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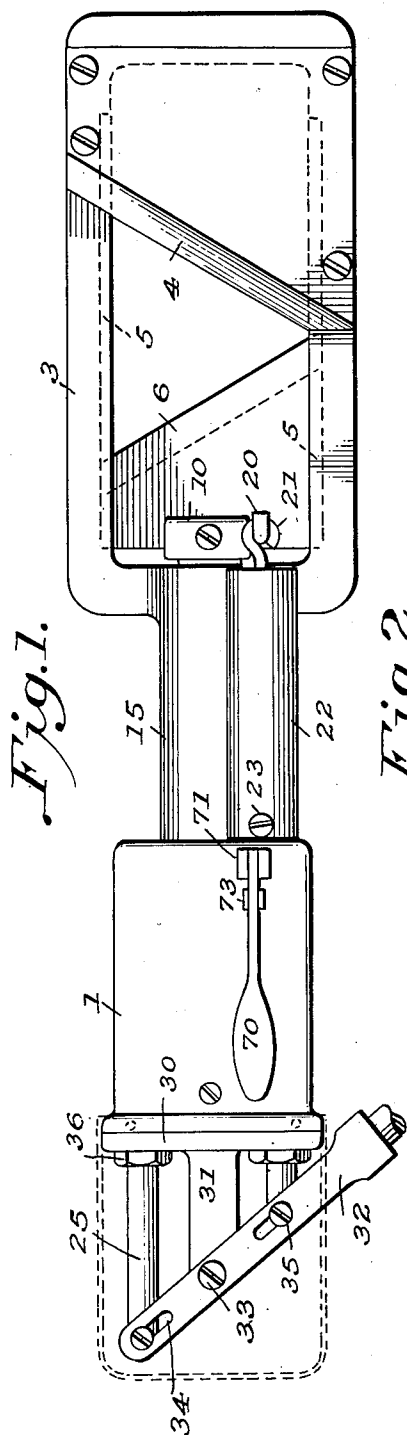
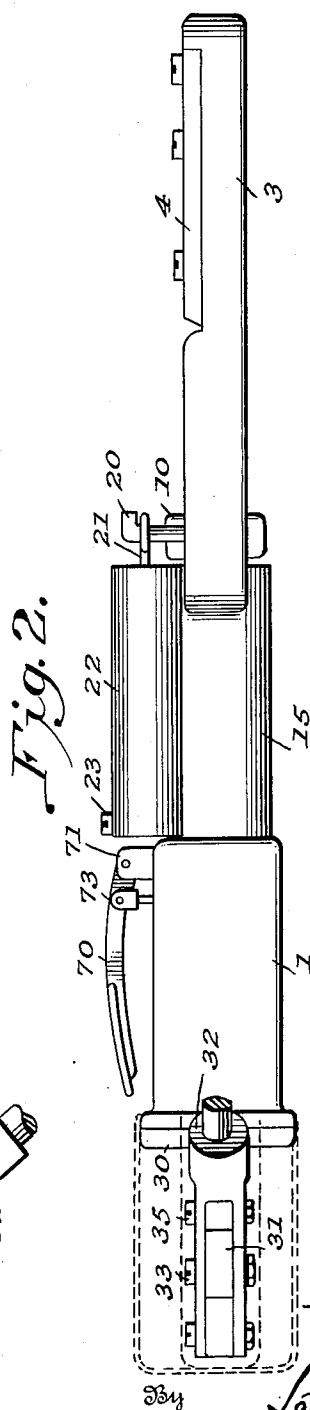
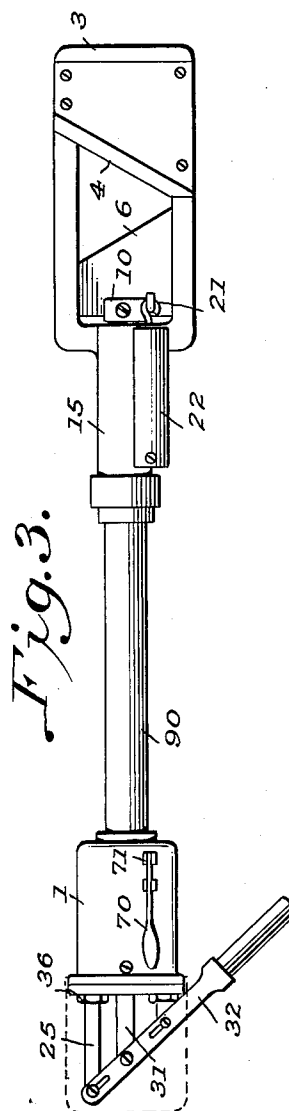
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2,257,245

