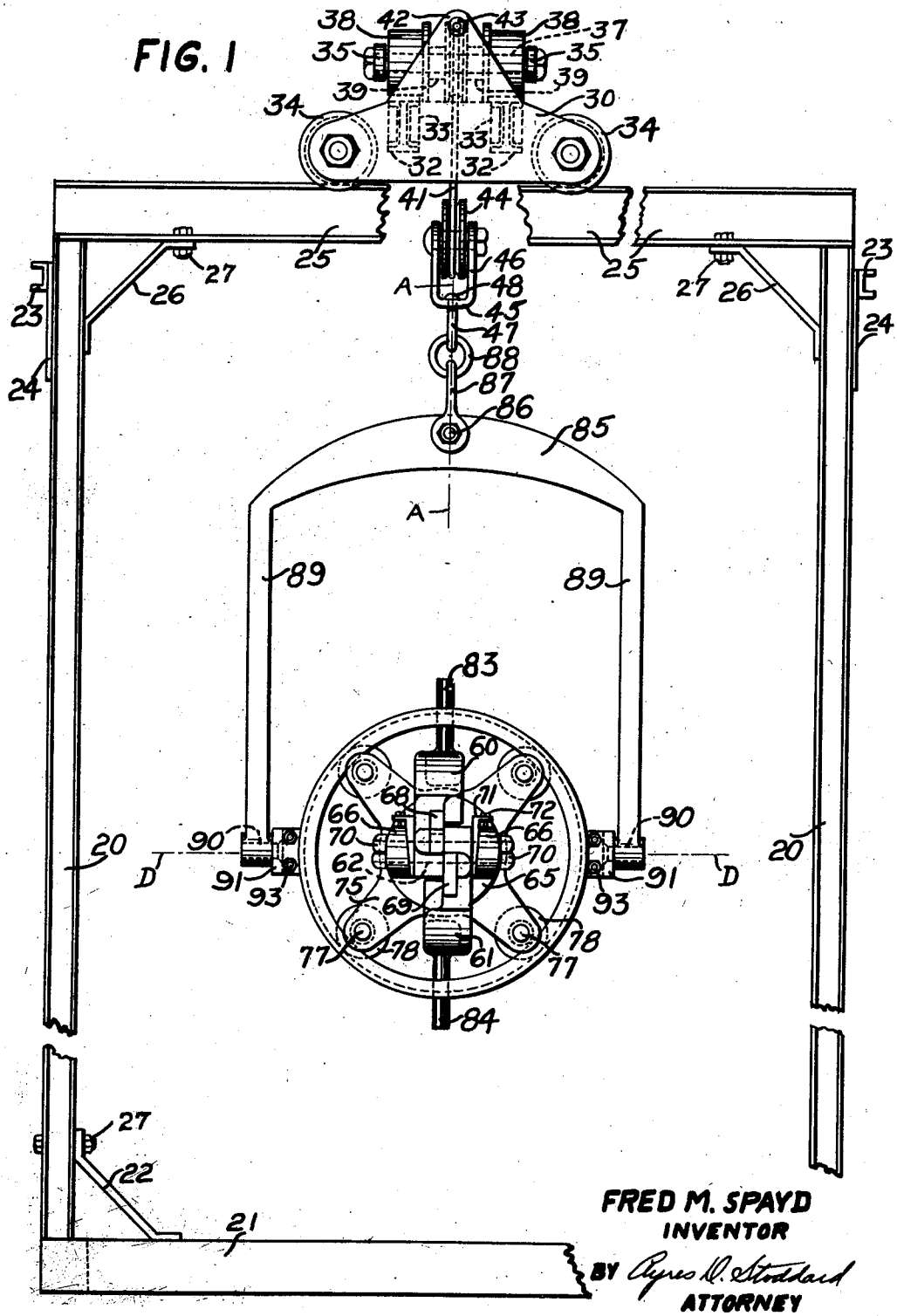
Nov. 14, 1944. F. M. SPAYD 2,362,776

SWINGING SHEARS

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FIG. 