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Jahnke

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[54] **POULTRY CUTTER**

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[51] **Int. Cl.** **A22c 21/00**

[58] **Field of Search** 17/11, 12, 52

[56] **References Cited**

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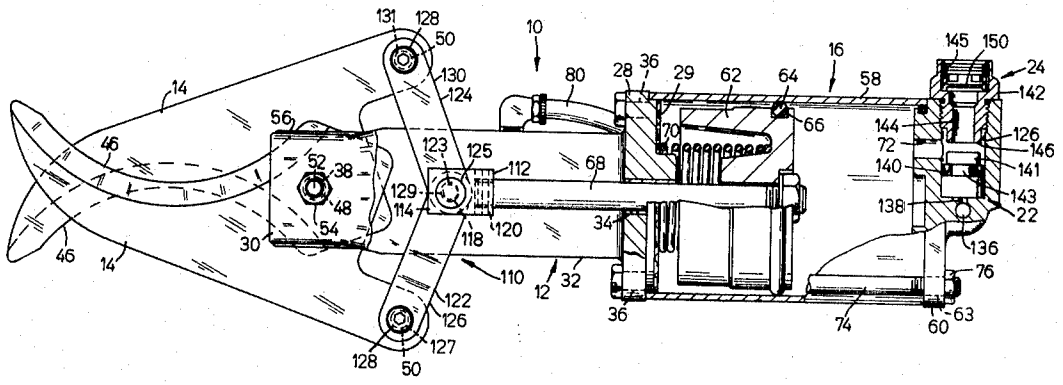
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[57] **ABSTRACT**

A hock and neck cutter having a pair of arcuate cutting blades pivotally mounted on the housing, a pneumatic piston and cylinder assembly mounted on said housing and a compound linkage assembly connecting said piston and cylinder assembly to said cutting blades to provide decreasing speed and increasing force in the movement of said blades. A low-force air valve is used to control the pressurization of the piston and cylinder assembly and a discharge air silencer is provided in the discharge passage of the piston and cylinder assembly.

