# United States Patent

**Peters**

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## [54] PIN CUTTER


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[21] Appl. No.: **125,226**

**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 799,383, Feb. 14, 1969, abandoned.

[52] **U.S. Cl.** ..... **30/180,** 30/187, 30/228, 30/245

[51] **Int. Cl.** ..... **B26b 17/00**

[58] **Field of Search** ..... 30/187, 180, 228, 245



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[57] **ABSTRACT**

Two embodiments of a power-actuated cutter for severing metal pins or bars are described. The first embodiment is designed for severing, for example, orthopedic pins substantially flush with the surfaces of the bone in which they are embedded without significantly moving or otherwise disturbing such pins and the surrounding bone structure. The cutter includes a pair of blade-equipped cutter jaws selectively movable between open and closed positions, and a ram operative to force such jaws toward their closed position. A reciprocable piston having its power stroke energized by the application of compressed gas thereto is coupled to the ram by force multiplier structure operative to transmit to the ram an increased multiple of the force association with movement of the piston through the power stroke thereof. The second cutter embodiment is especially designed for severing concrete reinforcing bars or the like and includes an axially rotatable, cylindrical drum which has a wedge-shaped projection wrapped around its cylindrical surface for engaging the cutting jaws and forcing them towards their closed position upon rotation of the drum. A reciprocable piston having its power stroke energized by the application of compressed gas is also provided in this embodiment. The reciprocable piston drives a rack which in turn rotates the drum to thereby force the jaws toward their closed position.


