Dec. 19, 1967 W. B. CUNNINGHAM 3,358,779

DEMOLITION DEVICE

Original Filed Feb. 17, 1965

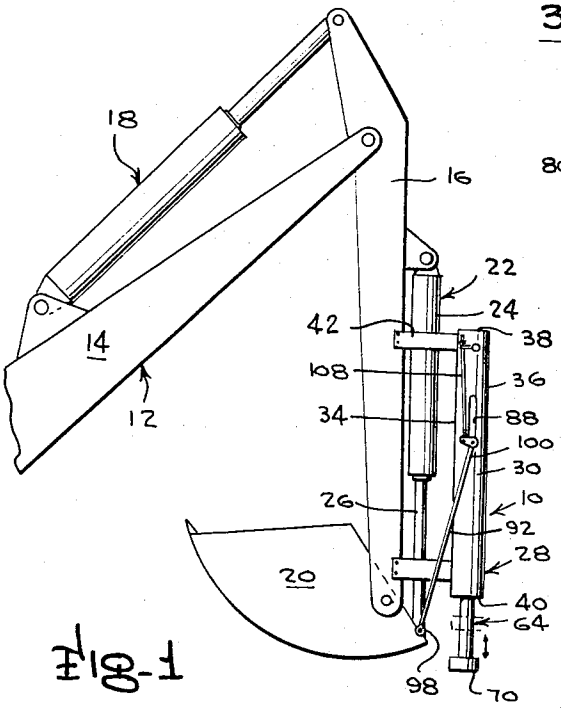


Fig-1

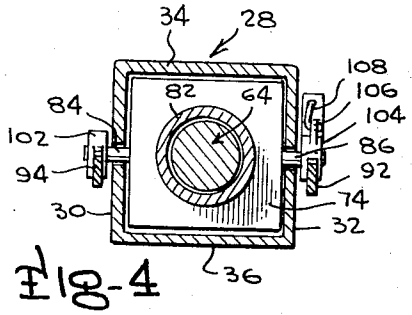
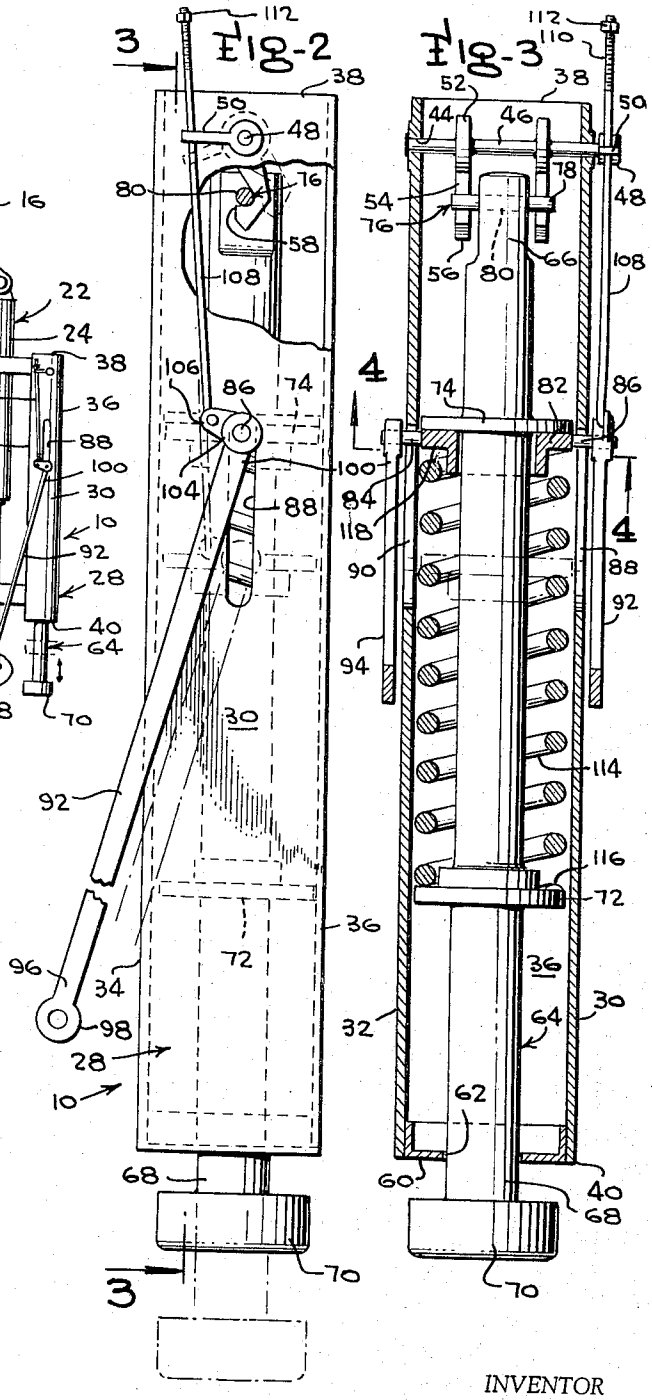


Fig-4



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DEMOLITION DEVICE

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5 Claims. (Cl. 173—119)

ABSTRACT OF THE DISCLOSURE

An impact-type demolition device mounted on a prime mover, the device having a housing with an impact member therein for delivery of spring-urged striking force, a slidable collar on the impact member, actuating linkage means secured to the collar for movement thereof against the spring bias to load the impact member, a catch means on one end of the housing to engage the impact member in its loaded position, and release means to permit spring urged movement of the impact member.