1



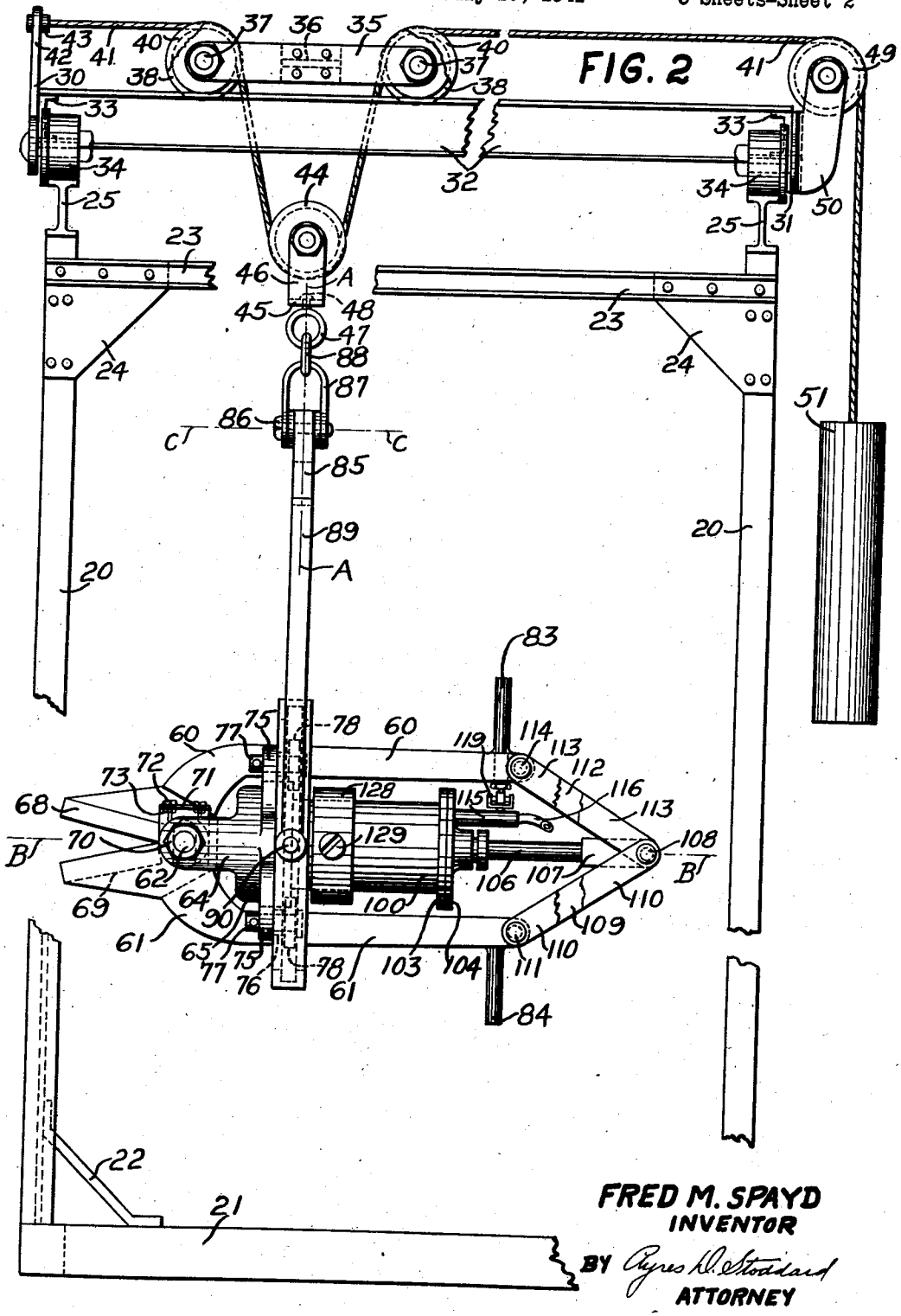
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SWINGING SHEARS