**12 Claims, 11 Drawing Figures**

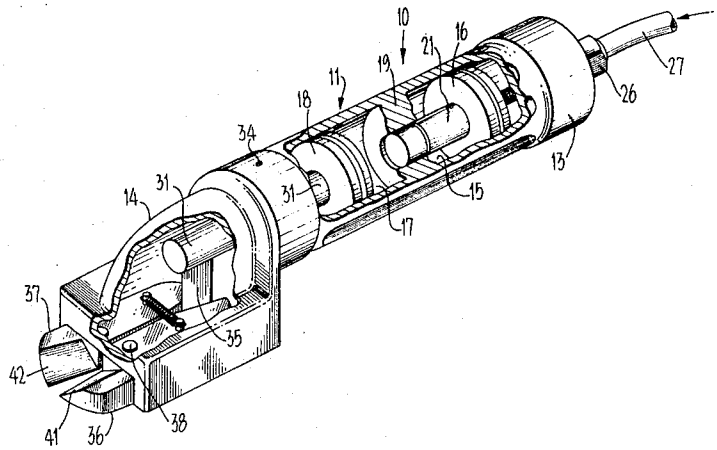


Fig. 1

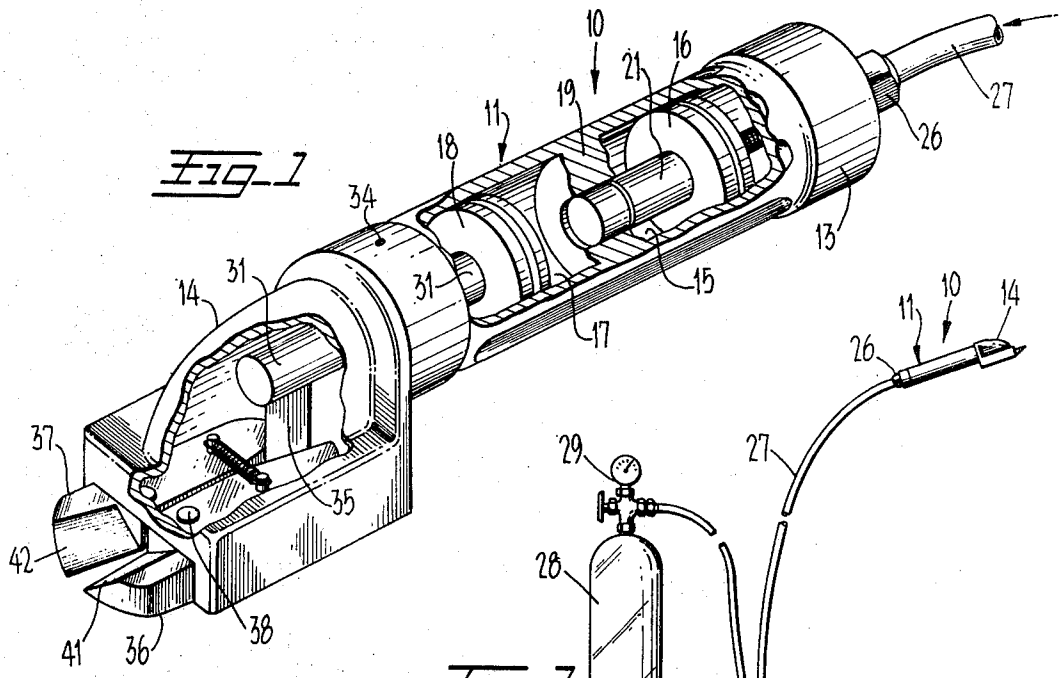



Fig. 2




Fig. 3

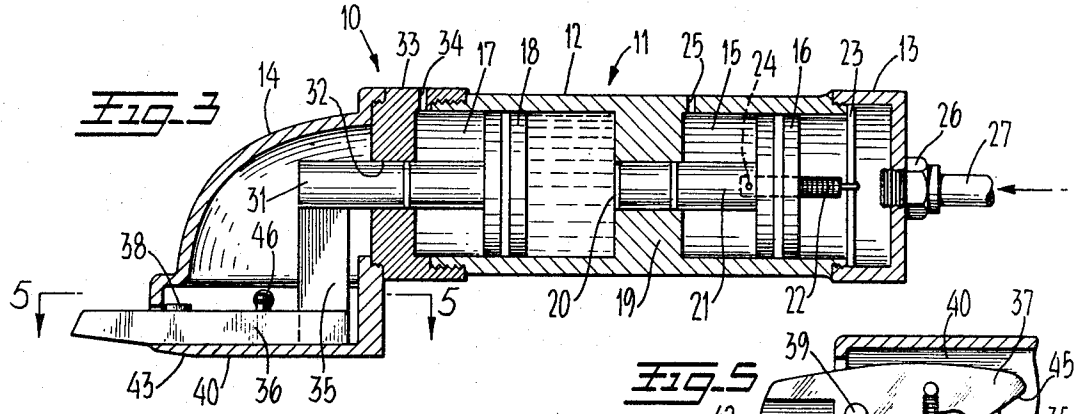



Fig. 4

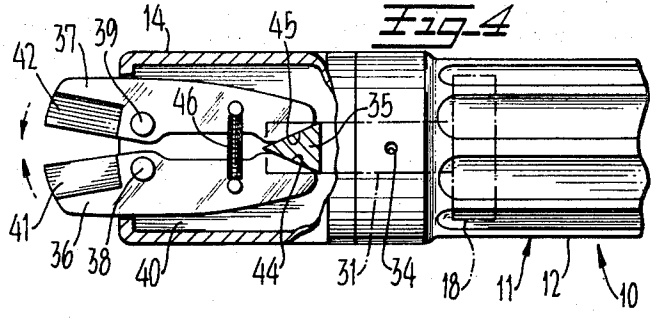
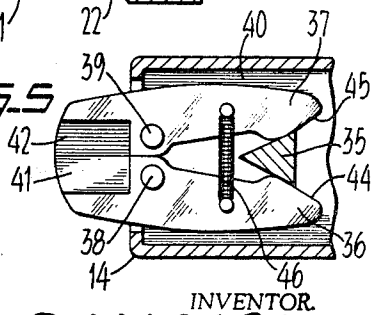



Fig. 5




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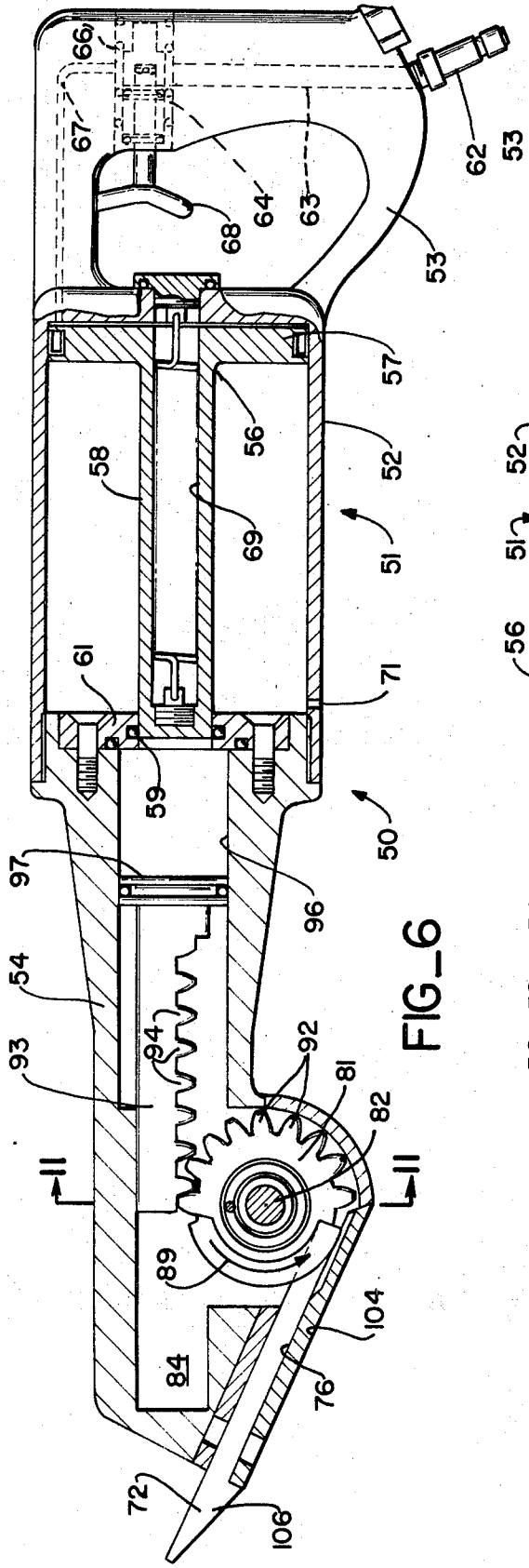