DEHORNING DEVICE

Filed March 12, 1940

4 Sheets-Sheet 1



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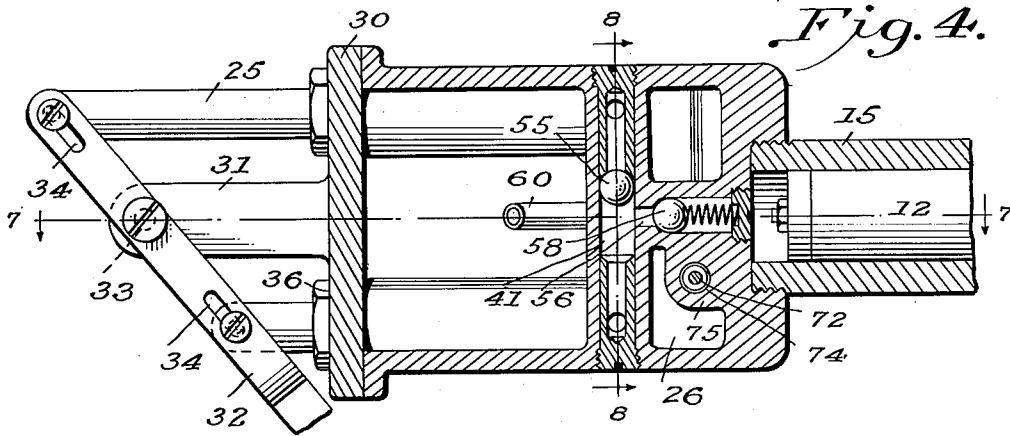
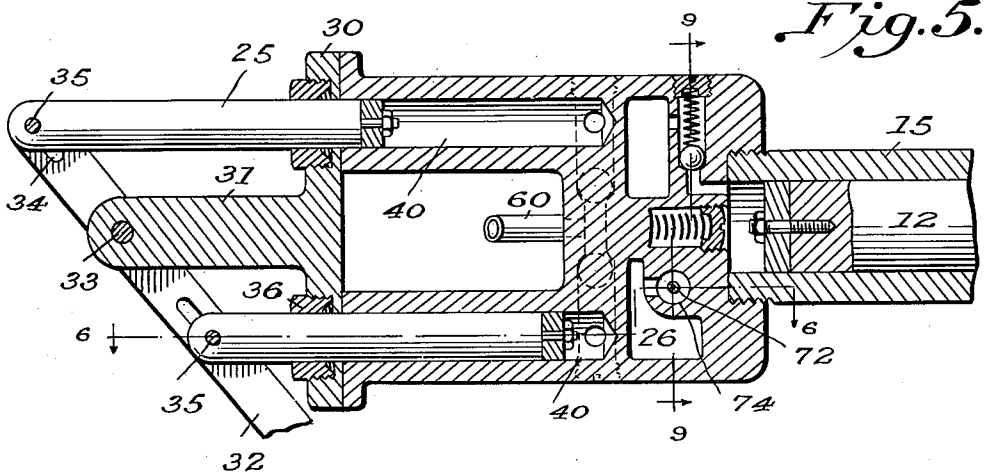
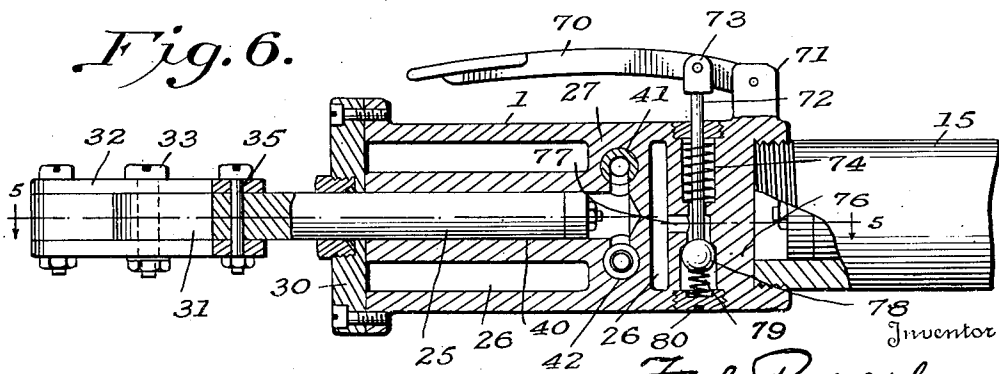
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4 Sheets-Sheet 2



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Fig. 7.