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FIG. 2



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SWINGING SHEARS

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FIG. 3

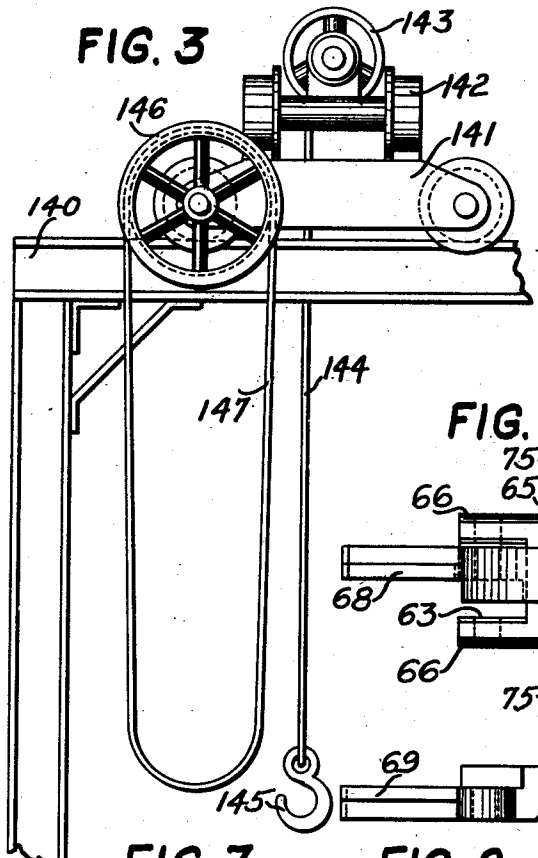


FIG. 4

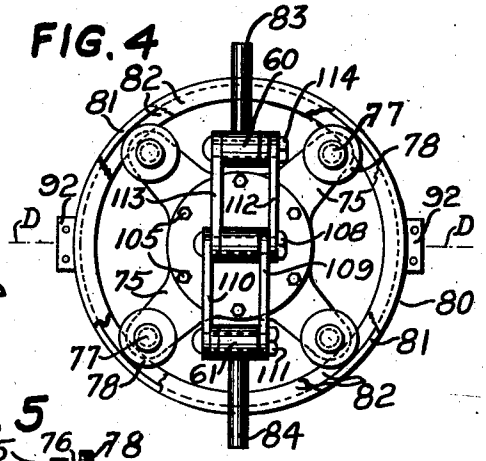


FIG. 5

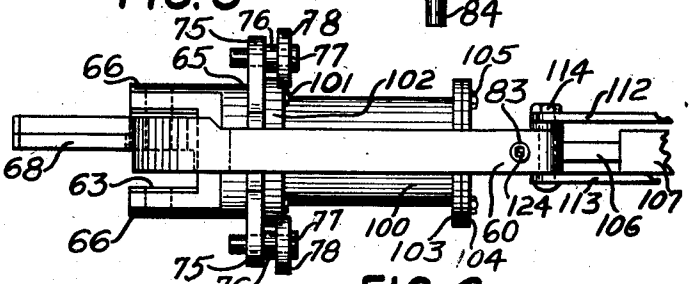


FIG. 6

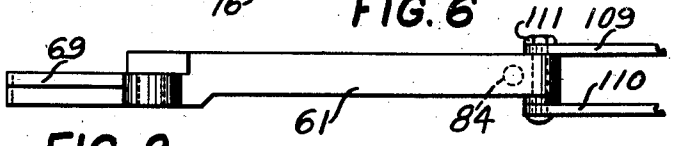


FIG. 7

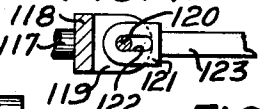


FIG. 8

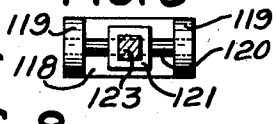


FIG. 9

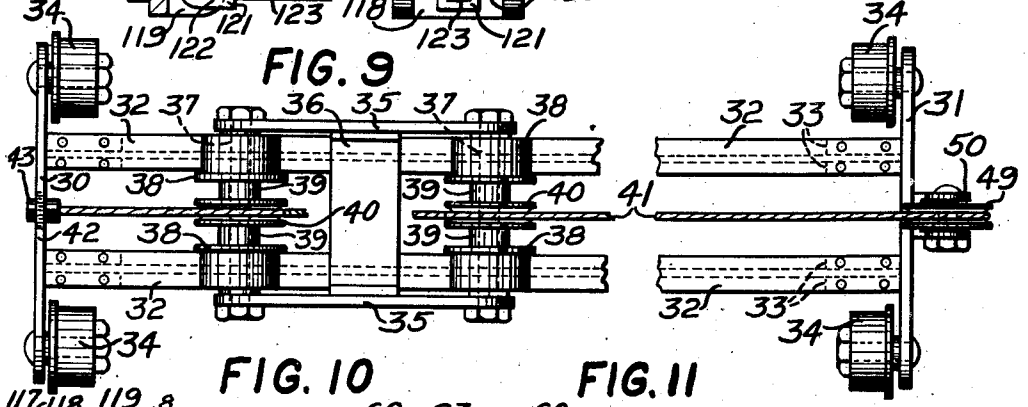


FIG. 10

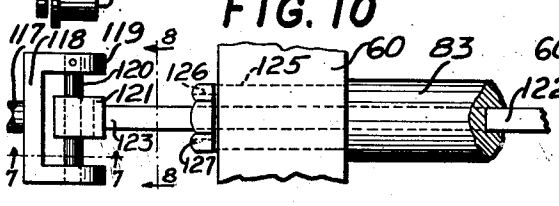
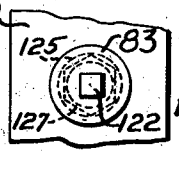