FIG_6

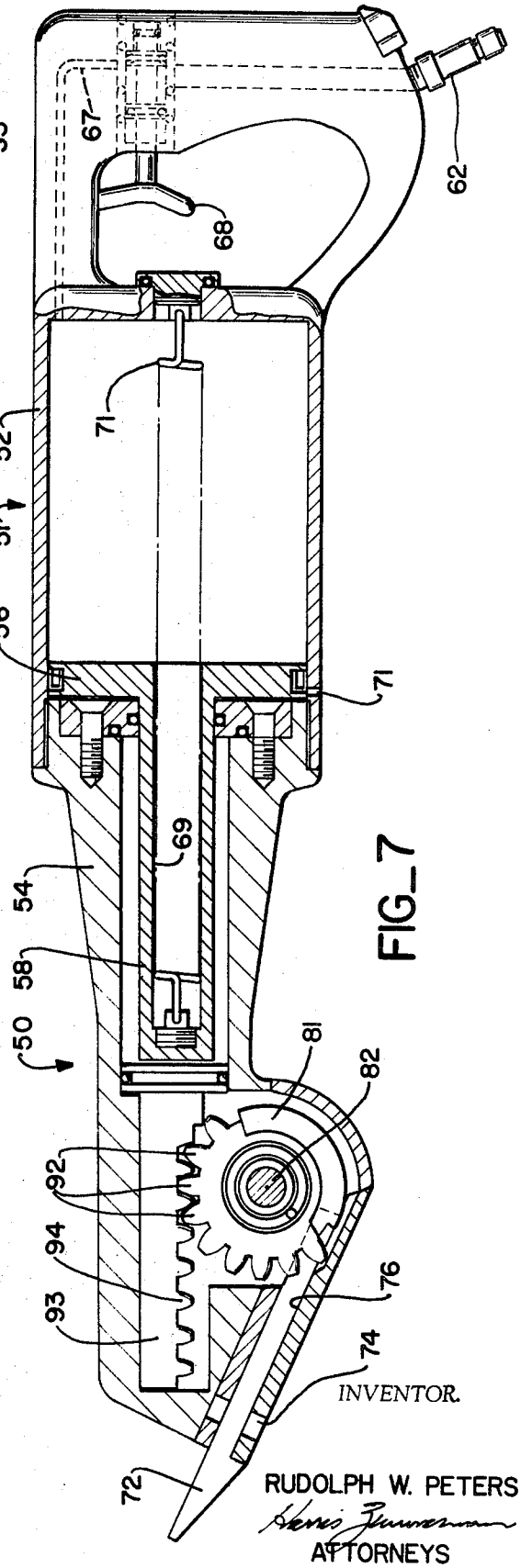



FIG_7

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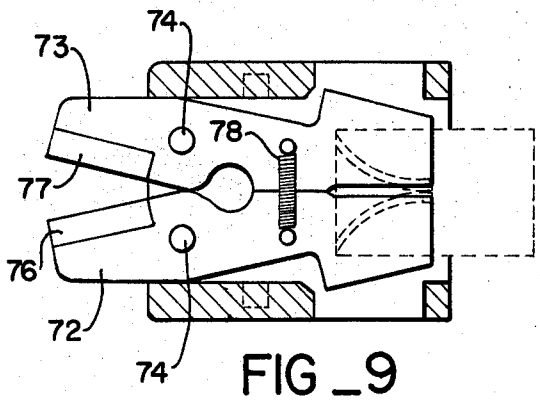



FIG_9

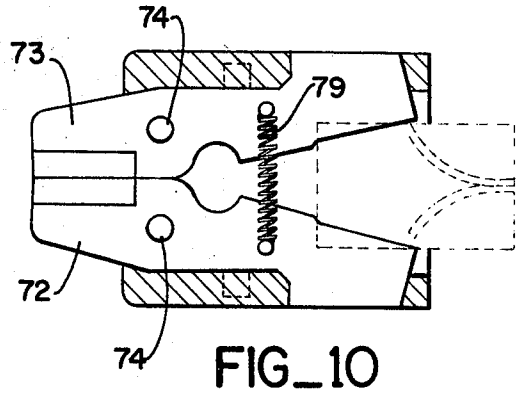



FIG_10

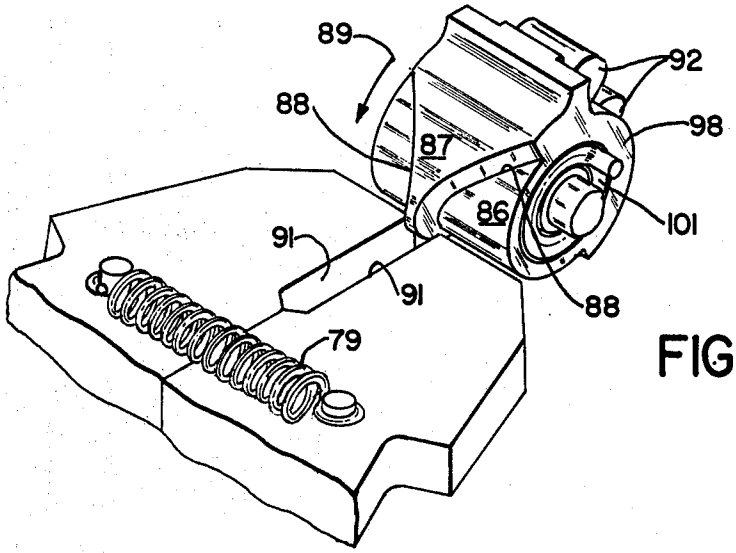



FIG_8

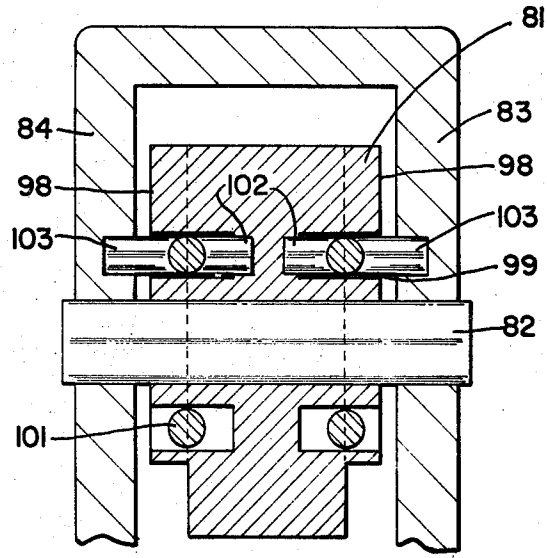



FIG_11

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# PIN CUTTER

## CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part application of my copending patent application Ser. No. 799,383 filed Feb. 14, 1969, now abandoned, for "Orthopedic Pin Cutter".