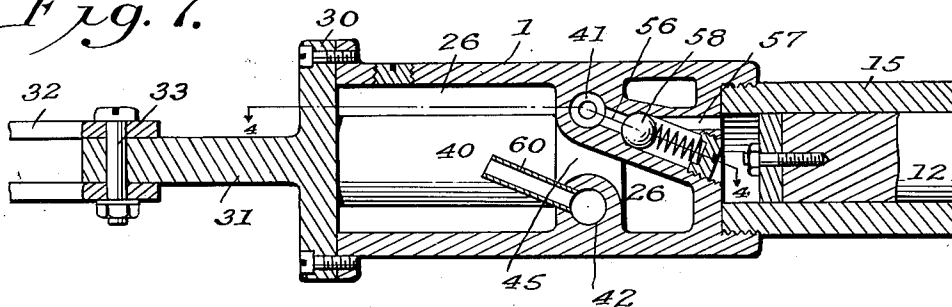


Fig. 8.

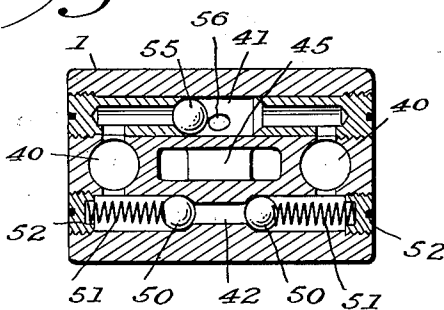


Fig. 9.

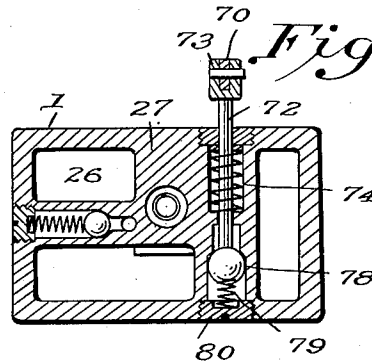


Fig. 10.

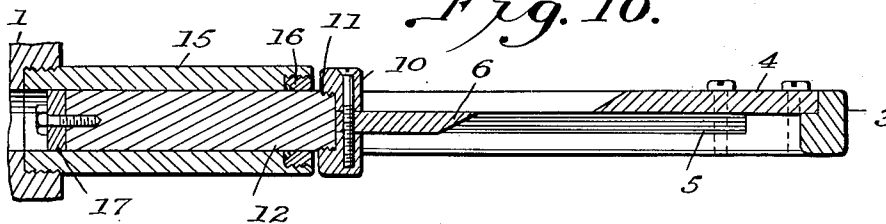
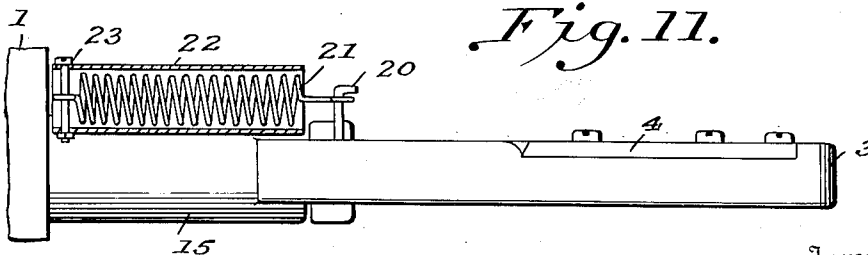


Fig. 11.



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Fig. 12.