FIG. 11



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UNITED STATES PATENT OFFICE

2,362,776

SWINGING SHEARS

Fred M. Spayd, Van Wert, Ohio

Application July 10, 1941, Serial No. 401,811

4 Claims. (Cl. 30—228)

My invention relates to a shearing device and particularly to swinging shears so mounted as to be operated from any angle or from any height.

One object of my invention is to provide novel shears preferably operated by hydraulic power.

Another object of my invention is the provision of power operated shears so constructed and mounted that they can be operated with the minimum amount of energy by the operator.

Another object of my invention is to provide novel shears of the type disclosed which are particularly adaptable for the shearing of heavy pieces of metal and other materials in a very efficient manner, and in the minimum amount of time.

A further object of my novel invention is the production of swinging shears that can be readily shifted from one position to any other position when cutting up large pieces of materials.

Another object of the invention is to produce a novel mounting for swinging shears, whereby said shears may be swung at any angle, end over end, end around end, or rolled in either direction, all of which movements may take place simultaneously or independently of each other.

A still further object of the invention is the provision of a framework for supporting the shears, said framework including a traveling crane for moving the shears in either of two directions, and a movable truck mounted on the crane for moving the shears in either direction at right angles to the movements provided by the traveling crane.

A further object of my invention is the provision of a specially designed mounting for a swinging shears, said mounting adapted to carry power operating means for the shears.

Still another object of the invention is the provision of a specially designed mounting for swinging shears, to which mounting is also secured a power operated cylinder for hydraulic operation of the shears, preferably compressed air.

Another object of my invention is to provide a special roller bearing device carried by the mounting for the shears, and a hanger supported by a swivel mounting.

Still another object of the invention is the provision of a novel operating means for the hydraulic cylinder when used to provide the power to operate the shears.

Another object is to provide a novel valve control for the hydraulic power, which control is carried by the shears so as to be operable to control the input of power regardless of the position in which the shears may be at the time it is necessary to control said input of power.

With these and other incidental objects in view, my invention includes certain other novel features and combinations of elements, the essential elements of which are set forth in appended claims, and a preferred form or embodiment of which is hereinafter illustrated and described with reference to the drawings which accompany and form part of this specification.

Of said drawings:

Fig. 1 is a front elevation, with certain parts broken away, showing my novel swinging shears and the mounting for the same.

Fig. 2 is a side elevation of the same.

Fig. 3 is a fragmentary view of a hoisting device which may be used in connection with my novel shears when desirable, for the handling of extra heavy materials which are to be cut up or dis-assembled by the use of the shears.

Fig. 4 is a rear elevation of the roller bearing mounting of the shears and also shows the linkages connecting the shears to the hydraulic cylinder, for operating the shears.

Fig. 5 is a detailed top plan view of the top blade and lever for the shears, the support for the shears, the hydraulic cylinder, and a portion of the linkages for operating the shears from the hydraulic power derived from the cylinder.

Fig. 6 is a detailed top plan view of the bottom blade and lever of the shears, and a portion of the operating linkage.

Fig. 7 is a section on line 7—7 of Fig. 10, showing a part of the valve operating mechanism.

Fig. 8 is a detailed view of part of the valve operating mechanism.

Fig. 9 is a top plan view of the crane and the truck carried thereby for moving the shears from one position to another position.

Fig. 10 is an enlarged view of the valve operating mechanism for the cylinder, and shows part of the handle on the top lever of the shears.

Fig. 11 is another view of the same.

General Description

Described in general terms my novel shears are mounted so as to be swung and/or turned in any direction that the operator may wish to swing and/or turn them to bring them in positions to shear metals or any other kinds of material when in use.

To accomplish this action of swinging, my novel shears are mounted to swing on a swivel joint which is carried by a traveling crane, on which is mounted a traveling truck adapted to

travel at right angles to the travel of the crane. The swivel permits rotary motion around a vertical axis.