This invention relates to cutting apparatus and, more particularly, to metal pin or bar cutters especially useful in severing or cutting orthopedic pins after insertion thereof into bone structure or in severing concrete reinforcing bars flush with a surface.

In certain orthopedic operations, rigid metal pins are inserted into bone structure with the intent that they remain there permanently to reinforce and strengthen the same. It is exceedingly advantageous, if not essential, that such pins be cut off substantially flush with the surface of the bone structure so as not to leave protrusions which could irritate surrounding body tissue; and in order for such pins to be most effective, it is desirable that substantially no transverse or lateral disturbances be imparted thereto as they are severed for any such disturbance of a pin would tend to loosen the same and possibly cause further damage to the bone structure.

Although orthopedic pin cutters and pin-cutting techniques have been used in the past, they have not been completely satisfactory and an object, among others, of the present invention is to provide an improved pin cutter operative to sever orthopedic pins substantially flush with the surfaces of bone structure in which they are embedded without imparting significant movement to such pins. Another object of the invention is the provision of an improved pin cutter that is power-actuated and includes force multiplier structure coupling the power input means of the tool with the cutting blades thereof so as to increase the magnitude of the force affecting displacement of such blades into the closed position thereof, and which force is derived from the power input means. Still another object of the invention is that of providing a pin cutter having a main cylinder equipped with a main piston reciprocable therein, and further having force multiplier structure defined by a multiplier cylinder equipped with a reciprocable multiplier piston; the two cylinders being axially oriented in tandem disposition with the main piston being energized by pressurized gas supplied to one end of its cylinder and the multiplier piston being energized by liquid present in one end of the multiplier cylinder.

Cutters of the general type described have also been used to sever the ends of reinforcing bars which project from reinforced concrete after the forms for the concrete have been removed. It is also important in connection with cutters designed for this purpose that the cutters be capable of cutting a bar substantially flush from the surface from which it projects. Moreover, such cutters must also be capable of imparting to the cutting jaws substantial force to effect the severing operation. In this connection, it will be appreciated that the steel bars used in concrete reinforcement are often as much as one half inch in diameter and it takes substantial force in order to drive jaw members through the thickness of the bar.

Accordingly, it is another object of the invention to provide an improved pin cutter operative to sever concrete reinforcing bars or the like substantially flush with the surfaces from which they project. Another object of the invention is the provision of such an approved cutter which includes for actuating the jaw members a cylindrical drum having a projection on its cylindrical periphery which coacts with the jaw members to force the ends thereof having cutting blades together toward their closed position. Additional objects and advantages of the invention, especially as concerns particular features and characteristics thereof, will become apparent as the specification proceeds.

Embodiments of the invention are illustrated in the accompanying drawing, in which:

FIG. 1 is a perspective view of an orthopedic pin cutter embodying the invention with portions of the casing broken away to illustrate its interior construction;



FIG. 2 is a side view in elevation of the orthopedic pin cutter connected with a source of pressurized fluid through a foot-operated control valve;

FIG. 3 is generally a longitudinal sectional view of the pin cutter of FIG. 1;

FIG. 4 is a broken top plan view with a portion of the casing broken away to show details of the cutter jaws of the embodiment of FIG. 1;

FIG. 5 is a broken longitudinal sectional view taken along the line 5—5 of FIG. 3;

FIG. 6 is a side view in elevation of a cutter for a concrete reinforcement bar or the like embodying the invention with portions broken away and in phantom to illustrate its interior construction;

FIG. 7 is another side view in elevation of the embodiment of FIG. 6 with portions thereof broken away to illustrate the relationship of its various internal parts after being actuated;

FIG. 8 is a partial perspective view illustrating the ends of the jaw members and the manner in which the actuating drum coacts therewith;

FIG. 9 is a partial sectional view showing the jaw members of the embodiment of FIG. 6, and illustrating the same in an open position corresponding to the relationship of the internal parts shown in FIG. 6;

FIG. 10 is a second partial sectional view similar to FIG. 9 but illustrating the jaw members in their closed position corresponding to the relationship of the internal parts shown in FIG. 7; and

FIG. 11 is a sectional view taken generally on a plane indicated by the lines 11—11 in FIG. 6.

The orthopedic pin cutter shown in FIGS. 1 through 5 of the drawing is denoted in its entirety with the numeral 10, and it includes a casing 11 comprised of an elongated generally cylindrical section 12 equipped at its rear end with a closure cap 13 and at its forward end with a head 14. The casing 11, and particularly the cylindrical section 12 thereof, is provided with an axially extending main cylinder 15 having a main piston 16 reciprocable therein; and it is further provided with an axially extending force-multiplier cylinder 17 having a force-multiplier piston 18 reciprocable therein. The cylinders 15 and 17 are disposed in axially aligned, tandem orientation and are separated by a divider wall 19 provided by the casing section 12, and which divider wall has a centrally disposed opening 20 therein of small cross section relative to the cross sectional areas of the cylinders 15 and 17.

The piston 16 is provided along the forward face thereof with a rod 21 that slidably and sealingly extends through the opening 20 in the divider wall 19 and is reciprocable with respect thereto. The piston 16 is biased toward the inactive retracted position thereof illustrated in FIGS. 1 and 3 by a helical tension spring 22 secured at one end to a post 23 fixedly constrained by the casing 11 against axial displacements in at least the forward direction, or toward the left as the pin cutter is shown in FIG. 3. At its opposite end, the spring 22 is secured to the piston 16 as by being seated within a recess provided therefor in the piston 16 and rod 21, and to which components the spring may be fastened by a set screw or other fastener 24.

