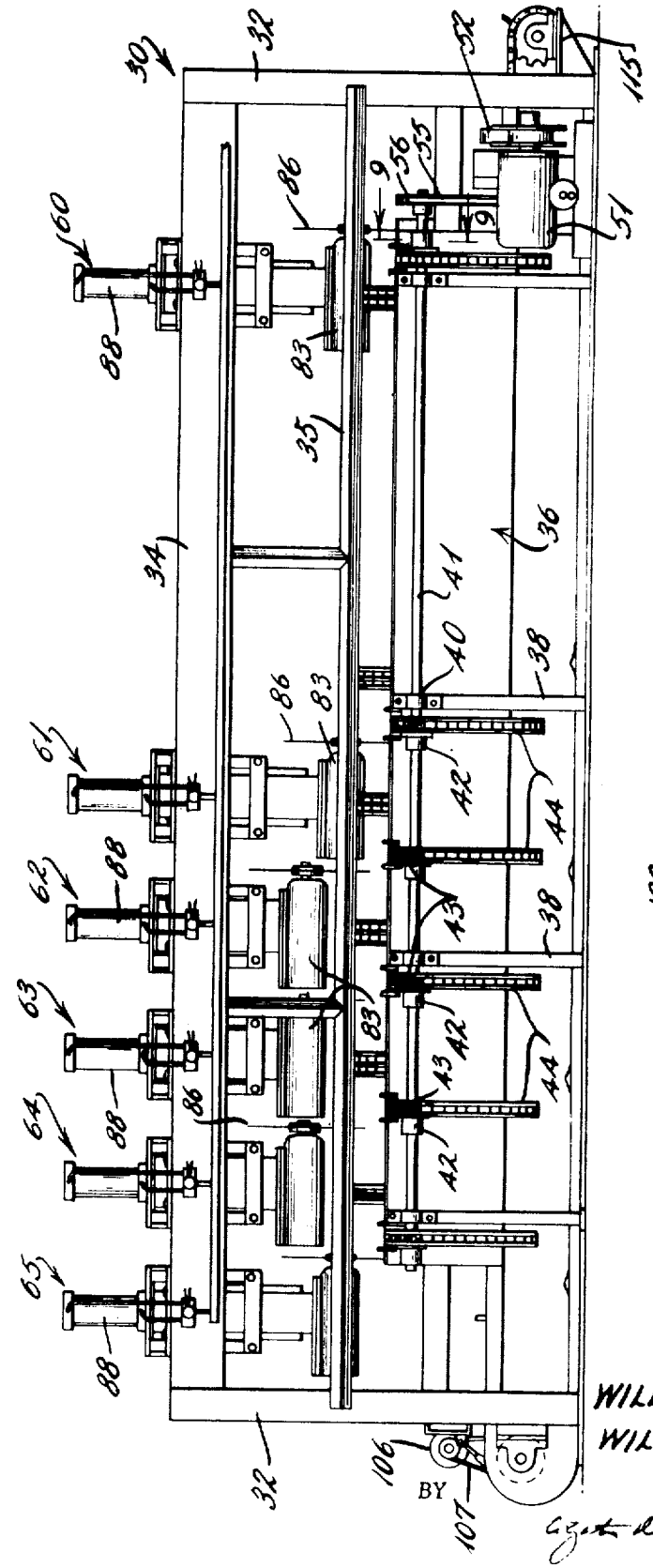


FIG. 4

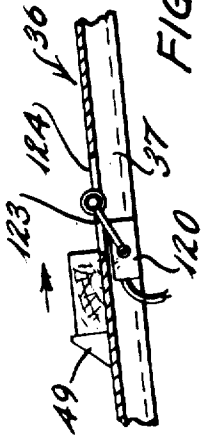


FIG. 11

INVENTORS
WILLIAM E. BROWN
WILLIAM C. DUFTON

BY

ATTORNEYS

FIG. 5

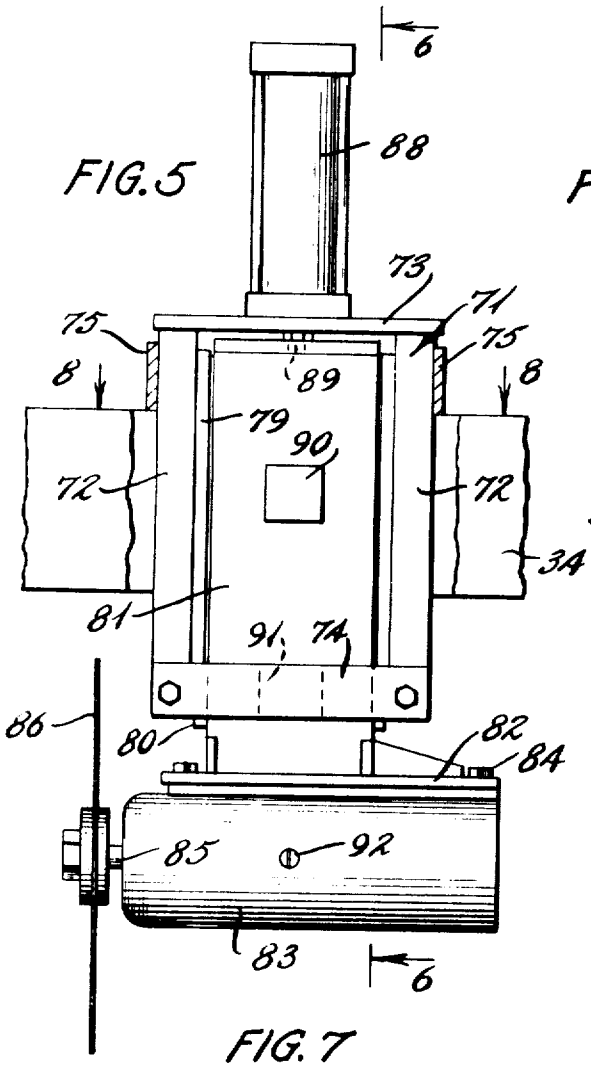


FIG. 6

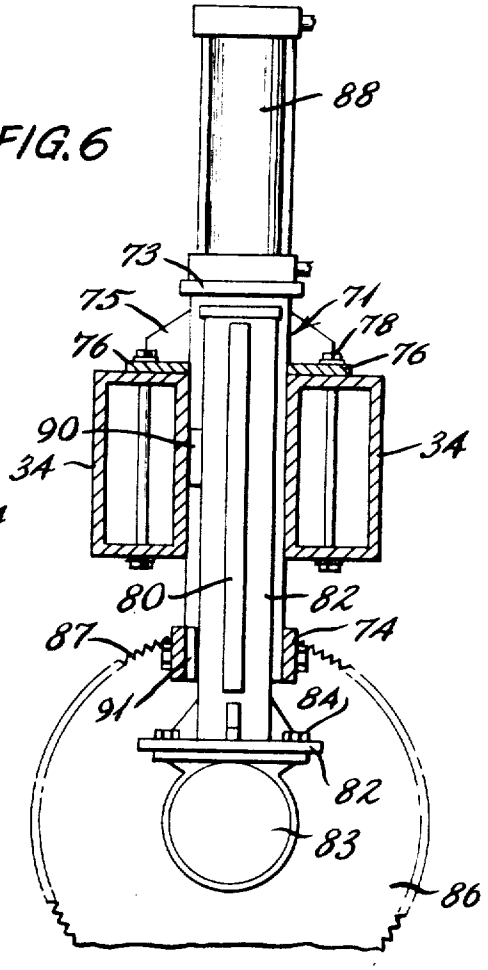


FIG. 7

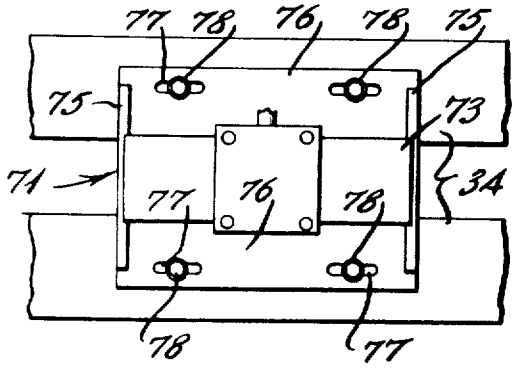
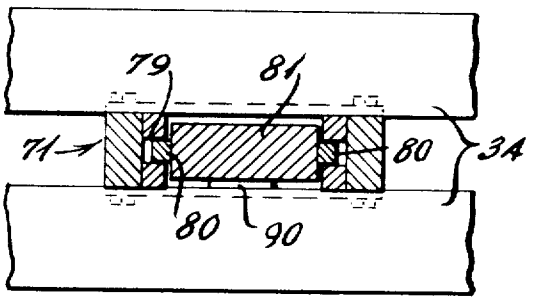