Hanging from the swivel is a bail carrying a circular channel frame to act as a bearing and a guide for rollers carried by a specially designed mounting block for the blade supporting levers of the shears, whereby the shears may be rotated in either direction on either or both of two horizontal axes to bring the blades in any desirable position for cutting.

The bail is hung from the swivel for rotation around the vertical axis of said swivel, and the bail pivot mounting permits swinging of the shears, back and forth around a horizontal axis.

Secured to the special mounting block is a hydraulic operated power cylinder preferably operated by compressed air, the flow of which to the cylinder is controlled by the usual by-pass valve to properly operate the piston of said cylinder from which is derived the power to actuate the blades of the shears to cut. This valve is controlled by a slidable valve actuator which in turn is driven by one of the handles on one of the blade levers of the shears.

While I have shown and described a weight to counter-balance my shears, I do not wish to limit myself to such specific construction, as a power hoist may be used for this purpose if desirable.

Detailed Description

Framework

The framework for supporting my novel swinging shears, and also for supporting the traveling crane, comprises four columns **20** (Figs. 1 and 2) of H-beams, secured to four sills or base beams **21** by angle braces **22**. Channels **23** and corner braces **24** tie the columns **20** together in one direction, and I-beams **25** resting on top of the columns **20** and tied thereto by angle braces **26** tie the columns together in the other direction, thus providing a very rigid framework for the crane which carries the swinging shears. Bolts **27** are preferably used to fasten the beams and braces together instead of rivets, so that the framework can be very easily dis-assembled when it is desirable to move the shears from one place of operation to another. However the entire framework can be readily loaded upon a large truck and transported from place to place if the operators do not wish to dis-assemble it.

Crane and truck

The crane and truck are shown in Figs. 1, 2 and 9. The crane travels on the I-beams **25** and comprises end frames **30** and **31** connected by two I-beams **32** through the medium of channels **33**. Four flanged wheels **34** are mounted on the frames **30** and **31** to roll on the I-beams **25** which form a track for the crane so that the shears can be moved to any desirable position along these beams **25**.

The truck which is mounted on the crane so that the shears can be moved to any desirable position along the I-beams **32**, comprises two truck bars **35** (Figs. 1, 2 and 9) connected by an H-bar **36**, and supporting axles **37** for four flanged wheels **38** which roll on the I-beams **32**.

Freely mounted on the axles **37** intermediate the wheels **38** and spaced thereon by spacing collars **39** are flanged pulleys **40** over which rides a cable **41** which supports the swinging shears.

One end of the cable **41** is fastened to an upstanding projection **42** of the frame **30** by a clamp **43**. A loop in the cable **41** between the pulleys **40** carries another pulley **44** mounted in a swivel **45** comprised of a U-coupling **46** having freely connected thereto a ring **47** which is free to turn either clockwise or counter-clockwise around the vertical axis A—A of a pin **48** secured to the ring **47** and freely turnable in the coupling **46** as viewed in Figs. 1 and 2.

The cable **41** passes over another pulley **49** mounted in a bracket **50** carried on the frame **31**, and to this end of the cable **41** below the pulley **49** there is attached a counter-weight **51** to balance the shears in any position of height necessary for operation of the shears when in use.

Shears and mounting for the same

Referring particularly to Figs. 1, 2, 4 and 5 my novel shears include an upper blade lever **60** and a lower blade lever **61** pivoted on a pin **62**. These levers **60** and **61** work in a slot **63** cut in the nose **64** of a supporting block **65** forming bearings for the pin **62**. The lever **60** has secured thereto a knife or blade **68** and the lever **61** has secured to it a knife or blade **69**. These **68** and **69** are to be made of heat treated steel for sharp shearing and for long wear.

The pin **62** is threaded on its ends and nuts **70** retain the pin **62** and the levers **60** and **61** in their proper shearing positions at all times.

The inside walls of the bearings **66** are tapered to provide for the usual tapered wedges **71** which straddle the pin **62** and which may be adjusted and held in proper adjustment by bolts **72** and lock nuts **73**.

As has been previously mentioned, the shears are of novel construction to rotate on a horizontal axis B—B as viewed in Fig. 2. To accomplish this result the supporting block **65** has four arms **75**, each arm **75** having a boss or shoulder **76**. A pin **77** projecting through the boss **76** and arm **75** forms a bearing for a roller **78**. These rollers **78** operate in a channel ring **80** formed by securing together, preferably by welding, a hoop **81** and two ring plates **82**.