8 Claims, 4 Drawing Figures



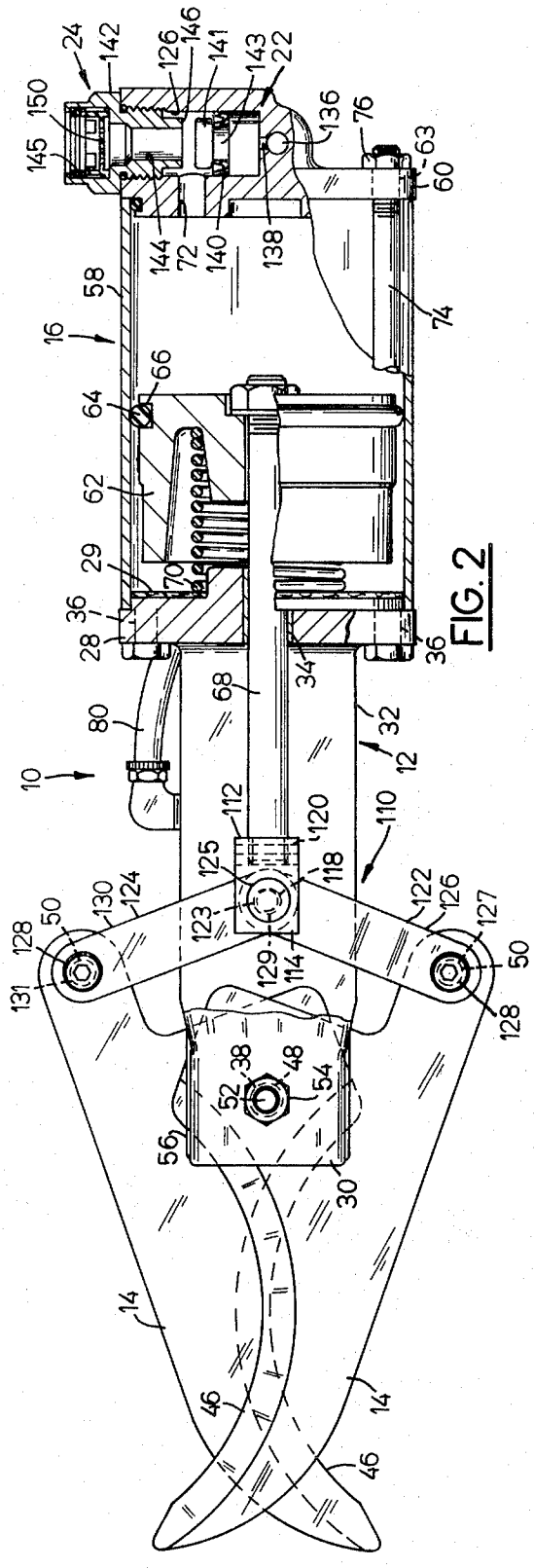


FIG. 2

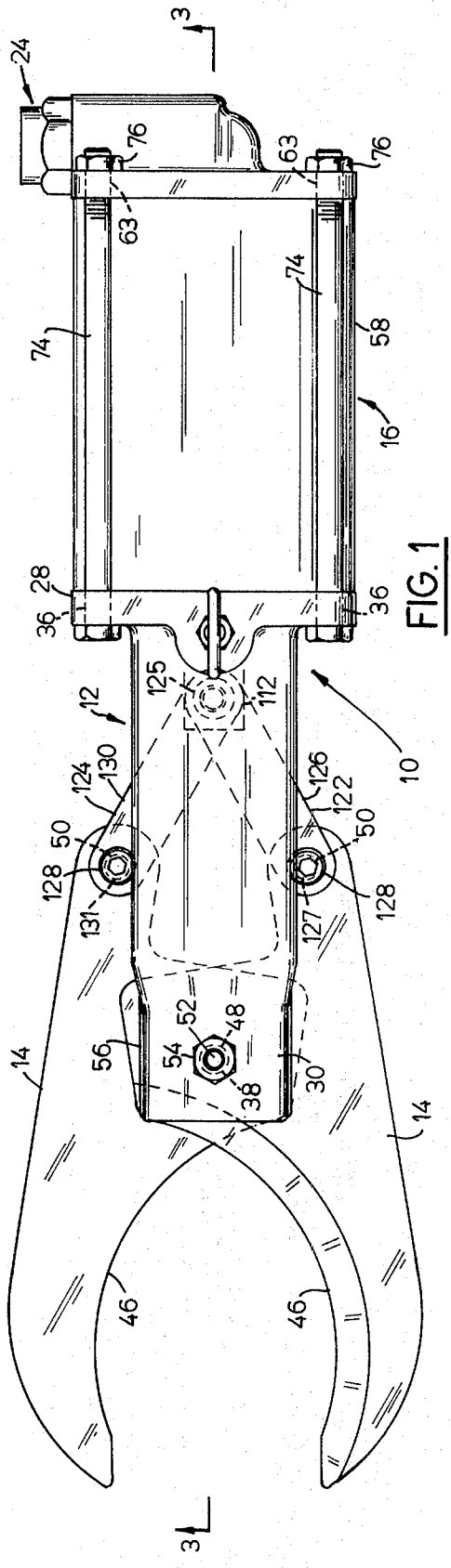


FIG. 1

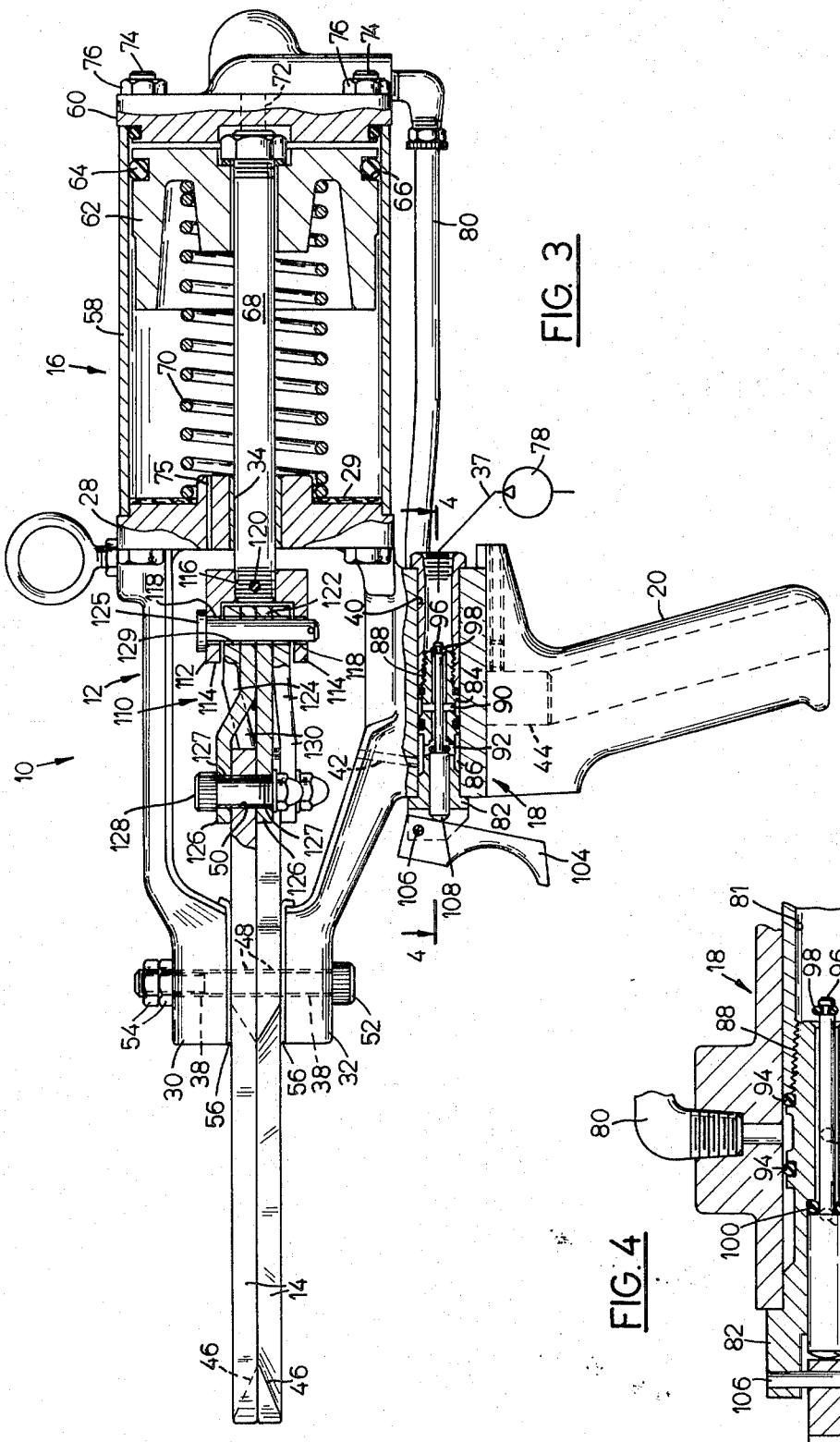


FIG. 3

FIG. 4

POULTRY CUTTER

SUMMARY OF THE INVENTION

The hock and neck cutter of this invention is a fast acting device that can be controlled by a small amount of manual force. A unique compound linkage arrangement provides a decreasing rate in the speed of closing movement and an increasing cutting force as the cutter blades close. By providing a decreasing rate of speed in closing, there is no necessity for having a limit stop to halt the closing momentum of the blades. A pressure responsive control valve is used to control the admission and discharge of air to and from the cylinder assembly. The cutting cycle can be stopped at any point by simply releasing the trigger actuated valve. A special exhaust silencer is provided in the exhaust line to eliminate air noise on discharge of air from the cylinder. Interchangeability of blades is achieved by using identically shaped cutter blades.

DRAWINGS

FIG. **1** is a top view of the hock and neck cutter;

FIG. **2** is a view similar to FIG. **1** with the portion of the housing and cylinder removed to show the inside of the cutter;

FIG. **3** is a side view in elevation of the cutter with a portion of the air valve and cylinder removed; and

FIG. **4** is an enlarged view of the air valve.