The forward end portion of the cylinder 15 is exhausted to atmosphere through a vent passage 25, and the rear end portion thereof is adapted to be supplied with a pressurized fluid through inlet means generally denoted 26, and which may take the form of a fitting threadedly received within an aperture provided therefor in the closure cap 13. As shown in FIG. 2, the inlet means 26 is connected through a supply conduit 27 to a source of pressurized gaseous fluid (such as compressed air, oxygen, nitrogen or other gas) as represented by the tank 28 which is provided with a conventional valve structure and pressure gauge 29 as shown. A conveniently manipulated control valve is advantageously interposed in the supply line 27 such as the foot-operated valve 30 shown in FIG. 2. Evidently, when a pressurized gas is supplied to the cylinder 15 through the inlet means 26, the piston 16 will be displaced toward the

divider wall 19 against the biasing force of the spring 22; and when the pressure developed within the cylinder is relieved by releasing the valve 30, the piston 16 will be returned to the deenergized position shown by the biasing force of the spring 22.

The piston 18 has a rod 31 secured thereto which extends through an opening 32 in the forward end closure 33 of the cylinder 17. The forward end portion of the cylinder 17 is exhausted to atmosphere through a vent passage 34, and the rear end portion of the cylinder is adapted to be filled with a liquid, as indicated in FIG. 3. The pistons 16 and 18 and piston rod 22 slidably and sealingly engage the respectively circumjacent surfaces provided by the casing section 12, and to facilitate this relationship the pistons and rod may be equipped with seal means such as the O-ring seals shown. The rod 31 may similarly be provided with an O-ring seal slidably engaging the circumjacent surface of the opening 32 although a sealing relationship at this location is not necessary since the adjacent end portion of the cylinder is vented to atmosphere through the passage 34.

The head 14 is hollow and turns downwardly through an angular distance approximately 90°, and extending into the head is the forward end of the rod 31 which at such end thereof is equipped with a downwardly projecting ram 35 of wedge-shaped or V-shaped configuration, as shown best in in FIGS. 4 and 5. The ram 35 at the lower end thereof is disposed between the inner or rear ends of a pair of jaw members 36 and 37 which together define cutter jaws and are axially elongated components pivotally supported, respectively, intermediate the ends thereof on pivot pins or posts 38 and 39 extending upwardly from the bottom wall 40 forming a part of the head 14. The jaw members 36 and 37 at the forward ends thereof project beyond the head 14 and are respectively equipped thereat with cutting blades 41 and 42.

The bottom wall 40 is a substantially flat, generally planar component provided at its forward end with a beveled edge 43 that tapers upwardly toward the blades 41 and 42 which are also flat along the bottoms thereof (as shown best in FIG. 3) and are inclined upwardly and forwardly along such bottoms at substantially the same angle as that of the lip 43. The flat configuration of the blades 41 and 42 along the bottoms thereof enables them to cut or sever an orthopedic pin substantially flush with the surface of bone in which it is embedded.

The jaw members 36 and 37 at their rear ends have angularly disposed cam surfaces 44 and 45 respectively engaging the facing surfaces of the wedge-shaped ram 35; and the jaw members are ordinarily biased into the open positions thereof illustrated in FIG. 4 by spring means which may take the form of a helical tension spring 46 respectively secured at the opposite ends thereof to the two jaw members. Evidently, the spring 46 not only biases the cutter jaws toward their open position but also imparts biasing force therethrough to the ram 35 and piston 18 tending to urge the same toward their retracted positions.

In use of the orthopedic pin cutter 11, the inlet means 26 thereof is connected to a source of pressurized gas (as shown in FIG. 2), and inclusion of a valve 30 along the supply line 27 enables the cutter to be energized selectively in a convenient manner. In this respect, actuating the valve 30 causes a pressurized fluid to be supplied to the rear end portion of the main cylinder 15 with the result that the main piston 16 therein is displaced axially toward the forward end of the tool. Such forward displacement of the piston 16 caused the rod 21 thereof to be displaced through the opening 20 in the divider wall 19 and into the rear end portion of the multiplier cylinder 17, whereupon the consequent reduction in volume tending to be enforced on such end portion of the multiplier cylinder, as represented by the volumetric displacement thereinto of the rod 21, causes the incompressible liquid within such end portion of the multiplier cylinder to displace the piston 18 thereof axially in a forward direction.

Such axial displacement of the piston 18 causes the rod 31 thereof to move forwardly therewith, whereupon the ram 35 (which is rigidly related to the rod 31) is displaced forwardly into its extended position, as shown in FIG. 5. Such displacement of the ram 35 wedges the inner end portions of the jaw members 36 and 37 outwardly about the pivot axes respectively defined by the posts 38 and 39 with the result that the forward blade-equipped ends of the cutter jaws are moved into their closed position as seen in FIG. 5. Consequently, any orthopedic pin disposed between the blades 41 and 42 is severed thereby. When the valve 30 is released, the pressure within the rear end portion of the main cylinder 15 is relieved thereby, and the spring 22 returns the piston to its retracted or deenergized position. Similarly, the spring 46 returns the jaw members 36 and 37 to the open position thereof shown in FIG. 4, and the resilient force of such spring 46 also biases the ram 35 and multiplier piston 18 toward their retracted positions.