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a division of subject matter originally disclosed in my prior copending application Ser. No. 433,364, filed Feb. 17, 1965, now Unted States Patent No. 3,319,724.

BACKGROUND OF THE INVENTION

(1) *Field of the invention*

This invention pertains generally to demolition devices finding a particular area of utilization in cooperation with conventional mobile construction equipment in the clearing of construction sites, roadbed distintegration, and the like.

(2) *Description of the prior art*

Prior patents known to the applicant to be related to the general area of endeavour under consideration include the following:

Pat. No. 422,687—Issued Mar. 4, 1890
Pat. No. 1,731,985—Issued Oct. 15, 1929
Pat. No. 2,017,470—Issued Oct. 15, 1935
Pat. No. 2,342,601—Issued Feb. 22, 1944
Pat. No. 2,517,980—Issued Aug. 8, 1950
Pat. No. 2,721,491—Issued Oct. 25, 1955.

SUMMARY OF THE INVENTION

The present invention is directed to the field of readily portable demolition equipment and to the combination of a vehicle having a work implement thereon, means for actuation of the work implement, and a supplemental disintegration tool useful with the work implement.

A basic object of the invention resides in the provision of readily portable impact imparting tools adapted for employment in the destruction of ground level materials such as existing pavement and roadbeds, and equally adapted for the clearance of walls and other upstanding materials.

A related object is to supply devices mounted on mobile apparatus and readily transported from place to place, and usable at varying angles with respect to the mounting thereof.

It is a further object of importance to supply an impact tool as aforesaid, for application to and use with existing construction machinery such as backhoes and/or other types of equipment, thereby obviating the need for special single function demolition tools at smaller job sites, or for the performance of relatively minor demolition projects at larger sites.

Yet another general objective of the invention resides in the provision of a ram or demolition device with an impact member, the impact member being driven in striking position by a spring means or the like, and the potential striking force being built up by compression or extension of the spring or similar means.

Further objects and advantages will occur to those skilled in the art following a consideration of the specification and drawings hereof.

DESCRIPTION OF THE DRAWING

FIGURE 1 is a side elevational view of a portion of a typical construction machinery unit, having a first form of demolition device constructed and assembled in accordance with the teachings of the invention mounted thereon;

FIGURE 2 is an enlarged side elevational view of the demolition device of FIGURE 1, partially broken away;

FIGURE 3 is a sectional view taken substantially on the section line 3—3 of FIGURE 2, looking in the direction of the arrows; and

FIGURE 4 is a transverse sectional view on the line 4—4 of FIGURE 3, looking in the direction of the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Proceeding to a more detailed description of the invention, and initially to the form thereof disclosed in FIGURES 1 through 4, the demolition device **10** is shown as applied to a typical unit of construction machinery **12**. The machinery **12** may be of any suitable type, and preferably includes a prime mover (not shown), with an outward boom **14** having a pivotally mounted end boom **16** thereon. A first hydraulic cylinder assembly **18** is employed to pivot the end boom **16** with respect to the boom **14**. A work element, such as a scoop **20**, is pivoted on the distal end of the boom, and a second hydraulic cylinder assembly **22** operates the same. The second cylinder assembly **22** includes a cylinder **24** connected to the prime mover power source, and an extensible element **26** secured to the scoop **20**, whereby extension and retraction of the element **26** pivots the scoop about the distal end of the end boom.

The demolition device **10** comprises an elongated, tubular housing **28** which, as shown in FIGURE 4, is of substantially rectangular section. The housing includes side walls **30**, **32**, front and rear walls **34**, **36**, and has upper and lower ends **38**, **40**, respectively. As shown in FIGURE 1, bracket plates **42** connect the housing **28** to the boom **16** in an outwardly spaced relationship to the second cylinder assembly **22**.

The side walls **30** and **32** have a pair of co-aligned openings **44** formed therein adjacent the upper end **38** of the housing, and a cross pin **46** is pivotally mounted therein. The pin **46** has an end portion **48** projecting outwardly of the side wall **30** which carries a lever arm **50** apertured vertically adjacent its outer end, for a purpose described below. The pin further carries a pair of release catches **52** with substantially L-shaped grips, including arms **54** and feet **56** with raised leading ends **58**.