DESCRIPTION OF THE INVENTION

The hock and neck cutter **10** of the present invention generally includes a housing or body **12** having a pair of identical cutting blades **14** pivotally mounted on the body and actuated by means of a pneumatic piston and cylinder assembly **16.** The piston assembly **16** is actuated to close the blades **14** by means of a trigger actuated valve assembly **18.** A handle **20** is mounted on the body **12** in a position to provide for actuation of the valve assembly **18** by gripping the handle. Actuation of the trigger assembly **18** pressurizes the piston and cylinder assembly **16** to close the blades, and on release of the trigger assembly **18** the piston and cylinder assembly automatically retracts to open the blades.

A unique pressure responsive air valve **22** is used to direct the flow of air into the piston and cylinder assembly **16** and to direct the discharge of air from the piston and cylinder assembly **16.** The noise of the discharged air is silenced by means of an air silencer **24** provided in the discharge passage **26** from the piston and cylinder assembly **16.**

More particularly and referring to FIG. **3,** the body **12** is shown in the form of a casting having an end plate **28** and upper and lower support arms **30** and **32.** The end plate **28** includes a central aperture **34** and a number of mounting holes **36.** Coaxial bores **38** are provided in the ends of each of the upper and lower arms **30** and **32.** The lower arm **32** is provided with a bore **40** which is connected to a discharge air passage **42.** A boss **44** is provided on the bottom of arm **32** for the handle **20.**

CUTTING BLADES

The cutting blades **14** are identical so that they can be interchangeably mounted on the housing **12.** Each of the cutting blades **14** includes a radiused cutting edge **46** and a hole **48.** A second hole **50** is provided at the inner end of each of the cutting blades **14** at a spaced distance from hole **48.** The blades **14** are mounted in the space between the ends of the upper and lower arms **30** and **32** with the holes **48** axially aligned with the bores **38.** The blades are mounted for pivotal movement on the body by means of a bolt **52** which extends through the holes **38** and **48** and is retained therein by lock nuts **54.** Tension is maintained in the blades by means of brass shoes **56** provided between the blades **14** and the ends of the arms **30** and **32.** Although the blades are shown as having radiused or arcuate cutting edges, it should be understood that the edges could also be straight.

PISTON AND CYLINDER ASSEMBLY

The piston and cylinder assembly **16** includes a cylindrical housing **58** having one end seated on the end plate **28** of the body **12** and an end plate **60** having mounting holes **63** seated in the open end of the housing **58.** The end cap **28,** cylinder **58** and end cap **60** are held in a fixed relation by means of a number of through bolts **74** and nuts **76** which extend through holes **36** and **63.** An air vent passage **75** is provided in end plate **28.**

A piston head **62** is mounted within the cylinder **58** and is sealed therein by means of an O-ring seal **64** positioned in an annular groove **66** in the outer surface of the piston head **62.** A piston rod **68** is connected to the piston head **62** and extends outwardly through the bore **34** in the end cap **28.** The piston is biased by means of spring **70** towards the end cap **60.** The piston head **62** is prevented from bottoming on the end cap **28** by means of a cushioning pad **29** to minimize noise. Air trapped in cylinder **58** is vented through passage **75** to atmosphere.

Air is admitted to and discharged from the cylinder housing **58** through a port **72** in end cap **60.** In this regard, the end cap **60** is provided with the discharge passage **26** which intersects port **72.** An air inlet port **136** is connected to the passage **26** through an orifice **138.** The direction of air flow through the discharge passage **26** is controlled by means of the air valve **22** as described hereinafter.