The pin cutter 11 is operative to sever an orthopedic pin without significantly disturbing the same since no translational displacements of the tool are required during the cutting procedures and the tool can be carefully placed and held in position during its use by both hands of the surgeon, should this be necessary, since no manual force is required in application to the tool to effect its operation. It may be noted that for purposes of facilitating the ease with which a surgeon can hold the cutter, the cylindrical section 12 thereof may have angularly spaced and axially extending recesses or grooves along the outer surface thereof, as shown in FIG. 4. The flat inclined bottoms of the blades 41 and 42 enable the pin cutter to sever an orthopedic pin substantially flush with the surface of bone structure in which it is embedded, thereby obviating projections which could irritate the surrounding body tissues. Further, the powerful cutting action imparted to the cutter jaws enables the blades 41 and 42 thereof to sever orthopedic pins cleanly leaving substantially no burrs or other ragged surfaces. In this respect, typical embodiments of the invention readily sever solid stainless steel pins of from one-sixteenth to three-sixteenths of an inch in diameter.

The piston rod 21, cylinder 17 and piston 18 define force-multiplier structure coupling the main piston 16 of the tool with the actuating structure thereof defined by the rod 31 and ram 35 so as to effect displacement of the actuating structure into its extended position by application thereto of an axial force significantly increased in magnitude over the smaller-valued force associated with movement of the main piston 16 forwardly through its cylinder 15 whenever such movement is energized by admission of pressurized fluid into the cylinder 15 through the inlet means 26 thereof. The extent of the force magnification defined by the force-multiplier structure is determined by the ratio of the cross sectional areas of the pistons 16 and 18 (which are of the same diameter and, therefore, have the same cross sectional areas) to the cross sectional area of the rod 21. In a typical embodiment of the pin cutter 11, this ratio is of the order of 3 to 1 whereupon, for example, energizing gas at a pressure of approximately 400 psig admitted into the main cylinder 15 to energize the power stroke of the main piston 16 is increased to a pressure value of about 1,200 psig in the liquid energizing the power stroke of the multiplier piston 18. Therefore, the force (pressure of the energizing gas admitted into the cylinder 15 multiplied by the cross sectional area of the cylinder 16) associated with movement of the piston 16 through the power stroke thereof is increased by a multiple of three in its application to the actuating structure or wedge-shaped ram 35 thereof.

The value of such force is further magnified by the camming or wedging action defined by the ram 35, and the extent of such magnification is defined by the ratio of the axial distance through which the ram is displaced to the distance of the transverse displacement enforced upon each jaw member 36 and 37 along a line substantially normal to the axis of displacement of the ram (such transverse displacement being substantially equal to about one-half the transverse dimension of the rear wall of the ram 35, as is evident by comparing FIGS. 4

and 5). In the typical embodiment of the pin cutter 11 referred to hereinbefore, such ratio is about 2 to 1, thereby effectively increasing the axial force associated with forward displacement of the ram 35 by a multiple of two.

Further magnification or increase of force results from the lever action of the jaws which are provided with a mechanical advantage of about 4 to 1. The summation of these magnifications results in a force of about 7,600 pounds at the cutting portion of the jaws, notwithstanding the original energizing gas being introduced at a pressure of about 400 pounds per square inch.

The tool and various components thereof may be fabricated from conventional materials using standard techniques. In the embodiment illustrated, the casing 11 is formed of metal and the cylinders 15 and 17 may be machine finished. The closure cap 13 and end closure 33 can be threadedly secured to the casing section 12 as shown, and the head 14 can be threaded onto the end closure 33.

The embodiment of the invention illustrated in FIGS. 6 through 11 is especially adapted for heavy duty cutting such as of concrete reinforcing bars. It is also designed to enable severing of a member substantially flush with a surface from which it projects. Such cutter is denoted in its entirety by the reference numeral 50 and it includes a casing 51 comprised of an elongated, generally cylindrical section 52 closed at its rear end and terminating thereat in a pistol grip 53 facilitating handling of the tool. The forward end of the cylindrical section is closed by an elongated head 54 which projects forwardly therefrom and carries the severing mechanism.

The cylindrical section 52 defines a fluid pressure cylinder and has a piston 56 reciprocable therein. The piston 56 includes a piston head 57 from which a drive rod 58 projects axially forward through the fluid cylinder. As is illustrated, the forward end of such drive rod is slidably received within a bore 59 extending centrally through an end plate or disc 61 at the forward end of the cylinder. As will be explained hereinafter, the drive rod 58 not only constrains the piston for reciprocable motion within the cylinder, but also drives the mechanism which closes the severing jaws.

Means are also provided for delivering fluid pressure to the cylinder to drive the piston 56 forwardly therein on a power stroke. More particularly, an inlet fitting 62 is threadably received in the butt end of the pistol grip 53 and communicates with a passage 63 therein leading to one side of a piston 64 within a trigger valve cylinder 66. A second passage 67 leads from the opposite end of the valve cylinder 66 to and through the rear end wall of the cylinder 52. It will be appreciated that when the fitting 62 is suitably connected to a source of fluid pressure such as to a gas tank, and the trigger 68 of the valve is depressed, the pressure from the tank will be introduced into the cylinder 52 through the passage 67 in accordance with conventional practice. Such pressure will drive the piston 56 from its inactivated position shown in FIG. 6 forwardly on a power stroke. In this connection, the drive rod 58 is provided with an axial bore 69 within which is disposed a helical spring 71 connected in tension between the rear end wall of the cylinder and the forward end of the drive rod. The tension on the spring 71 will normally urge the piston into its unactivated position shown in FIG. 6, as well as return the piston to such position after the pressure introduced into the cylinder via passage 67 is released. A vent hole 71 is provided adjacent the forward end wall of the piston to allow the forward face of the plate 57 to remain at atmospheric pressure.