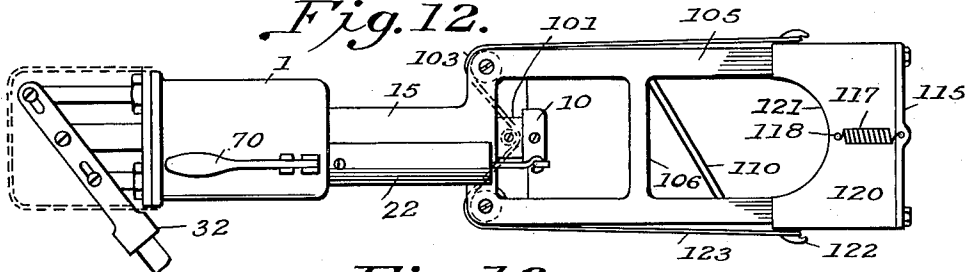


Fig. 13.

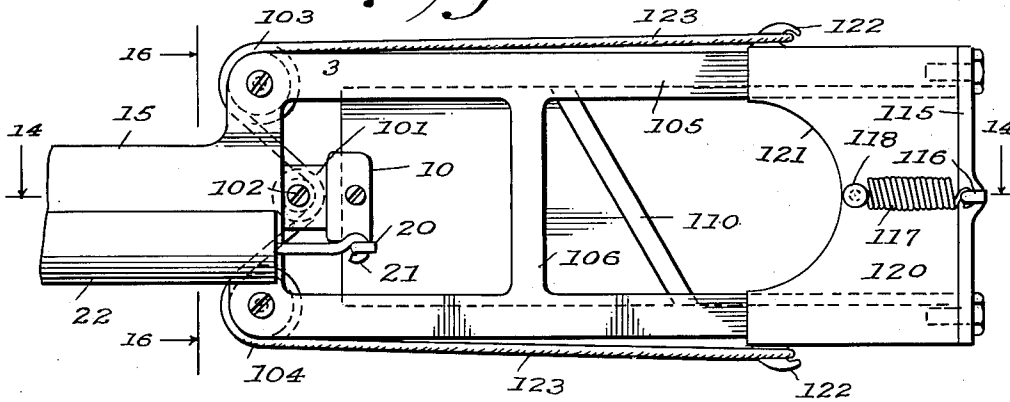


Fig. 14.

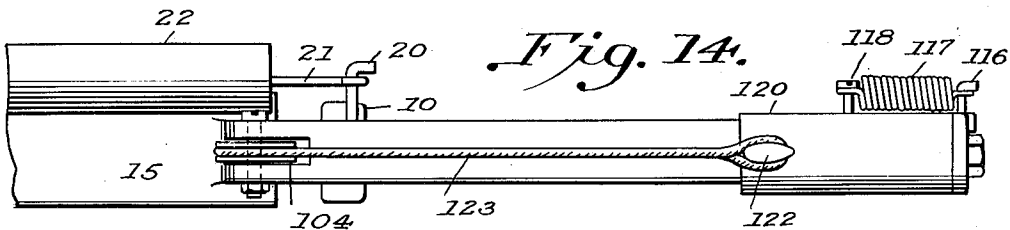


Fig. 15.

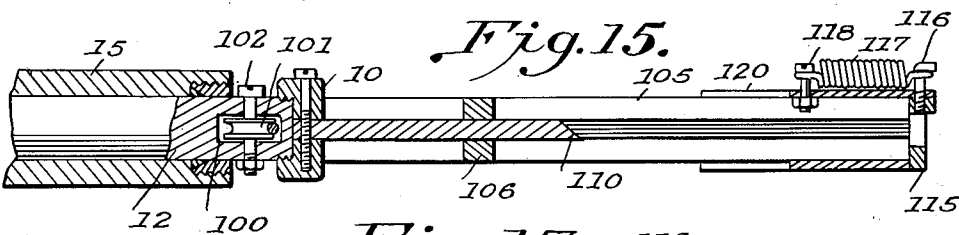


Fig. 17.

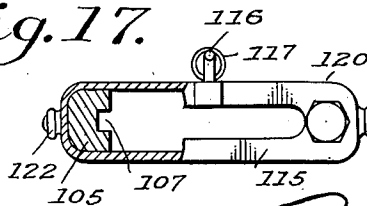
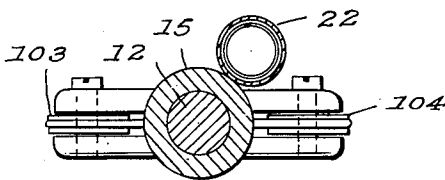


Fig. 16.



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UNITED STATES PATENT OFFICE

2,257,245

DEHORNING DEVICE

Faucette S. Rudolph, Yuma, Ariz.