FIG. 8



INVENTORS
WILLIAM E. BROWN &
WILLIAM C. DUFTON

BY

ATTORNEYS

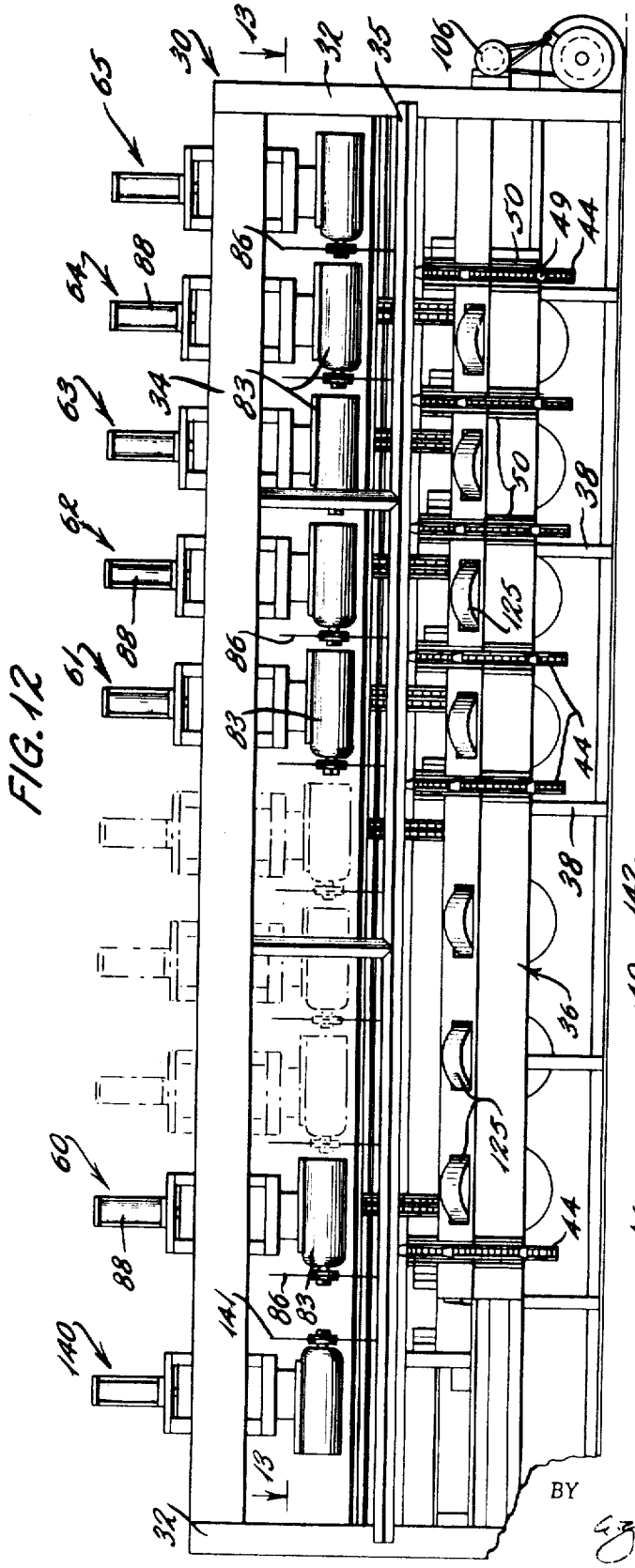


FIG. 12

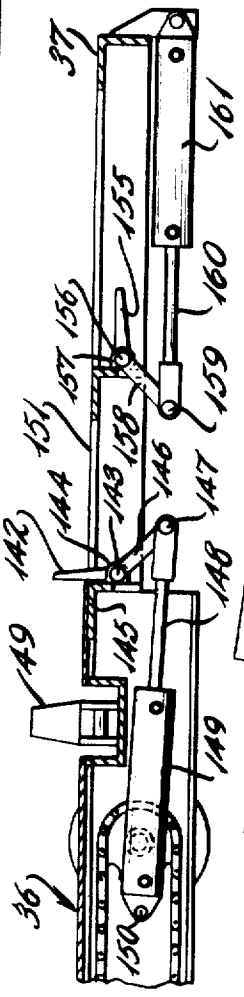


FIG. 14

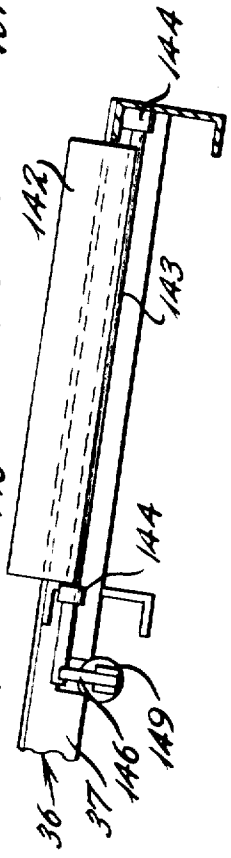


FIG. 15

INVENTORS
WILLIAM E. BROWN &
WILLIAM C. DUFTON