The elongated head portion 54 of the cutter carries cutting jaws at its forward end. More particularly, a pair of jaw members 72 and 73 are pivotally secured on pivot pins 74 within a slot 76 which extends angularly downward into the forward portion of the head 54. Such jaw members 72 and 73 respectively define cooperating cutting blades 76 and 77 along their inner edges forwardly of the pivot pins 74. As is illustrated, the cutting blades project outwardly of the slot 76 for engagement with a reinforcing bar or the like which it is desired to cut. A helical tension spring 78 connected between the jaw members rearwardly of the pivot location urges such rear ends together and thus tends to maintain the cutting blades in the open position shown in FIG. 9.

Means are provided responsive to translational movement of the piston 56 on its power stroke by pivoting the opposed cutting blades 76 and 77 toward one another into a closed position. As a particular salient feature of the instant invention, such actuating structure includes a cylindrical drum 81 which is rotatably carried by the casing immediately adjacent and above the rear ends of the jaw members 72 and 73. More specifically, an axle 82 is journalled for rotation between side walls 83 and 84 of the head portion and has rigidly secured thereto the cylindrical drum 81. The drum 81 is provided with a projection on its cylindrical periphery which coacts with the jaw members to force the ends thereof having the cutting blades together toward the closed position upon axial rotation of such drum. That is, as is best illustrated in FIG. 8, the cylindrical periphery or surface 86 of the drum is provided with a projection 87 which is in the form of a wedge wrapped on the cylindrical periphery. The side edges 88 of such projection taper away from one another in the direction of rotation of the drum, denoted by the arrow 89, and the projection 87 extends to a location between the jaw members rearwardly of the locations at which such jaw members are pivotally secured to the remainder of the cutter. The result is that as the drum rotates in the direction of arrow 89, the side edges 88 of the projection 87 coact with the inner side edges 91 of the jaw members rearwardly of the pivot locations to force the rear ends of the jaw members apart. This will in turn force the cutting blades 76 and 77 at the forward portions of the jaw members pivotally toward one another into the closed position. FIGS. 9 and 10 respectively illustrate the jaw members in their open positions and forced to their closed positions as aforesaid.

Means are provided for axially rotating the drum 81 and thereby providing the desired activation of the jaw members toward their closed position. More particularly, that portion of the cylindrical periphery of the drum opposite that including the wedge 87 is provided with a plurality of pinion gear teeth 92. Gear means coact with the teeth 92 to provide rotation of the drum. That is, a rack 93 having a linear gear set 94 engaged with the teeth 92 is mounted for axial reciprocable motion within the head portion 54. In this connection, such head portion is provided with a cylindrical bore 96 which extends forwardly of the forward end plate 61 and into which the drive rod 58 on the piston 56 is driven upon fluid pressure being applied to the rear face of the piston head 57 as previously described.

The rear end of the rack 93 is provided with a piston 97 which slidably engages the walls of the cylinder bore 96 and constrains the rack for axial reciprocable motion. The space defined by the rear surface of piston 97, the front surface of plate 61 and the bore 96 is filled with oil. Thus, upon actuation of piston 56 and forward movement of drive rod 58, the latter acts as a piston in the oil, urging piston 97 forwardly. As will be seen by comparing FIGS. 6 and 7, such movement will result in the rack 93 being driven forwardly and consequently causing rotation of the cylindrical drum 81. Upon such rotation of the drum, the side edges 88 of the projection 87 will coact with the inner side edges 91 of the jaw members as described previously to cause movement of the cutting blades to their closed position.

As is depicted in FIG. 6, when the piston 57 is in its unactuated position, the free end of the drive rod 58 is spaced within plate 61. Since the effective area of the forward end of the drive rod is smaller than the rear surface area of piston 97, the rod will move a greater lineal distance than piston 97, but the force will be inversed by a comparable ratio. Thus, if the ratio of areas is 2 to 1, the rod will move twice as far as piston 97, but the force on the latter will be double that of the rod. The arrangement of the parts is such that the blades come together just before the drive rod would otherwise engage the piston 97 as indicated in FIG. 7. This force multiplying feature of the invention enables the apparatus to be used to sever bars of a

greater thickness than one would normally expect from the fluid pressure applied to the piston **57**.

Spring means are provided for normally maintaining the drum **81** in its inactivated orientation depicted in FIGS. **6** and **8**. That is, the planar end faces **98** of the drum are each provided with an annular groove **99** which is coaxial with the axle **82**. A helical torsion spring **101** is located in each of the grooves **99** and has one end **102** positioned within a pocket at the bottom of its associated groove **99** in the drum, and its other end **103** correspondingly located in a pocket in the adjacent side wall **83** or **84** of the head **54**. With the ends of the springs **101** so constrained, it will be seen that such springs will tend to resist rotation of the drum relative to the walls of the head **54**. Because of such, the springs **101** will return the drum **81** and the rack **93** to their inactivated positions after the release of fluid pressure applied to the piston **56**.

It will be appreciated that the value of the force transmitted by the cylindrical drum to the jaw members is magnified by the camming or wedging action by which the rotary motion of the drum is converted to transverse displacement of the rear ends of the jaw members. The extent of such magnification is defined by the ratio of the angular distance through which the drum rotates to the transverse displacement forced upon each of the jaw members **72** and **73**. By choosing the optimum angle between the outwardly tapering side edges **88** of the wedge **87** relative to the inner side edges **91** of the jaw members, a desired magnification can be obtained. Of course, further magnification or increase of force results from the lever action of the jaw members provided by their pivoted securance.