The lower end **40** of the housing is provided with a journal cap **60** with a central bore **62** therein. An elongated, substantially cylindrical impact member **64** is mounted for axial movement within the housing **28** and extends through the bore **62**. The member **64** is of heavy, substantially solid construction, and includes a reduced inner end **66** and an outer end **68** with an enlarged striking head **70** fixed thereto.

As best shown in FIGURE 3, a stepped collar **72** is fixed to the member **64** adjacent its end **68**, and an upwardly spaced stop plate **74** is fixed thereabout adjacent

the end **66**. A catch engagement pin **76** with laterally extending portions **78** is mounted in a transverse opening **80** in the end **66**.

A second, slidable collar **82** is mounted on the member **64** between the fixed collar **72** and the stop plate **74**. The slidable collar **82** has substantially cylindrical side lugs **84**, **86**, projecting therefrom on opposite sides, and the lugs extend through elongated, vertically extending slots **88**, **90**, respectively, formed in the side walls **30** and **32** of the housing. Thus, the slidable collar is vertically movable within the limits set by the height of the slots **88** and **90**.

Linkage means is provided between the impact member **64** and the second hydraulic cylinder. The linkage includes elongated arms **92**, **94**. Each arm has an outer end **96** with an annular pivot eye **98** thereon. The eyes **98** are pivotally connected to the scoop **20** whereby the arms are movable responsive to extension and retraction of the member **26**. The opposite ends **100** of the arms have annular bearings **102**, **104** thereon engaging the lugs **84** and **86**. The bearing **104** has an ear **106** thereon. A rod **108** is connected to the ear **106**, and the rod **108** has a threaded upper end **110** with a set nut **112** thereon. The rod **108** extends through the aperture of the lever arm **50**.

As best seen in FIGURE 3, a coil spring **114** is positioned about the impact member and has an end **116** abutting the collar **72**, and an end **118** abutting the slidable collar **82**.

FIGURE 3 illustrates the device in an initial position, with the catches **52** engaging the portions of the pin **76** to restrain the impact member against downward movement. Upon extension of the element **26** of the cylinder **22**, the arms **92** and **94** cause the slidable collar to move downwardly, compressing the spring **114**, and when the downward limit is reached, the nut **12** trips the lever **50**, releasing the pin **76** from the catch **52**, and causing the impact member to be sharply thrust outwardly of the housing. When the element **26** is retracted the arms **92** and **94** are returned to the full line position of FIGURE 2, the rod moving upwardly in a non-linear path and turning the lever arm **50** in a clockwise direction as viewed in FIGURE 2. This in turn results in reengagement of the catches **52** with the pin **76**. Movement of the extension element **26** is then reversed, and the cycle of operation repeated.

Having described and illustrated an embodiment of this invention in some detail, it will be understood that this description and illustration have been offered merely by way of example and that the invention is to be limited in scope only by the appended claims.

I claim:

1. An impact imparting device comprising:
an elongated hollow housing;
the housing including opposite ends;
an impact member including a shaft and a striking head;
fixed collar means on the impact member;
a slidable collar on the impact member;
a spring means in the housing adapted to bias the impact member in one direction;
means to load the impact member in opposition to the spring bias, said means including a hydraulic cylinder with an extendable portion, and linkage means connecting the extendable portion of the hydraulic cylinder with the impact member;
catch means mounted on one end of the housing to engage the impact member in its loaded position;
the linkage means being secured to the slidable collar for movement of the slidable collar against the spring bias; and
release means to permit spring urged movement of the impact member.

2. The invention of claim **1**, wherein:
the spring means comprises a coil spring disposed within the housing about the impact member.

3. An impact imparting device for use with a boom mounted implement having a pivotal work element thereon and having an extensible and retractable hydraulic cylinder assembly thereon including an extensible element connected at one end to the work element, the impact imparting device comprising:
an elongated housing having upper and lower ends;
bracket means securing the housing to the boom;
the housing including walls with elongated slots formed therein;
an impact member mounted in the housing for axial movement including an outwardly extended striking head and an upper end;
spaced apart, fixed collars on the impact member;
a movable collar on the impact member having lugs extending through the slots;
linkage elements secured to the lugs and to the extensible element of the cylinder; and
spring means about the impact member between the movable collar and one of the fixed collars.

4. The invention of claim **3**, and:
catch means mounted on the upper end of the housing to engage the upper end of the impact member; and
release means extending between the catch means and one of the lugs.

5. The invention of claim **4**, wherein:
the catch means includes a pivotally mounted pin with a projecting end portion;
a lever on said end portion;
substantially L-shaped catches on the pin;
a cross pin on the impact member seated on the L-shaped catches; and
a rod extended between said one lug and the lever arm to trip the lever upon extension of the extensible member.

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