BY

ATTORNEYS

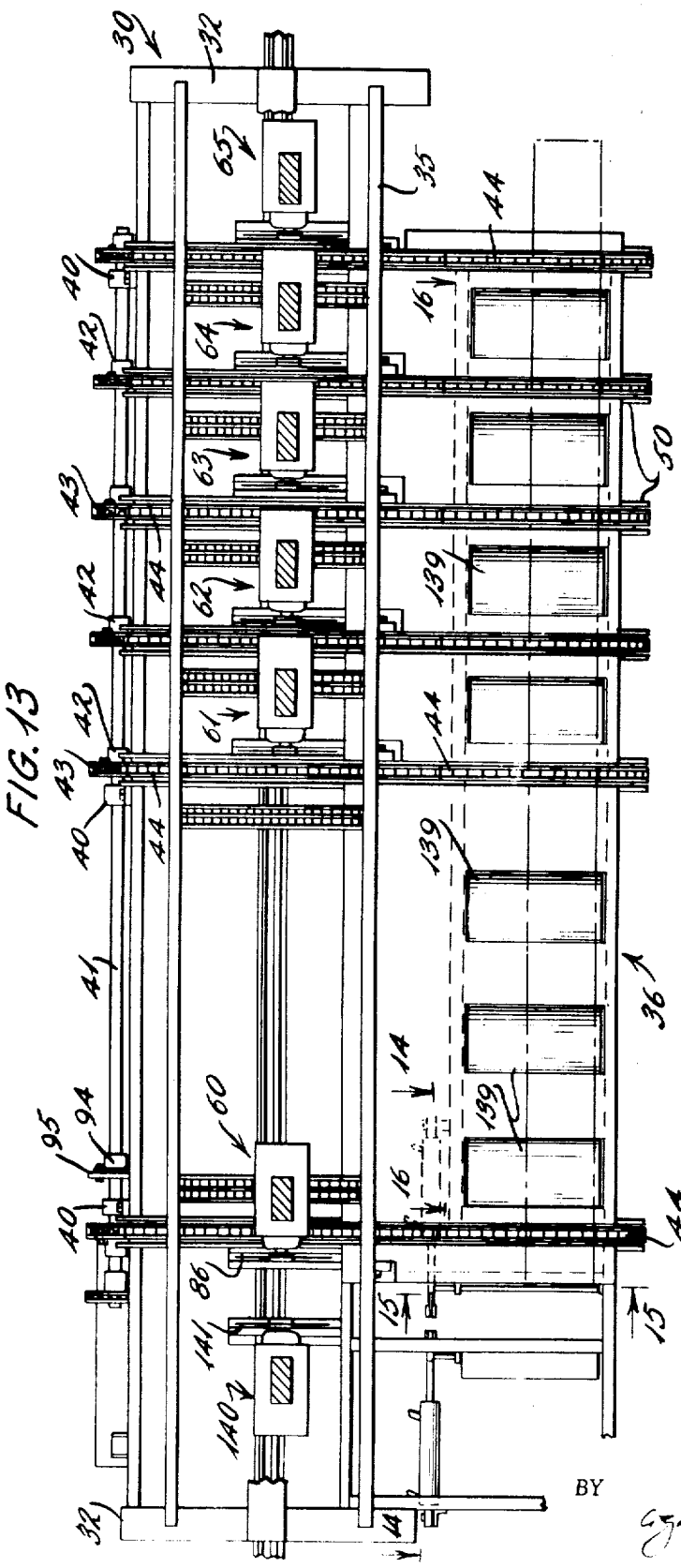


FIG. 13

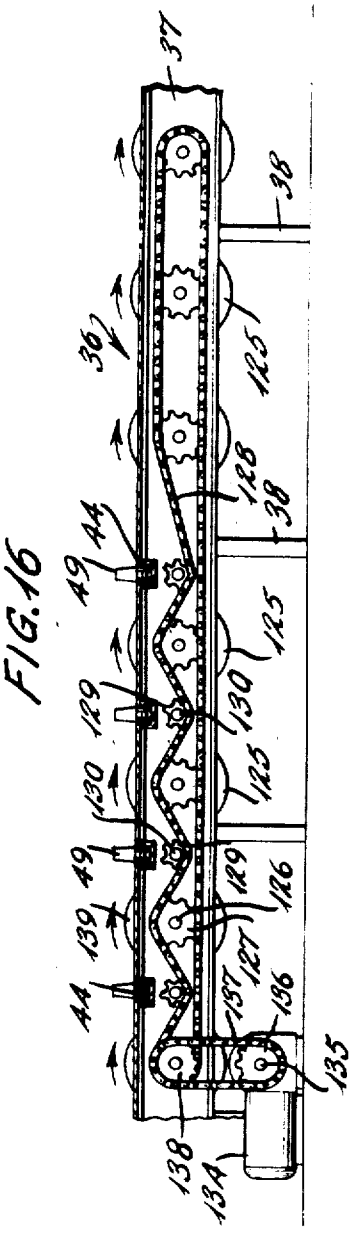


FIG. 16

INVENTORS
WILLIAM E. BROWN &
WILLIAM C. DUFTON

BY

ATTORNEYS

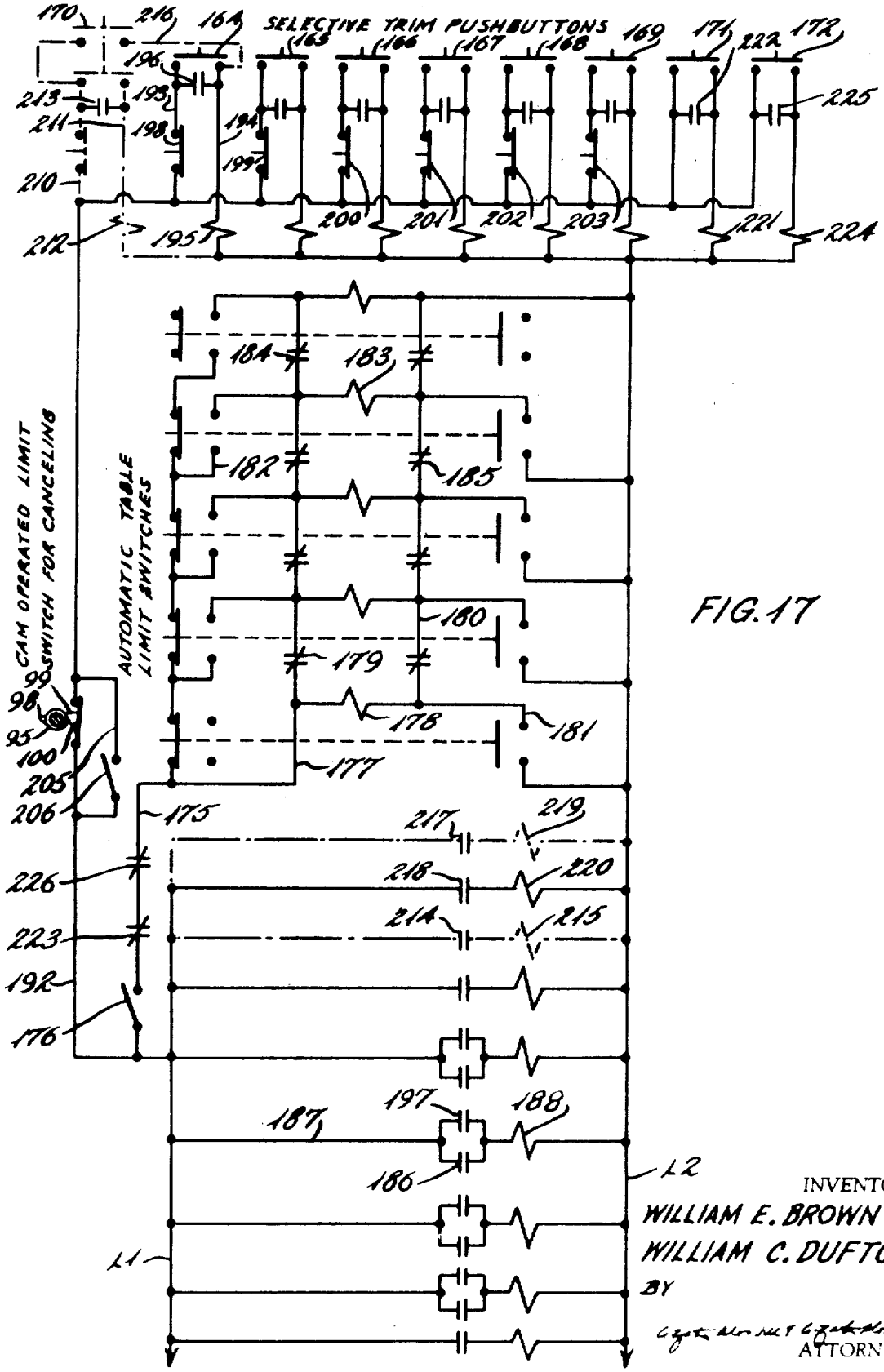
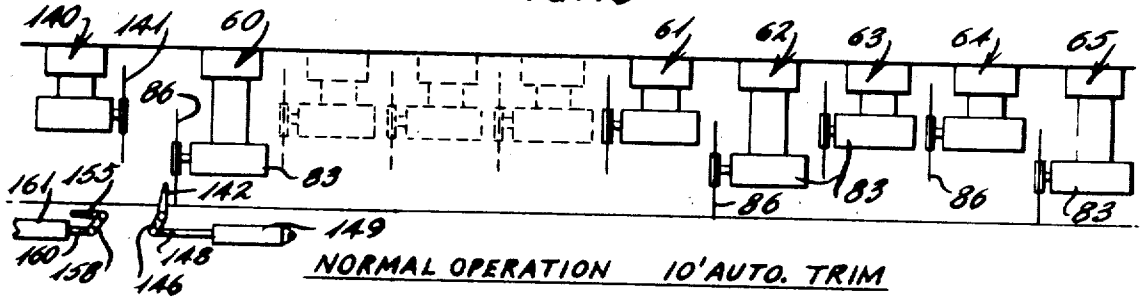