The lever **60** of the shears has turnably mounted thereon, for a purpose to be later described, a handle **83**, and the lever **61** has secured thereto a handle **84**. By means of these handles the shears can be rolled and/or turned in any direction and at any angle at the will of the operator.

In other words, from the above description it can be readily and clearly seen that the shears and the mounting block **65** therefor can be rotated on the horizontal axis B—B (Fig. 2), which rotation, as viewed in Figs. 1 and 4 is either clockwise or counter-clockwise, to position the shears in any desired or necessary angle for use.

The shears can also be rotated clockwise or counter-clockwise around the vertical axis A—A of the pin **48** (Figs. 1 and 2).

To accomplish this last mentioned movement of the shears, I have provided a bail **85** for supporting the shears from the swivel **45**. This bail **85** (Figs. 1 and 2) has pivoted thereto by means of a bolt **86**, a U-clip **87** which in turn has a ring **88** connected to the swivel ring **47**. The vertical arms **89** of the bail **85** are mounted to turn on trunnion pins **90** carried by channel shaped members **91** secured to lugs **92** which are preferably welded to the channel ring **80** by bolts **93**. To assemble the bail to the ring **80** the trunnion pins **90** are first put in the arms **89** after which the clips **93** are bolted to the lugs **92**.

By this novel construction the operator may, by grasping the handles **83** and **84** rotate the shears

on the vertical axis A—A of the swivel pin 48 to bring the shears in any desirable position for operation of cutting. The shears can also be swung clockwise or counter-clockwise (Fig. 1) around the horizontal axis C—C (Fig. 2) of the bolt 86. Moreover the shears may also be rotated end over end either clockwise or counter-clockwise around the horizontal axis D—D (Figs. 1 and 4) of the trunnion pins 90, and at the same time the shears may be rolled around the horizontal axis B—B at the will of the operator.

Power operating means for the shears

As above mentioned I prefer to operate my novel shears by hydraulic power and for this purpose there is secured to the mounting block 65 a compressed air cylinder 100 by means of bolts 101 (Fig. 5), a flange 102 on the cylinder providing the means for such fastening of the cylinder to the specially constructed mounting block 65. The other end of the cylinder has a flange 103 to which is secured the usual cap 104 by means of bolts 105 (Figs. 4 and 5). A piston rod 106 (Fig. 2) projecting from the cylinder in the usual manner has fastened thereto a block 107 to which is pivoted, by means of a bolt 108, links 109 and 110 (Figs. 2, 4 and 6) which links are also pivotally connected by a bolt 111 to the lower blade lever 61 of the shears.

Also pivotally connected to the bolt 108 are links 112 and 113 which are in turn pivotally connected to the upper blade lever 60 of the shears by means of a bolt 114.

The cylinder has projecting therefrom an inlet pipe 115 (Fig. 2) having a by-pass control valve (not shown) therein to control the input of compressed air from a supply hose 116. A valve stem 117 (Fig. 10) projects from the pipe 115 and has secured thereto a bar 118 with arms 119 carrying a wrist pin 120 (Figs. 7, 8 and 10).

A block 121 has a slot 122 by means of which it surrounds the wrist pin 120. This block 121 is secured to a square rod 123 adapted to slide back and forth in a square hole 124 (Fig. 5) of the handle 83, which is turnably mounted in the lever 60 of the shears. To provide for such turning of the handle 83 the same has a shoulder 125 (Figs. 10 and 11) and also a threaded tenon 126 for a nut 127. The shoulder 125 is slightly longer than the thickness of the lever 60 and when the nut 127 is drawn up tight against the shoulder 125 the handle is free to be turned in the lever 60 to operate the valve stem 117 and the valve.

To operate the shears to cut the operator simply turns the handle 83 and by means of the square rod 123, block 121, wrist pin 120, arms 119, bar 118 and valve stem 117, the valve (not shown) in the pipe 115 is turned to allow the compressed air from the supply hose 116 to enter the cylinder 100 with the result that the piston rod 106 is moved inwardly, or to the left (Fig. 2) whereupon the links 109, 110, 112 and 113 spread the right hand ends of the levers 60 and 61 thus closing the blades 68 and 69 in shearing fashion to cut off whatever material may have been placed between them.