It will be noted that the inclined bottom wall **104** of the head **54** beneath the jaw members **72** and **73** is substantially flat so that such jaw members can be brought into flush engagement with a surface from which a bar or the like to be severed projects. Moreover, the free ends of the jaw members which project outwardly of the slot **76** are also provided with depending protuberances **106** which bring such jaw members substantially into the plane defined by the wall **104**. This further enhances the ability of an operator to sever a bar substantially flush with a surface from which it might project.

I claim:

**1**. A cutter for metal pins, bars or the like, comprising a casing provided with an axially extending main cylinder having a main piston reciprocable therein through power and return strokes, cutter jaws carried by said casing for movement between open and closed positions for severing when closing a pin or bar disposed therebetween, actuating structure supported by said casing for displacements between extended and retracted positions and being operatively connected with said cutter jaws to force the same toward the closed position thereof upon displacement of said actuating structure into its extended position, force-multiplier structure including an axially extending multiplier cylinder having a multiplier piston reciprocable therein, said actuating structure being connected with said multiplier piston for displacement thereby into its extended position, said main and multiplier cylinders being disposed in tandem orientation along said casing which is equipped with a divider wall separating said cylinders from each other and provided centrally with an opening therethrough, said main piston being equipped with a rod slidably and sealingly extending through said opening and being extensible into said multiplier cylinder to reduce the volume thereof upon movement of said main piston through its power stroke, the effective area of said main piston against which such pressurized fluid acts being substantially greater than the effective area of said rod so as to effect an increase in the magnitude of the force transmitted to said actuating structure, the end portion of said multiplier cylinder intermediate said multiplier piston and said divider wall being substantially filled with a fluid, and inlet means connected with said main cylinder for supplying pressurized fluid thereto to energize the power stroke of said main piston.

**2**. The cutter for metal pins, bars or the like of claim **1** wherein said main cylinder is adapted to be energized by gaseous fluid, and in which means are provided for returning said pistons to their retracted positions upon relief of any pressure force resulting from the supply of pressurized fluid to said main cylinder.

**3**. The cutter for metal pins, bars or the like of claim **1** in which said cutter jaws comprise a pair of jaw members equipped with cutting blades movable relative to each other between the aforesaid open and closed positions, said blades being flat along the undersurfaces thereof to enable a pin to be served substantially flush with a surface from which it projects.

**4**. A cutter for metal pins, bars or the like comprising a casing, a pair of adjacent jaw members pivotally supported on said casing for pivotal movement of opposed cutting blades defined at one end of said pair toward and away from one another between open and closed positions, respectively, for severing when closing a pin or bar disposed therebetween; actuating structure supported by said casing operatively connected with said pair of cutting jaw members to force the same toward the closed position upon actuation thereof, said actuating structure including a cylindrical drum rotatably carried by said casing adjacent said jaw members and having a projection on its cylindrical periphery which coacts with said jaw members to force the ends thereof having said cutting blades together toward said closed position upon axial rotation of said drum, and means for axially rotating said drum.

**5**. The cutter for metal pins, bars or the like of claim **4** wherein said pair of adjacent cutting jaw members are pivotally supported on said casing at locations intermediate their ends, and said cylindrical drum is carried by said casing with said projection extending between said jaw members rearwardly of the locations at which the same are pivotally supported on said casing, the side edges of said projection coacting with the inner side edges of said jaw members rearwardly of said pivot locations upon axial rotation of said drum by separating the ends of said jaw members opposite the ends having the cutting blades and thereby pivotally forcing said cutting blades toward said closed position.

**6**. The cutter for metal pins, bars or the like of claim **5** wherein said projection is in the form of a wedge wrapped on said cylindrical periphery having side edges tapering away from one another in the direction of rotation of said drum to provide said coaction with the inner side edges of said jaw members separating said opposite ends and consequently said jaw members to said closed position.

**7**. A cutter for metal pins, bars or the like of claim **4** wherein a plurality of pinion gear teeth are provided about a portion of the cylindrical periphery of said drum and said means for axially rotating said drum includes gear means engageable with said teeth for imparting said rotation via said teeth to said drum.

**8**. The cutter for metal pins, bars or the like of claim **7** wherein said gear means is in the form of a reciprocable rack engageable with said teeth for rotating said drum upon translation thereof.

**9**. The cutter for metal pins, bars or the like of claim **8** wherein said casing is provided with a cylinder having a piston reciprocal therein through power and return strokes, said piston having a drive rod projecting axially therefrom for operative engagement with said rack upon movement of said piston through said power stroke to drive said rack and thereby rotate said drum to force said cutting members to a closed position, and means for communicably connecting said cylinder to a source of fluid pressure to drive said piston on said power stroke.

**10**. The cutter for metal pins, bars or the like of claim **9** wherein the free end of said drive rod has a smaller area than the confronting surface of said rack.

**11**. The cutter for metal pins, bars or the like of claim **9** wherein said pair of adjacent cutting jaw members are pivotally supported on said casing at locations intermediate

their ends, and said cylindrical drum is carried by said casing with said projection extending between said jaw members rearwardly of the locations at which the same are pivotally supported on said casing, the side edges of said projection coacting with the inner side edges of said jaw members rearwardly of said pivot locations upon axial rotation of said drum by separating the ends of said jaw members opposite the ends having the cutting blades and thereby pivotally forcing said cutting blades toward said closed position.

12. The cutter for metal pins, bars or the like of claim 11 wherein said projection is in the form of a wedge wrapped on said cylindrical periphery having side edges tapering away from one another in the direction of rotation of said drum to provide said coaction with the inner side edges of said jaw members and separating said opposite ends and consequently pivoting said jaw members to said closed position.

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