Application March 12, 1940, Serial No. 323,628

8 Claims. (Cl. 30—241)

This invention relates to a dehorning device and, more particularly, to a hydraulic motor operated dehorning knife.

An object of the invention is to construct a portable hydraulically operated dehorner in which a movable knife blade is easily and powerfully moved in overlapping relation to a fixed knife for dehorning cattle and the like.

Another object of the invention is to positively guide and project the sliding blade with sufficient force and smoothness to insure that a positive cutting action results without splintering or the expenditure of very much energy.

Another object of the invention is to provide a pressure releasing means and spring return for the sliding guillotine type of knife so that after each stroke of the knife the apparatus will be in condition for immediate reuse.

A still further object is to improve the construction of the fluid motor with its pressure creating means and associated valves and passages and thereby can be readily manufactured and assembled with a minimum amount of machining and assembly difficulties.

While the fluid motor is described and claimed in combination with a dehorning instrument, it will be understood that the motor per se is adaptable for use with other tools and instrumentalities.

In the drawings,

Fig. 1 is a top plan view of the complete dehorning apparatus;

Fig. 2 is a side elevational view of the instrument;

Fig. 3 is a plan view of a slightly modified form in which a flexible conduit is provided so that the motor may be operated at some distance from the cutting element;

Fig. 4 is a horizontal section taken on line 4—4 of Fig. 7;

Fig. 5 is a horizontal section taken on line 5—5 of Fig. 6;

Fig. 6 is a horizontal section taken on line 6—6 of Fig. 5;

Fig. 7 is a horizontal section taken on line 7—7 of Fig. 4;

Fig. 8 is a transverse section taken on line 8—8 of Fig. 4;

Fig. 9 is a vertical section taken on line 9—9 of Fig. 5;

Fig. 10 is a fragmental vertical section showing the details of the operating piston and knife;

Fig. 11 is a side plan view partly in section of the knife return spring and knife holder;

Fig. 12 is a modified type of dehorner using a cable operated cutting blade projector;

Fig. 13 is an enlarged plan view of the modified form of blade and blade holder;

Fig. 14 is a side elevation of the modification;

Fig. 15 is a longitudinal cross section taken on line 14—14 of Fig. 13;

Fig. 16 is a vertical section taken on line 16—16 of Fig. 13 in the direction of the arrows; and

Fig. 17 is an end view of the cutter, partly in section.

Broadly speaking, the present apparatus is composed of three major parts, 1, 2 and 3, respectively. Numeral 1 denotes the fluid motor for generating fluid pressure in a cylinder and piston 2 for projecting a guillotine knife slidably mounted in a frame 3.

More particularly, the dehorning knife structure comprises an open frame 3 having an oblique knife plate 4 secured in the outer end thereof. Grooves 5 are provided in the side walls of the knife frame for the guidance of a reciprocating oblique knife blade 6 that is adapted to be projected outwardly and overlap the fixed knife 4, and, as shown in Fig. 10, the guide grooves 5 extend beyond the blade of fixed knife 4, so that the blades will actually overlap.

The inner edge of the movable knife 6 is bolted to a slotted holder 10, having a threaded opening 11 screwed on the outer end of cylindrical piston 12 that is mounted for movement in cylinder 15. The cylinder 15 may be formed integrally with the knife frame 3 or attached thereto by any suitable means.

The opposite end of the cylinder 15 is screw-threaded into the fluid motor casing 1 and, as shown, a packed gland 16 is provided at the outer end of the cylinder to seal the piston and to prevent loss of compression. Preferably an expansion packing 17 is also positioned on the inner end of the piston and thus expanded by the fluid pressure to which it is exposed.

Referring again to the movable knife 6, it will be observed that it is provided with an upstanding lug or hook 20 adjacent the knife holder 10. The shank of the upstanding hook 20 is engaged by a coil spring 21 retained in an open cylindrical casing 22 welded to the knife frame and operating piston cylinder. The opposite end of the spring 21 is retained by being looped around a bolt 23 passing through the casing 22. This spring assembly is for the purpose of returning the movable knife 6 to its initial or open position after the cutting action has taken place and pressure is relieved on the operating piston.