FIG. 17

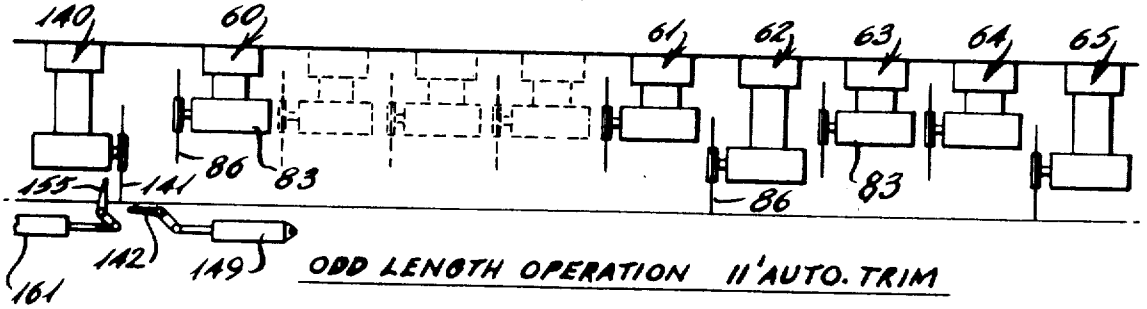
INVENTORS
WILLIAM E. BROWN &
WILLIAM C. DUFTON
BY
ATTORNEYS

FIG. 18



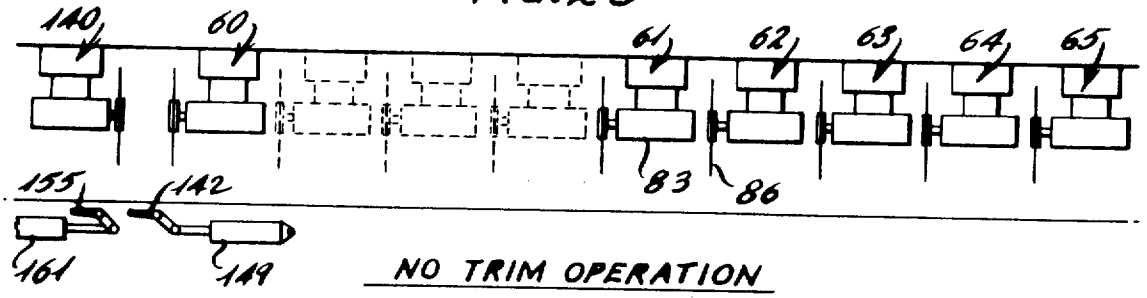
NORMAL OPERATION 10' AUTO. TRIM

FIG. 19



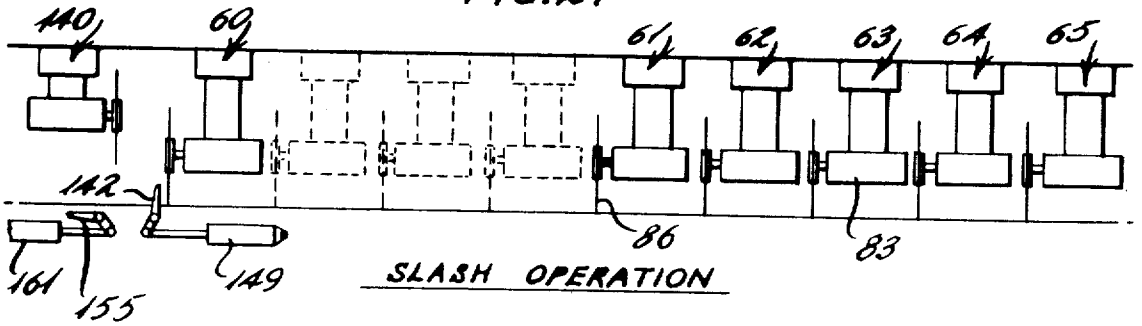
ODD LENGTH OPERATION 11' AUTO. TRIM

FIG. 20



NO TRIM OPERATION

FIG. 21



SLASH OPERATION

INVENTORS
WILLIAM E. BROWN &
WILLIAM C. DUFTON

BY
ATTORNEYS

VERTICAL DROP TRIMMER SAWS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to sawing equipment of various kinds and relates particularly to trimmer saw apparatus mounted on a frame for generally vertical movement. The saws are controlled either automatically or manually to cut lumber or other material in predetermined lengths and normally trim the lumber in 8, 10, 12, 14 and 16 foot lengths, although provision has been made to trim the lumber in 9, 11, 13, 15 and 17 foot lengths.

2. Description of the Prior Art

Heretofore many efforts have been made to provide trimmer saws having a plurality of spaced cutting blades which were independently operable so that boards could be trimmed to predetermined lengths. Most of these prior art structures have included saw blades mounted on a pivoted arm and having means for swinging the arm and saw blade about the pivot to interpose the blade in the path of movement of lumber along the saw bed. These pivotally mounted arm structures have not been satisfactory due to the pivoting action of the arms which has caused a substantial amount of saw chatter and has affected both the straightness and the width of the saw cut. Most of these prior art structures have been limited to conventional lengths of lumber, such as 8, 10, 12, 14 and 16 feet with no provision being made for boards of odd lengths. Most of these structures have required two or more operators for positioning the boards or other pieces of lumber on the conveyors and for selectively operating the mechanisms by which the saw blades are moved into operative and inoperative positions. Also these prior art devices have been expensive to manufacture and maintain and have been difficult to retain in alignment to provide a true trimming cut.