AIR VALVE ASSEMBLY

Means are provided for controlling the admission of air under pressure to the cylinder **58** from an air pressure source **78.** In this regard, the pressure source **78** is connected to the passage **40** in the lower arm **32** by means of a rubber tube **37.** The passage **40** as seen in FIGS. **3** and **4** is connected to the port **136** by means of a tube **80.** The flow of air through the passage **40** and into the tube **80** is controlled by means of the trigger actuated valve assembly **18.**

The valve assembly **18** includes a tubular member **81** and a body member **82** having recessed grooves **84** and **86** and a central passage **88.** The central passage **88** is connected to the air groove **84** by a transverse passage **90.** The recess **86** is connected to the central passage **88** by a transverse passage **92.** The air valve body member **82** is threadedly connected to the tubular member **81** and is sealed within the passage **40** by means of O-ring seals **94** located in annular grooves **96** on each side of the recess **84.**

The flow of air through the passage **88** is controlled by means of a valve stem **96** having an O-ring seal **98** at one end to sealingly engage the inlet end of the passage **88** and an O-ring **100** at the other end to sealingly

engage a shoulder **102** at the discharge end of the passage **88.** The O-ring seals **98** and **100** are spaced a distance apart slightly greater than the length of the passage **88.**

Under normal operating conditions, the pressure of the air in passage **40** will act against the cross sectional area of the end of valve stem **96** to force the valve stem **96** to a closed position with respect to the passage **88.** In the closed position the annular recess **84** will be connected to the discharge annular recess **86** through passages **90, 88** and **92.** The discharge recess **86** is vented to atmosphere through passage **42** in the lower arm **32.**

The valve stem **96** is moved axially in the passage **88** by means of a trigger **104** pivotally mounted on a pivot pin **106** located at the end of the air valve body **82.** The trigger **104** is positioned to engage the outwardly extending end **108** of the valve stem **96.** Pivotal movement of the trigger **104** towards the valve stem will move the valve stem axially in the passage **88.** The O-ring seal **98** will be moved away from the inlet end of the passage **88** allowing air under pressure to enter the passage **88.** The O-ring seal **100** will sealingly engage the shoulder **102** closing the discharge end of the passage **88.** Air entering the passage **88** will flow through the passage **90** into recess **84** and out through the tube **80** to pressurize the cylinder assembly. On release of the trigger **104,** the air under pressure in passage **40** will act to move the valve stem **96** axially in the passage to close the inlet to passage **88.** Any air under pressure in the tube **80** will be discharged through recess **84,** passages **90, 88** and **92,** recess **86** and out through passage **42.**

LINKAGE ASSEMBLY

The piston rod **68** is operably connected to the blades **14** by means of a compound linkage assembly **110.** The assembly **110** includes a member **112** having a pair of spaced flanges **114.** A threaded mounting hole **116** is provided in the body **112** and a pair of pivot holes **118** are coaxially located in the flanges **114.** The body **112** is threadedly mounted on the end of the piston rod **68** and secured thereto by a pin **120.**

The member **112** is connected to the blades **14** by means of lever arms **122** and **124.** The lever arm **122** is in the form of a single arm having a mounting hole **123** at the inner end and a pair of interconnecting flanges **126** at the outer end, each having a hole **127.** The arm **122** is connected to the blade **14** by means of a bolt **128** which extends through the hole **50** at the end of the blade **14** and the holes **127** at the end of flanges **126.** The arm **124** includes a pair of plates **130** each having a hole **129** at the inner end and a hole **131** at the outer end. The plates **130** are connected to the blade **14** by means of a bolt **128** which extends through hole **50** and holes **131.** The inner end of the arms **122** and **124** are connected to the body member **112** by means of a pivot bolt **125** which passes through the openings in the flanges **114** of the body member **112** and the holes **123** and **129** at the inner end of arms **122** and **124.**

The compound linkage assembly **110** provides for the rapid closing of the cutting blades **14** on initial movement of the piston rod **68** with a gradual reduction in the closing rate and an increase in the force acting on the blades as the piston rod approaches the end of its stroke. This can be seen in FIGS. **1** and **2** wherein the arms are shown initially at a small angular relation to each other. In the final position the arms will be positioned at a large angular relation to each other. It should be apparent that as the arms **122** and **124** spread apart, a smaller angular movement will be imparted to the blades but at a greater force.