Referring now to the several detail views of the hydraulic motor, it will be observed that the

motor casing 1, preferably machined or die-cast, contains the fluid pressure pistons and associated valves for applying the fluid pressure onto the inner end of the piston 12 for smoothly and positively projecting the knife blade 6. The casing 1 is made with spaced parallel piston chambers 25 at opposite sides thereof with an intermediate fluid storage chamber 26. As will be described hereinafter, the central fluid supply chamber extends through and beyond the vertical partition wall 27, so that a comparatively large amount of fluid is always available in the casing.

The outer end of the motor casing 1 is closed by a bolted cover plate 30 having an outwardly extending fulcrum 31 to which is pivoted operating handle 32. This handle is centrally pivoted by pin 33 to the fulcrum 31 and is made with elongated slots 34 for the retention of pivot pins 35 passing through openings formed in the outer ends of the motor pistons 25. It will be obvious that upon movement of the handle 32, the motor pistons 25 will be alternately reciprocated. To prevent the leakage of fluid from the casing around the pistons, packing nuts 36 are mounted in the cover plate 30 through which the pistons move.

The pistons 25 move in their respective piston chambers 40 that extend into the transverse partition wall 27. This wall (see Fig. 8) contains upper and lower valved passages 41 and 42, respectively, which communicate with the piston chambers 40. Intermediate the upper and lower valved passages 41 and 42 and lying between the parallel cylinder chambers 40 is an open passageway 45 to permit the fluid in the storage chambers 26 to circulate.

The central portion of the lower passage 42 is constricted to form seats for the ball valves 50 that are normally retained against their seats by springs 51 held in place by screw plugs 52 threaded in the outer ends of the passages.

The upper passage 41 is slightly enlarged at its central portion and constricted at either end to form alternate seats for the freely movable valve ball 55. A discharge opening 56 leads from the middle of upper passage 41 and branches off there from through passage 57, whereby fluid is introduced behind the piston 12 in cylinder 15. The fluid is normally blocked from passing through openings 41, 56 and 57 by means of a spring pressed ball valve 58, but upon being subjected to pressure the valve 58 is unseated and the fluid passes into the chamber 15 through exit 57. Fluid is introduced into the lower chamber 42 through pipe 60, which projects into the main storage chamber 26.

It will be obvious to those skilled in the art that when movement is given the handle 32 the pistons 25 create suction in the lower chambers which alternately unseat ball valves 50 and allow the fluid to pass from the chamber 26 through pipe 60 to passage 42 and thence upwardly into the piston chambers 40. After the pistons have drawn fluid into their respective chambers, the alternate reciprocation thereof forces the fluid upwardly into passage 41, where ball valve 51 under the influence of this pressure alternately opens and closes the right and left hand sides of the passage permitting the compressed fluid to pass into space 56 and, as before described, into the main piston chamber. Thus, the power piston 12 carrying the movable knife 6 is positively projected in the frame until it strikes the end of its side guide grooves.

After the cutting operation is completed and

it is desired to release the considerable pressure on the rear of the piston, the operator depresses the handle 70 pivoted at one end to an upstanding lug 71 formed on the motor casing. A vertically movable rod 72 is pivoted at 73 intermediate the ends of the handle 70 and extends downwardly through a passage 74 formed in a thickened portion 75 of the end of the casing. The lower end of the passage 74 communicates with the main power piston chamber 12 through duct 76 and into a portion of the fluid storage space 26 through transverse port 77. In the lower enlarged portion of the vertical chamber 74, there is mounted a ball valve 78 normally maintained in projected position through the medium of spring 79 and screw plug 80.

Consequently, the compressed fluid pressure in the cylinder 15, after it has accomplished its work in projecting piston 12, is relieved by depressing handle 70 to unseat ball 78 and open communication through duct 76, passage 74 and port 77 to permit the fluid to flow into storage space 26 and central opening 45 to return to the main storage compartment 26.

When desired a flexible conduit 90 may be inserted between the fluid motor unit 1 and the knife piston unit 2 so that the knife may be used at a distance from its source of power. As indicated in dotted lines, a casing 91, enclosing the moving parts of the pump operator, may be fastened to the end of the motor casing 1.

The modification illustrated in Figs. 12 to 17, inclusive, is primarily directed to the structure and operation of the cutter blade. The fluid motor operator 1 and piston 12 are similar to the before described form of dehorner.

As shown, the end of the power piston 12 is provided with a transverse slot 100 in which a pulley wheel 101 is mounted therein on bolt 102. Similar pulley wheels 103 and 104 are also positioned in slots formed in the inner corners of the knife frame 3. Preferably, the slotted side arms 105 of the frame are rounded and joined intermediate their ends by spaced cross bars 106.