SUMMARY OF THE INVENTION AND OBJECTS

The present invention is an apparatus having a plurality of trimmer saws each of which is moved into and out of cutting position in a generally vertical plane by fluid under pressure and the position of such saws can be controlled either manually or automatically. Apparatus is provided for trimming the boards or other lumber in standard lengths of 8, 10, 12, 14 and 16 feet, as well as for trimming boards in odd lengths of 9, 11, 13, 15 and 17 feet. Also means is provided so that random length boards will be automatically cut to the longest available standard length. A control console or panel is provided having a plurality of switches each of which controls the position of an independent saw so that the sawyer can operate a plurality of saws to selectively cut a board to a desired length or to remove one or more sections of a board having defects therein.

It is an object of the invention to provide a trimmer saw assembly including a plurality of independently operable saws which can be selectively moved into and out of cutting position along guides disposed in a substantially vertical plane for cutting lumber into standard lengths or for cutting lumber in odd lengths with the position of the saws being controlled either manually or automatically.

Another object of the invention is to provide a trimmer saw assembly which can be operated to trim lumber to certain predetermined lengths and which will automatically trim the lumber to the longest standard length if the lumber is not long enough to reach the predetermined saw.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front perspective view illustrating a vertical drop trimmer saw machine constructed in accordance with the present invention.

FIG. 2 is an enlarged side elevation thereof.

FIGS. 3 and 3a are sections on the line 3—3 of FIG. 2.

FIG. 4 is a rear elevation.

FIG. 5 is an enlarged section on the line 5—5 of FIG. 2.

FIG. 6 is a section on the line 6—6 of FIG. 5.

FIG. 7 is a top plan view of the structure of FIG. 5.

FIG. 8 is a section on the line 8—8 of FIG. 5.

FIG. 9 is an enlarged fragmentary detail section on the line 9—9 of FIG. 4.

FIG. 10 is an enlarged fragmentary detail section on the line 10—10 of FIG. 3.

FIG. 11 is an enlarged fragmentary detail section on the line 11—11 of FIG. 3*a*.

FIG. 12 is a front elevation illustrating a modified form of the invention.

FIG. 13 is a section on the line 13—13 of FIG. 12.

FIG. 14 is an enlarged fragmentary detail section on the line 14—14 of FIG. 13.

FIG. 15 is an enlarged fragmentary detail section on the line 15—15 of FIG. 13.

FIG. 16 is a section on the line 16—16 of FIG. 13.

FIG. 17 is an electrical wiring diagram.

FIGS. 18 through 21 are schematic views illustrating different positions of the saws under different operating conditions.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With continued reference to the drawings, a frame 30 is provided having a pair of generally upright side members 32 which converge at their upper ends and are connected together by an intermediate portion 33. The side members 32 on opposite sides of the machine are connected by a pair of spaced generally parallel crossheads 34 and if desired such side members can be connected by braces 35.

A saw bed or table 36 is located between the side members 32 and below the crossheads 34 and such table includes a frame 37 mounted on a plurality of upright posts 38. The table frame 37 is inclined upwardly from front to rear of the machine. At the rear of the frame 37 a plurality of pillow blocks 40 are provided in which a shaft 41 is rotatably mounted.

In order to move boards or lumber to be trimmed along the table 36, a plurality of hubs 42 are keyed or otherwise fixed to the shaft 41 and each of such hubs is adjustably connected to a sprocket 43 which engages and drives a chain conveyor 44. As illustrated in FIG. 9, the sprocket 43 is adjustably mounted on the hubs 42 by means of a plurality of slots 45 extending through the sprocket and adapted to receive bolts or studs 46 fixed to the hubs 42, nuts 47 being provided to clamp each sprocket to its associated hub in adjusted position. The table 36 is provided with a recessed channel 48 for

each of the chain conveyors **44** and such channels are recessed a distance such that the top of the chain is even with or below the upper surface of the bed. Each of the chains has a plurality of equally spaced upstanding lugs **49** which project upwardly above the surface of the table and engage one edge of a board or other piece of lumber to move such board across the table. A guideway or channel **50** is mounted on the front of the table frame **39** to guide the chain conveyors into the recessed channels **48**. If desired the guideways **50** could be replaced by idler sprockets.

In order to rotate the shaft **41** and drive the chain conveyors, a power plant **51**, which could be an electric motor, internal combustion engine or fluid motor, is provided and such power plant is drivingly connected by a belt, pulley, chain or the like **52** to a transmission **53** which may have either a fixed or variable output. The transmission **53** has a drive wheel **54** connected by a belt, chain or the like to a driven wheel **56** fixed to the shaft **41**.

Lumber which has been cut to a predetermined width and thickness is placed one board at a time on the table **36** either manually or by means of an automatic unscrambler and such lumber is moved by the chain conveyors up the incline of the table **36**.

In the modification shown in FIGS. **1–11**, the boards are moved lengthwise toward one end of the table until such boards abut a bumper **57** and such bumper functions as a base reference point.

In order to trim the ends of the board so that they are square and the length of the board is a predetermined distance, a plurality of circular saws **60, 61, 62, 63, 64** and **65** are mounted on the crossheads **37** in a manner to be extended and retracted into and out of position for sawing the boards as the chain conveyors **44** move the boards across the table **36**. As illustrated, the base or "zero" saw **60** is located adjacent to one end of the crossheads **34** and the saw assemblies **61–65** are located along the length of the crossheads at spaced intervals. Normally the spacings between the base saw assembly **60** and the saw assemblies **61–65** are standard distances of 8, 10, 12, 14 and 16 feet.

With reference to FIGS. **5–8**, each of the saw assemblies **60–65** includes a fixed frame **71** having side members **72** connected by a top plate **73** at one end and a pair of connecting plates **74** at the opposite end. The side members **72** are welded or otherwise attached to bridges **75** extending from one of the crossheads **34** to the other. The bridges **75** are interconnected by outwardly extending flanges **76** each of which is provided with at least one elongated slot **77**. Fastening members **78**, such as bolts or the like, extend through the slots **77** into the crossheads **34** so that when such fastening members are tightened the frame **71** will be in fixed position. However, such frames can be adjusted lengthwise of the crossheads by means of the slots **77**.

Along the inner surface of each of the side members **72** is a recessed guideway **79** facing each other and adapted to slidably receive an elongated guide member **80** located at opposite sides of a body **81**. A mounting plate **82** is welded or otherwise attached to the lower end of the body **81** and a saw power plant **83** is connected to such mounting plate in any desired manner, as by fasteners **84**. The saw power plant includes a drive shaft **85** on which a circular saw blade **86** having cutting teeth **87** is fixed in any conventional manner.

Each of the bodies **81** are adapted to be raised and lowered so that the saw blades **86** are out of engagement with the boards on the table **36** or are interposed in the path of travel of such boards. As illustrated, the means for raising each of the bodies **81** includes a fluid cylinder **88** fixed to the mounting plate **82** and having a piston rod **89** connected to the body **81**. The fluid cylinder can be operated either pneumatically or hydraulically and can be either single or double acting. If the cylinder is single acting, the fluid under pressure will raise the body **81** and by relieving the fluid under pressure, the body will be lowered by gravity.