The piston rod **68** can be lubricated by directing the discharged air from passage **42** against the piston rod. In this regard, it should be noted that the air which is used for actuating the neck and hock cutter is normally oil laden, i.e., oil is introduced into the air stream. By directing the air discharged through passage **42** against the piston rod, a small amount of oil will be deposited onto the piston rod **68.**

AIR SILENCER

Air discharged from cylinder **68** is silenced by means of the air silencer assembly **24.** In this regard, the silencer assembly **24** includes a body member **142** which is threadedly received in the end of the passage **26.** The body member **142** includes a discharge passage **144** having a valve seat **146** at its inner end and an enlarged threaded bore **145** at its outer end. The discharge air is silenced by means of a screen **150** provided in the bore **145** at the outer end of the passage **144.** The screen **150** acts to diffuse the air and thereby eliminate any noise.

DISCHARGE AIR VALVE

Means are provided for controlling the admission of air into the cylinder **58** and the discharge of air from the cylinder **58.** Such means is in the form of the valve **22** provided in the passage **26** in the end plate **60.** In this regard, the valve **22** includes a valve or seal element **141** and a stem **143.** A V-shaped seal ring **140** is mounted on the outer periphery of the stem **143** in a position to sealingly engage the walls of passage **26.** Air entering through the port **136** and orifice **138** will force the valve **22** outwardly in the passage **26** into engagement with the valve seat **146** closing the passage **144.** The force of the air will collapse the seal so that air will bypass the valve stem and enter the cylinder **58** through port **72.**

When the trigger **104** is released, the force of the air acting on the valve **22** will drop to zero in the passage **26.** The spring **70** will immediately act on the piston head **62** to retract piston rod **68.** Reverse motion of the piston head **62** will produce an increase in pressure in the passage **26** on the discharge side of the valve **22.** This air under pressure will act on the V-type seal **140** to force it into engagement with the passage **26.** The valve member **22** will move inwardly in the passage **26.** As the valve member **22** moves away from the body **142** of the silencer **24,** the passage **144** will open allowing air to discharge through the silencer **24** to atmosphere.

I claim:

1. A hock and neck cutter comprising,

a housing,

a pair of identical cutting blades pivotally mounted on said housing,

a pneumatic piston and cylinder assembly mounted on said housing,

an air inlet passage and an air discharge passage connected to said cylinder assembly,

means for operably connecting said cylinder assembly to said blades to provide a decreasing rate of closing speed with increasing force,

a source of air under pressure connected to said passage in said cylinder assembly,

a pressure responsive valve member to direct air under pressure into the cylinder assembly and being responsive to exhaust pressure from the cylinder assembly to direct exhaust air through the discharge passage,

and means in said housing for selectively pressurizing said valve member to pivot said blades.

2. The cutter according to claim **1** wherein said connecting means includes a pair of lever arms each having one end connected to a common point on said cylinder assembly and the other end to a point on the blades spaced from the pivot point of the blades.

3. The cutter according to claim **1** wherein said pressurizing means includes a trigger controlled low force air valve assembly mounted in said housing to control the admission of air to said inlet passage.

4. The cutter according to claim **1** wherein said pressure responsive valve member includes a valve element and a valve stem, a V-shaped seal ring mounted on the outer periphery of said valve stem in a position to seal the air inlet passage, said V-shaped seal ring collapsing in response to the force of air entering the passage to allow air under pressure to pass into said cylinder assembly and responding to discharge air to open the discharge passage.

5. The cutter according to claim **1** including means for silencing the discharge air as it is discharged from the cylinder assembly.

6. A hock and neck cutter comprising:

a body,

a pair of cutter blades pivotally mounted on said body for movement between opened and closed positions,

a pneumatic piston and cylinder assembly mounted on said body,

a pressure responsive valve member to direct air under pressure into the cylinder assembly and being responsive to exhaust pressure from the cylinder assembly to direct exhaust air through the discharge passage,

a compound linkage assembly connecting said piston and cylinder assembly to said blades to provide decreasing speed of movement and increasing power when closing said blades,

and a trigger operated low force air valve connected to control the pressure responsive valve member.

7. The cutter according to claim **6** wherein said cutter blades are identical and each blade includes a radiused cutting edge.

8. The cutter according to claim **6** wherein said valve includes a V-shaped seal ring positioned to bypass inlet air past the valve into said cylinder assembly and to direct the discharged air to atmosphere.

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