Slide grooves 107 are provided in the inner sides of the side bars for guiding an oblique knife 110 fastened to the slotted holder 10 that is threaded to the outer end of piston 12. This is the same construction as before described and a similar knife return spring and assembly 20, 21 and 22 is used.

A bar 115 is bolted to the outer ends of the slotted frame arms 105 and carries a hook 116 on its upper edge for securing the end of coil spring 117. The opposite end of the spring is fastened by bolt 118 to the top of a slide or feed 120. This element is formed of sheet metal and embraces the side frame bars 105 and is adapted to slide therealong. The upper and lower front edges of the slide box 120 are arcuately cut out at 121 to provide an abutment for supporting the horn to be cut.

On each side edge of the feeder 120 there are fastened hook members 122 to retain the ends of a flexible operating cable 123 which run over the frame pulleys 103 and pass around piston pulley 101.

To operate this modified form of cutter the device is positioned over a horn in such a manner as to be retained against the arcuate plates 121. The fluid motor operator 32 is actuated to force piston 12 and knife 110 outwardly into the frame 3 whereupon the pulley 101 pulls the cable 123 to cause the slide 120 to move toward the cutter. This movement continues until the horn

is severed and the slide has passed over the top and bottom of the blade of the knife. On release of pressure by means of handle 70, as before described, the springs 21 and 117 quickly retract the knife blade 110 and slide or feeder 120 to their initial positions.

This form of cutter insures a smooth, powerful stroke which severs the animal's horn without crushing or splintering.

What I claim is:

1. In a dehorner, a fluid cylinder having a rectangular frame formed thereon, a fixed knife secured in one end of said frame, a movable knife adapted to slide in the sides of said frame and overlap the said fixed knife, a piston attached to the movable knife, and movable in said cylinder, and a manually operated hydraulic motor secured to said cylinder adapted to move said piston, automatic check valves controlling the flow of fluid from said motor to said cylinder and a manually operated valve controlling the flow of fluid from the cylinder to said motor.

2. In a dehorner, a manually operated fluid pump, passages for conveying fluid therefrom to a cylinder, a piston in said cylinder, a horizontal frame integrally formed on the outer end of said cylinder, a movable knife adapted to slide in said frame under movement of said piston and a cooperating fixed knife secured in the outer end of said frame.

3. In a dehorner, a manually operated fluid pump, a cylinder connected to said pump and having a piston therein, a rectangular frame integrally formed on the outer end of said cylinder, a fixed blade mounted in the outer end of said frame, a movable blade attached to said piston, said movable blade adapted to slide and overlap the said fixed blade when the said fluid pump is operated to project said piston.

4. In a portable hydraulically operated dehorner, a grooved frame having a fixed blade therein and a reciprocating blade guided therein,

said reciprocating blade being secured to a piston which is positively projected by fluid pressure whereby the blade is moved along the frame in said grooves and into overlapping relation with the said fixed blade, and a spring secured to the reciprocating blade and the cylinder for returning the blade after projection thereof.

5. In a dehorner, a manually operated fluid pump, a cylinder connected to said pump and having a piston therein, a frame carried by said cylinder, a knife carried by said piston, and movable in said frame, a slide mounted on the outer ends of the frame and slidable thereover, and a cable receiving movement from said piston to simultaneously move the slide and knife toward one another.

6. In a dehorner of the type described having a piston reciprocating inside of a frame, a knife carried by said piston and adapted to slide in said frame when said piston is projected, a cooperating slide normally positioned on the ends of said frame and a flexible operator therefor receiving movement from said piston adapted to move the said slide toward and overlie said knife when the said piston is projected.

7. A fluid operated dehorner including a power piston having a pulley thereon, a knife affixed to the end of the piston, said piston reciprocating within a frame on the outer of which is positioned a slide member, a flexible cable secured at its ends to said slide and passing over said pulley whereby said slide will be drawn along said frame toward said knife as said piston is projected.

8. In a dehorner, a frame, a movable knife adapted to slide in said frame, and a movable feeder adapted to slide over said frame, a piston directly attached to said knife and to said feeder through the medium of a flexible cable whereby the said feeder envelopes said knife when the said piston is actuated.

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