The body **81** is provided with a boss or safety limit **90** extending outwardly from one side and generally in alignment with a stop **91** carried by one of the connecting plates **74**. When the flow of fluid to the cylinder **88** is interrupted, the body will be lowered until the boss **90** engages the stop **91** and prevents any further lowering movement of the body. As illustrated the center of gravity **92** of the saw power plant and blade is located along the vertical axis of the body **81**.

With reference to FIG. **10**, the saw assemblies **60–65** are operated in a manner that will be described later so that the base saw **60** and the 16 foot saw **65** normally are in the down position. However, the intermediate saw assemblies **61–64** can be selectively lowered and in order to return the intermediate saws to an inoperative position after a board has been cut, a hub **94** is mounted on the shaft **41** and a cam plate **95** is adjustably mounted on such hub. This is done by providing a plurality of slots **96** extending through the cam plate **95** and such slots are adapted to receive bolts or studs **97** by means of which the cam plate can be secured in fixed adjusted position relative to the hub. The cam plate has an outwardly extending peripheral cam **98** adapted to engage a cam follower **99** carried by a limit switch **100** once each rotation of the shaft **41**. In order to make certain that the cam plate **95** is in timed relation with the chain conveyors **44**, the periphery of the cam plate and cam is exactly as long as the distance between the lugs **49** and by regulating the position of the cam plate relative to the hub **94**, cancellation of the saw assemblies will occur at substantially the same point for every board.

After the lumber has been trimmed, the boards are discharged from the table **36** for further processing including dressing the boards to finished size as well as treating the boards with preservative. However, the scraps of lumber which have been severed from the board by the saw assemblies **60–65** are not discharged from the opposite side of the table **36**, but instead as soon as the board has been trimmed to appropriate size, the scraps are discharged into a trough **101** located below the saw assemblies **60–65**. The trough includes a pair of inclined converging sides spaced apart at their lower edges.

In order to discharge scraps of lumber from the trough **101**, a chain conveyor **102** is located along the bottom of the trough **101** and such chain conveyor includes a plurality of spaced upstanding lugs **103** adapted to engage the scraps of lumber within the trough **101**. The chain conveyor **102** has an upper run slidably mounted in a channel member **104** and a lower run slidably carried in a channel member **105**. Both of such channel members extend lengthwise of the table **36** and the trough **101**. If desired the lugs **103** on the

chain conveyor **102** can be of the collapsible type so that the lugs will be upstanding while traversing the upper run of the conveyor but which can be collapsed adjacent to the conveyor **102** when traversing the lower run.

The chain conveyor **102** is driven in any desired manner as by a power plant **106**, and such power plant is connected by a belt, chain or the like **107** to drive a transmission **108** such as a gear reduction or the like. The transmission **108** has an output shaft **109** journaled in bearings **110** on opposite sides of the chain conveyor **102**. A drive sprocket **111** is mounted on the shaft **109** intermediate the bearings **110** and such sprocket receives and drives the chain conveyor **102**. At the opposite end of the frame **30** an idler sprocket **112** rotatably receives the chain conveyor **102** and such idler sprocket is mounted on a shaft **113** freely rotatably mounted in bearings **114** mounted on a platform **115** connected to the frame **30**. Movement of the chain conveyor **102** will remove scrap material from the trough **101** and discharge such material from one end of the frame.

With reference to FIG. **11**, if desired a plurality of limit switches **118**, **119**, **120**, **121**, and **122** may be mounted below the table **36** and each of such switches may have an operating arm **123** projecting upwardly through an opening **124** in such table and disposed in the path of movement of lumber being moved by the chain conveyors **44**. The limit switches **118–122** are located substantially in alignment with the saw blades **86** of the saw assemblies **61–65**, respectively, for a purpose which will be described later.

As illustrated in FIGS. **12–16**, the table **36** may have a plurality of relatively wide rollers **125** mounted adjacent to the front thereof and between the chain conveyors **44**. Each of the rollers **125** is mounted adjacent to one end of a shaft **126** and such shaft is provided with a sprocket or gear **127** adjacent the opposite end. A drive chain **128** (FIG. **16**) engages the sprockets **127** in a manner to simultaneously drive all of the rollers **125** in the same direction. If desired, an idler sprocket **129** mounted on an adjustable shaft **130** can be provided between each of the sprockets **127** to take up the slack in the drive chain **128**, as well as to make certain that the sprockets **127** are positively engaged by such drive chain.

In order to drive the chain **128**, a power plant **134** is located adjacent to one end of the table and such power plant includes an output shaft **135** having a sprocket **136** fixed thereto and such sprocket drives a chain **137** which in turn drives a sprocket **138** mounted on one of the shafts **126**. Rotation of one of the shafts causes rotation of the chain **128** and consequently rotation of all of the shafts **126**.

The rollers **125** extend upwardly through openings **139** in the table **36** so that when a piece of lumber is placed on the table by the chain conveyors **44** such piece of lumber will engage the rollers **125** and move the lumber lengthwise until it engages the bumper **57** while simultaneously the lumber is being carried up the incline of the table by the lugs **49** of the chain conveyors. It is noted that the rollers **125** may be generally cylindrical or may be tapered from front to rear so that the leading edge of the rollers could be located in alignment with or below the upper surface of the table **36** while the rear edge could be located above the upper surface of such table. Also it is contemplated that the axis of the shafts **126** could be disposed at an angle to the plane of the upper surface of the table **36** so that the leading edge of a cylindrical roller would be located in alignment with or below the upper surface, while the rear edge would be disposed above the upper surface of the table.

In some instances it is desirable to cut lumber in odd lengths such as 9, 11, 13, 15 and 17 feet. In order to do this, a circular saw assembly **140**, which is similar in construction to the saw assemblies **60–65**, is mounted on the crossheads **34** with a saw blade **141** spaced approximately one foot from the saw blade of the base saw assembly **60**. As illustrated in FIGS. **12** and **13**, the saw assembly **140** is spaced to the left of the base circular saw assembly.

When the saw assembly **140** is to be used, the fixed bumper **57** is replaced by a collapsible bumper **142**. In order to collapse the bumper **142**, such bumper is mounted on a shaft **143** rotatably journaled in bearings **144** carried by an angle member **145** forming part of the table frame **37**. A lever **146** is fixed at one end to the shaft **143** and the opposite end of such lever is connected by a pin **147** to one end of a piston rod **148** carried by a fluid cylinder **149** which is swingably connected by a pin **150** to the frame **37**. Extension and retraction of the piston rod **148** will cause the bumper **142** to move through an opening **151** in the upper surface of the table **36** to raised or lowered position.

When the base saw assembly **60** is raised, the bumper **142** will be lowered at the same time and the saw assembly **140** will be lowered into operative position. In this position an auxiliary bumper **155** is adapted to be raised so that the boards on the table will move into engagement therewith. In order to raise and lower the auxiliary bumper **155**, such bumper is mounted on a shaft **156** rotatably journaled in bearings **157** carried by the frame **37**. A lever **158** is welded or otherwise attached at one end to the shaft **156** and the opposite end of such lever is connected by a pin **159** to one end of a piston rod **160** carried by a fluid cylinder **161** and such cylinder is swingably connected by a pin **163** to the frame **37**. It is noted that if desired the auxiliary bumper **155** could be permanently fixed in upright position on the frame **37**.