The control valve on the stem 117 in the pipe 115 is of the usual by-pass type wherein when the valve is opened to cause the blades 68 and 69 to close to shear any material, a sufficient amount of air is by-passed around to the opposite end of the piston in the cylinder 100, and after the material has been sheared off or cut and the operator closes the valve by reversely turning the handle 83, such by-passed air forces the cylinder piston to return home and push the rod 106 out or to the right (Figs. 2 and 5) to home position to draw the right ends of the levers 60 and 61 towards each other to the positions shown, to open the blades 68 and 69 ready for the next shearing operation.

As the right ends of the levers 60 and 61 are spread apart the valve rod 123 slides in the hole 124 of the handle 83 and due to the clearance slot 122 in the block 121 there is sufficient room for the wrist pin 120 so that there will be no binding or interfering of these parts during the spreading or during the closing of the shear levers 60 and 61.

Moreover the valve stem 117 can be controlled at all times by the operator to open and close the shears regardless of the positions in which the shears may be relative to their open and closed positions. By turning the handle 83 at any time during the operation of the shears the input and output of air to the cylinder can be definitely controlled.

A collar 128 (Fig. 2) having a set screw 129 may be adjusted along the cylinder and locked in adjusted position to control the balancing of the shears on the trunnion pins 90.

Any form of hydraulic power for the cylinder can be controlled in the same manner by the handle 83 and its special connections to the valve stem 117.

While I have shown and described hydraulic power means to operate the shears, electric power means could be used to operate them without departing from the spirit of my invention, by attaching an electric motor to the block 65 to operate the rod 106 and linkage to the levers 60 and 61.

Hoist

For the purpose of hoisting and handling heavy objects which are to be cut up by the shears I have shown a usual hoisting device in Fig. 3. This device is carried on a framework 140, only a part of which is shown and includes a traveling crane 141 which has running thereon a truck 142 carrying a winch 143 with a cable 144 and a hook 145 to hook on to heavy objects to be lifted.

A ratchet controlled pulley 146 is mounted on the crane 141 and has the usual endless chain, cable or heavy rope 147. The pulley 146 is geared to the winch 143 in the usual manner (not shown) so that when the chain 147 is pulled the winch 143 is turned to wind and unwind the cable 144 to raise and lower any object to which the hook 145 has been connected.

Since I have fully described the various motions and operations of my novel swinging shears and also their novel mountings in connection with the detailed description of the same, I do not think that it is necessary to repeat those motions and operations at this time, as a thorough understanding of the mechanisms and operations of the same can be had from the above descriptions of the same when read in connection with the drawings which clearly illustrate all phases of my invention.

While the form of mechanism herein described and illustrated is admirably adapted to fulfill the objects primarily stated, it is to be understood that I do not wish to limit my invention to the one form or embodiment herein disclosed, for it is susceptible of embodiment in various other forms all coming within the scope of the claims which follow.

What I claim is:

1. The combination of shearing blade levers; a rolling support for said levers; hydraulic power actuating means for the levers, said means being carried by said support; a piston rod driven by said means; a linkage between said rod and said levers to operate the latter for shearing action; a rigid handle secured to one of said levers; a rotatable handle mounted on the other of said levers; and valve actuating means operated by the rotatable handle to control said power actuating means.

2. The combination of swinging shears including blade carrying levers; a freely rotatable support for said levers for rolling the shears around one axis; power actuating means carried by said support; a channel ring bearing for said support; a bail shaped carrier for said channel ring bearing for rolling the shears around another axis; a mounting for the bail carrier for rotating the shears around a vertical axis and for oscillating the shears around another axis; handles on the levers to facilitate any and all of the above mentioned movements of the shears either separately or simultaneously; control means for the power actuating means; and means carried by one of said handles for operating the control means at the will of the operator to cause the power means to actuate the shears in any and all positions to which the shears may have been set by the operator to bring them in desirable positions for cutting.

3. A shearing device including movable blade carrying levers mounted on a pin for shearing action; a rotatable support for said pin; power means secured to said support; a linkage between said power means and said levers to actuate the levers for shearing movement for the blades thereon upon operation of said power means; control means for the power means; a rigid handle secured to one of said levers; a rotatable handle mounted on the other of said levers; and means operated by said rotatable handle to operate said control means for the power means at the will of the operator.

4. A shearing device including movable blade carrying levers mounted on a pin for shearing action; a rotatable support for said pin; power means secured to said support; a linkage connected to each lever and to said power means to actuate said levers; control means for the power means; and means carried by one of said levers to operate the control means.

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