In order to selectively control the positions of the saw assemblies **60–65** and **140**, a console or electrical panel **163** (FIG. **1**) can be located in any desired position. As illustrated, the console is located adjacent to the front of the table **36** and such console includes a plurality of switches **164–169** for independently controlling the positions of the saw assemblies **60—65**, respectively, a switch **170** for controlling the position of the saw assembly **140**, and switches **171** and **172** for controlling no trim and slash operations in a manner to be described later.

With reference to FIG. **17**, a wiring diagram is illustrated in which the electrical control of the saw assemblies **60–65** and **140** is divided into two separate and independent systems. One system automatically measures the length of a piece of lumber and selects a saw for cutting the longest standard length which is possible for the particular piece of lumber. The other system includes a plurality of manually operated selection but-

tons to operate selected saws. The second system can be operated entirely manually so that each saw assembly has a first switch to lower the saw and a second switch to raise such saw, or such second system can be operated semi-automatically so that one or more saws are operated selectively by independent switches but such switches will be automatically canceled after a particular piece of lumber has been cut.

In the operation of the automatic system, a pair of electrical lines L1 and L2 supply electrical energy to the apparatus. An electrical conduit **175** is connected to the power line L1 and a power switch **176** is disposed in such conduit. Normally the base saw assembly **60** and the 16 foot saw assembly **65** are in lowered position while the saw assemblies **61—64** and the saw assembly **140** are in raised position, so that a board in excess of 16 feet in length will be trimmed to 16 feet. When a piece of lumber is being moved across the upper surface of the table **36** by the chain conveyors **44**, such board will engage all of the limit switches **118-122** which are connected in series with each other and such switches will be depressed.

When the switch **118** in front of the 16 foot saw **65** is depressed, electrical energy will flow through a conduit **177** and energize a relay **178** to open a normally closed contact **179** to interrupt the flow of electrical energy through the conduit **177** and establish the flow of electrical energy through a ground line **180** and simultaneously will establish the flow of energy through a conduit **181** to the power line L2. When the switch **118** is released by the passage of the board, the **16** foot saw assembly **65** will continue in operation since the flow of electrical energy has been established through the ground line **180** which is connected to the power line L2.

Also, as an example, if a board is at least 10 feet but less than 12 feet in length, the 12 foot limit switch **120** will remain closed, however, the 10 foot switch **121** will be opened. Electrical energy will flow along the conduit **175** through the limit switches **118**, **119** and **120** and then through a conduit **182** to a relay **183** which will open a normally closed switch **184** in the conduits **177** and a normally closed switch **185** in the ground line **180**. This establishes a flow of electrical energy through the conduit **177** through the relay **183** and along the ground line **180** to the power line to complete a circuit. Simultaneously operation of the relay **183** will close a normally open switch **186** in a conduit **187** and permit electrical energy to flow to a solenoid operated valve **188**. Operation of the valve **188** will operate the corresponding fluid cylinder **88** to lower the 10 foot saw assembly **62** to cut the board to a 10 foot length. The 10 foot saw assembly **62** will remain in lowered position until another limit switch on the table **36** is energized.

As an example, if the next board is in excess of 16 feet, the limit switch **118** again will be operated to operate the relay **178** and open the switch **179** which will interrupt the flow of electrical energy to the relay **183** and open the switch **186**. The opening of the switch **186** will operate the cylinder **88** and raise the 10 foot saw assembly to inoperative position. The same operation as the 10 foot saw assembly **62** is repeated for each of the 8, 12, and 14 foot saw assemblies.

Periodically a piece of lumber having a defective portion will be delivered to the trimmer saw assembly and it is desirable to remove the defective portion of the board. In order to provide selective control of the individual saws, the manually operated system is provided having an electrical conduit **192** connected to the power line L1 and one side of each of the push button switches **164–169** is connected to the conduit **192** by a conduit **193**. The opposite side of each of the push button switches is connected by a conduit **194** to a relay **195** which will close a normally open contact **196** to establish a flow of electrical energy to the relay **195** when the push button has been released. Simultaneously the relay **195** will close a normally open contact **197** in the conduit **187** to energize the corresponding solenoid operated valve **188** which controls the fluid cylinders **88** which in turn control the raising and lowering of the saw assemblies **60–65**.

As an example, if a piece of lumber is defective between the 10 and 12 foot saw assemblies, the push buttons **166** and **167** both will be depressed to energize the corresponding relay **195** of each push button as well as the corresponding solenoid operated valve **188** of each saw assembly. Preferably cancellation switches **198–203** are provided for the push button switches **164–169**, respectively, to interrupt the flow of electrical energy to the push button switches so that the corresponding saw assemblies will return to their normal position.

Usually the push button switches **164–169** are operated for special conditions which prevail on an individual board and therefore it is desirable that the push button switches be automatically canceled after the board has been cut. This is done by inserting the limit or line switch **100** in the conduit **192**. The cam follower **99** is mounted on the line switch **100** and such cam follower is adapted to be engaged by the cam **98** on the cam plate **95** at the time that the rear edge of the board is located substantially along the center line of the saw blade. In this position as soon as the board has been cut, the cam **98** will engage the cam follower **99**, open the line switch **100** and interrupt the flow of electrical energy to the relay **195** to de-energize the same.

Under certain conditions, it is desirable to override the automatic cancellation of the push button switches **164–169**, such as when it is desired to cut the board to a length of 12 feet without having to press the 12 foot push button **167** for each board. In order to do this a bypass line **205** is provided which bridges the line switch **100** and such bypass line is provided with a manually operated switch **206**. When the switch **206** is open, the line switch **100** will automatically cancel all of the push button switches **164–169**. However, when the switch **206** is closed, electrical energy will continue to flow through the conduit **192** regardless of whether the line switch **100** is open or not.

When it is desired to cut an odd length of lumber, such as 9, 11, 13, 15 or 17 feet, the push button switch **170** is depressed to permit electrical energy to flow through a conduit **210** and a conduit **211** to energize a relay **212**, close a normally open contact **213** and establish a circuit to the relay **212** after the switch **170** is released. The relay **212** will close a contact **214** and energize a solenoid operated valve **215** and cause the circular saw assembly **140** to be lowered into operative

position. Simultaneously when the push button switch **170** is closed, electrical energy will flow through a conduit **216** to the conduit **194** of the base saw assembly **60** and energize the corresponding relay **195**, close the contact **197** and operate the valve **188** of the base saw assembly causing such base saw to be raised to inoperative position.

At the same time the relay **212** will close normally open contacts **217** and **218** to energize solenoid operated valves **219** and **220** to lower the collapsible bumper **142** and raise the auxiliary bumper **155**. The saw assemblies **61–65** will operate in the same manner, either automatically or manually, as previously described; however, these saws will now be spaced a distance of 9, 11, 13, 15 and 17 feet respectively from the saw assembly **140**.

Under conditions where it is desired to pass a board through the trimmer saw assembly without trimming the board, the push button switch **171** is depressed to permit electrical energy to flow through the conduit **192** to a relay **221**. Operation of the relay **221** will close a normally open contact **222** and will open a normally closed contact **223** in the electrical conduit **175**. Also the relay **221** will close the contact **197** of the base saw assembly **60** and the 16 foot saw assembly **65** so that all saw blades will be raised to inoperative position. As soon as the untrimmed board has been discharged from the machine, the line switch **100** will be operated to interrupt the flow of electrical energy to the relay **221** and de-energize the same so that the base saw assembly **60** and the 16 foot saw assembly **65** will return to the lower operative positions.

If for some reason the operator chooses to lower all saws to operative position simultaneously so that the piece of lumber will be cut into a plurality of small pieces, the slash push button switch **172** is depressed to permit electrical energy to flow to a relay **224** to establish a circuit through a normally open contact **225** and to open a normally closed contact **226** in the electrical conduit **175** of the automatic system. Simultaneously the normally open contacts **197** of the saw assemblies **61–64** will be closed to operate the solenoid operated valves **188** of the **8**, **10**, **12**, and **14** foot saws so that all of the saws will be lowered to operative position and the board will be slashed into a plurality of relatively small pieces. As soon as the board has been cut, the line switch **100** will be operated to de-energize the relay **224** and return the saws to normal positions.

If desired a plurality of additional saw assemblies can be provided between the 8 foot saw and the base saw, as illustrated in phantom in FIGS. **18–21** to cut the entire board into 2-lengths.

It will be apparent from the above that since the center of gravity **92** of the saw power plant is located along the vertical axis of the body **81**, movement of the saw blade **86** into cutting position will be in a straight vertical plane and torque on the saw blade **86** and the shaft **85** will be reduced to a minimum to eliminate any chatter during the cutting operation. Vertical movement of the saw blade in a plane normal to the direction of movement of the lumber will insure that the end of the lumber is cut at right angles to the edges thereof

Also it will be apparent that the lumber can be cut in standard lengths of 8, 10, 12, 14 and 16 feet, as well as lengths of 9, 11, 13, 15 and 17 feet. The boards or lumber usually are cut to a predetermined length automatically; however, the saw assemblies can be controlled individually if desired.

We claim

1. A vertical drop trimmer saw apparatus for cutting material to predetermined or selected lengths comprising a main frame, a base saw assembly mounted adjacent to one end of said main frame, a plurality of equally spaced saw assemblies mounted on said main frame and spaced a predetermined distance from said base saw assembly, each of said saw assemblies including a generally vertically disposed fixed frame mounted on said main frame, a body slidably mounted on said fixed frame, means for moving said body relative to said fixed frame, a saw power plant mounted on said body with the center of gravity of the saw power plant being disposed generally along the vertical axis of said body, cutting means carried by said power plant and adapted to be driven thereby, means for controlling said body moving means to selectively raise and lower said saw assemblies out of and into cutting position, a saw table located below said main frame, bumper means on said saw table to limit lateral movement of material thereon, a plurality of conveyor means mounted on said table, and means for driving said conveyor means simultaneously to move material along said table so that the material will engage the cutting means that are disposed in cutting position and will be cut thereby.

2. The structure of claim **1** including means for automatically moving said saw assemblies into cutting position so that the material will be cut to the longest convenient length.

3. The structure of claim **2** in which said automatic moving means includes a plurality of limit switches mounted on said saw table in a position to be engaged by the material thereon, and one of said limit switches being located generally in alignment with each of said cutting means.

4. The structure of claim **1** including means for individually selectively moving said cutting means into cutting position.

5. The structure of claim **4** including means for automatically cancelling the saw assemblies which have been selectively operated.

6. The structure of claim **1** including an auxiliary saw assembly mounted on said main frame in spaced relation to said base saw assembly, and means for automatically raising said base saw assembly to inoperative position when said auxiliary saw assembly is lowered to operative position.

7. The structure of claim **6** in which said bumper means includes a first collapsible bumper spaced slightly to one side of said base saw assembly and a second bumper spaced slightly to one side of said auxiliary saw assembly, said first and second bumpers limiting the lateral movement of the material so that the base saw assembly and the auxiliary saw assembly will remove a small portion of the material from one end of the material.

8. The structure of claim **1** including a plurality of rollers mounted on said saw table and adapted to automatically move material laterally against said bumper means.

9. The structure of claim 1 in which each of said conveyor means includes a plurality of upstanding members adapted to engage the material, and means for adjusting said conveyor means so that the upstanding members are substantially in alignment with each other.

10. The structure of claim 1 including a trough mounted on said saw table and located below the upper run of said conveyor means so that scrap material will be discharged into said trough, chain conveyor means disposed lengthwise of said trough, and means for operating said trough chain conveyor means for discharging scrap material from said trough.

11. The structure of claim 1 including means for raising all of said saw assemblies simultaneously to inoperative position so that the material on said saw table will not be cut.

12. The structure of claim 1 including means for operating all of said saw assemblies simultaneously so that the material will be cut into a plurality of relatively small pieces.

13. A trimmer saw apparatus for cutting material to predetermined or selected lengths comprising a main frame, a first saw assembly mounted on said main frame adjacent to one end thereof, a second saw assembly mounted on said main frame substantially 8 feet from said first saw assembly, third, fourth, fifth and sixth saw assemblies mounted on said main frame and disposed substantially 2 feet apart with the third saw assembly being spaced substantially 2 feet from the second saw assembly, a seventh saw assembly mounted on said main frame adjacent to said first saw assembly, each of said saw assemblies including a generally vertically disposed fixed frame, a body slidably mounted in a generally vertical direction on said fixed frame, means for moving said body relative to said fixed frame, cutting means mounted on each of said bodies, the cutting means of said seventh saw assembly being spaced substantially one foot from the cutting means of said first saw assembly, means for driving said cutting means, means for automatically and/or selectively controlling the means for moving said body, a saw table located below said main frame, selectively operable bumper means on said saw table to limit lateral movement of material thereon, a plurality of conveyor means mounted on said saw table, and means for driving said conveyor means simultaneously to move material along said table so that the material will engage the cutting means located in operating position to cut the material.

14. A vertical drop trimmer saw apparatus for cutting material to predetermined or selected lengths comprising a main frame, a base saw assembly mounted adjacent to one end of said main frame, a plurality of equally spaced saw assemblies mounted on said main frame and spaced a predetermined distance from said base saw assembly, each of said saw assemblies including a generally vertically disposed fixed frame mounted on said main frame, a body slidably mounted on said fixed frame, means for moving said body relative to said fixed frame, a saw power plant mounted on said body with the center of gravity of the saw power plant being disposed generally along the vertical axis of said body, cutting means carried by said power plant and adapted to be driven thereby, means for controlling said body moving means to selectively raise and lower said saw assemblies out of and into cutting position, a saw table located below said main frame, bumper means on said saw table to limit lateral movement of material thereon, a plurality of conveyor means mounted on said table, means for driving said conveyor means simultaneously to move material along said table, an auxiliary saw assembly mounted on said main frame in spaced relation to said base saw assembly, said bumper means including a first bumper generally in alignment with said base saw assembly and a second bumper generally in alignment with said auxiliary saw assembly, and means for moving said first bumper out of the path of the material when said base saw assembly is raised.

* * * * *