July 29, 1958 W. V. CORNETT 2,845,258

IMPACT TYPE CONCRETE BREAKING MACHINE

Original Filed July 13, 1949 4 Sheets-Sheet 1

Fig. 1.

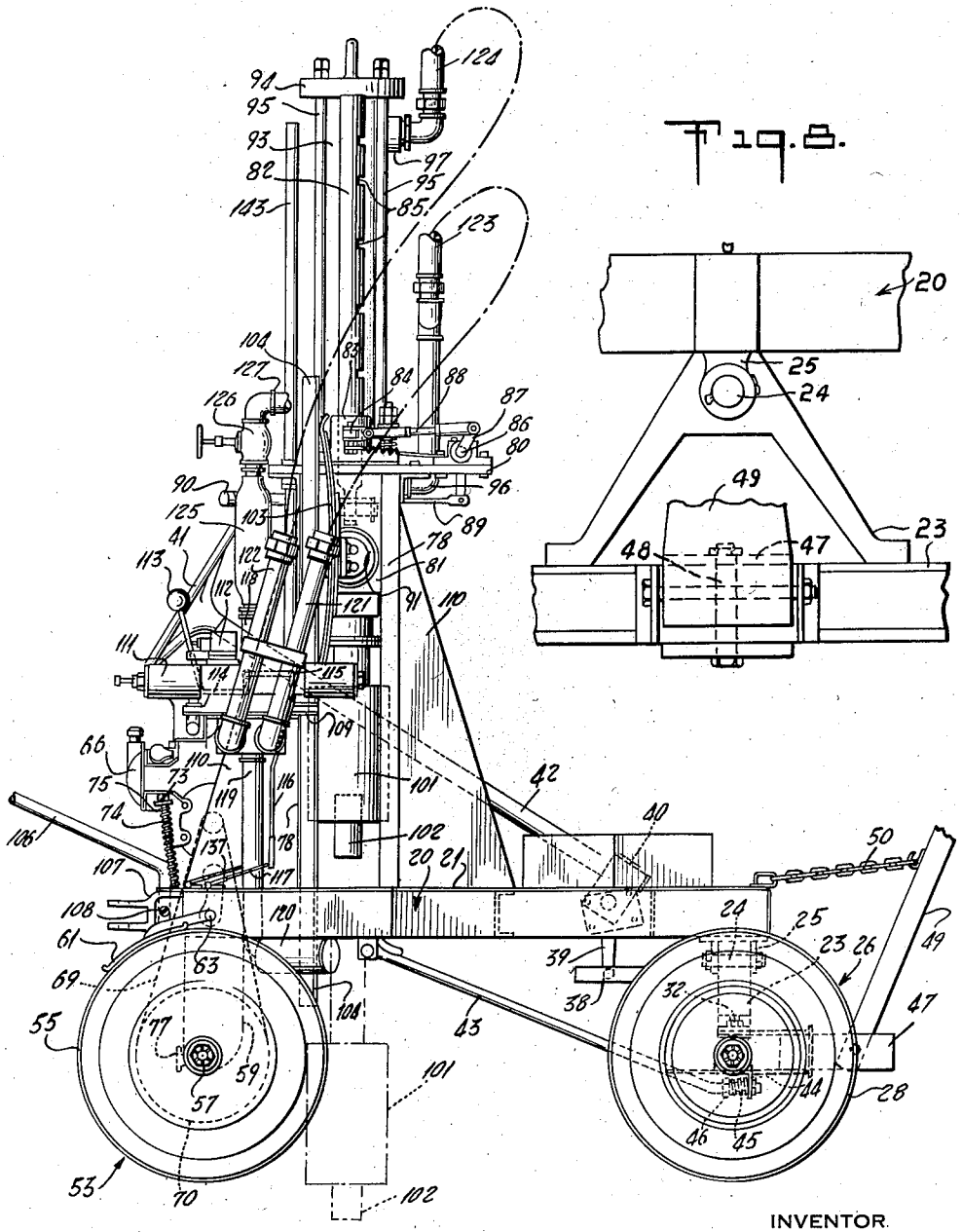


Fig. 8.

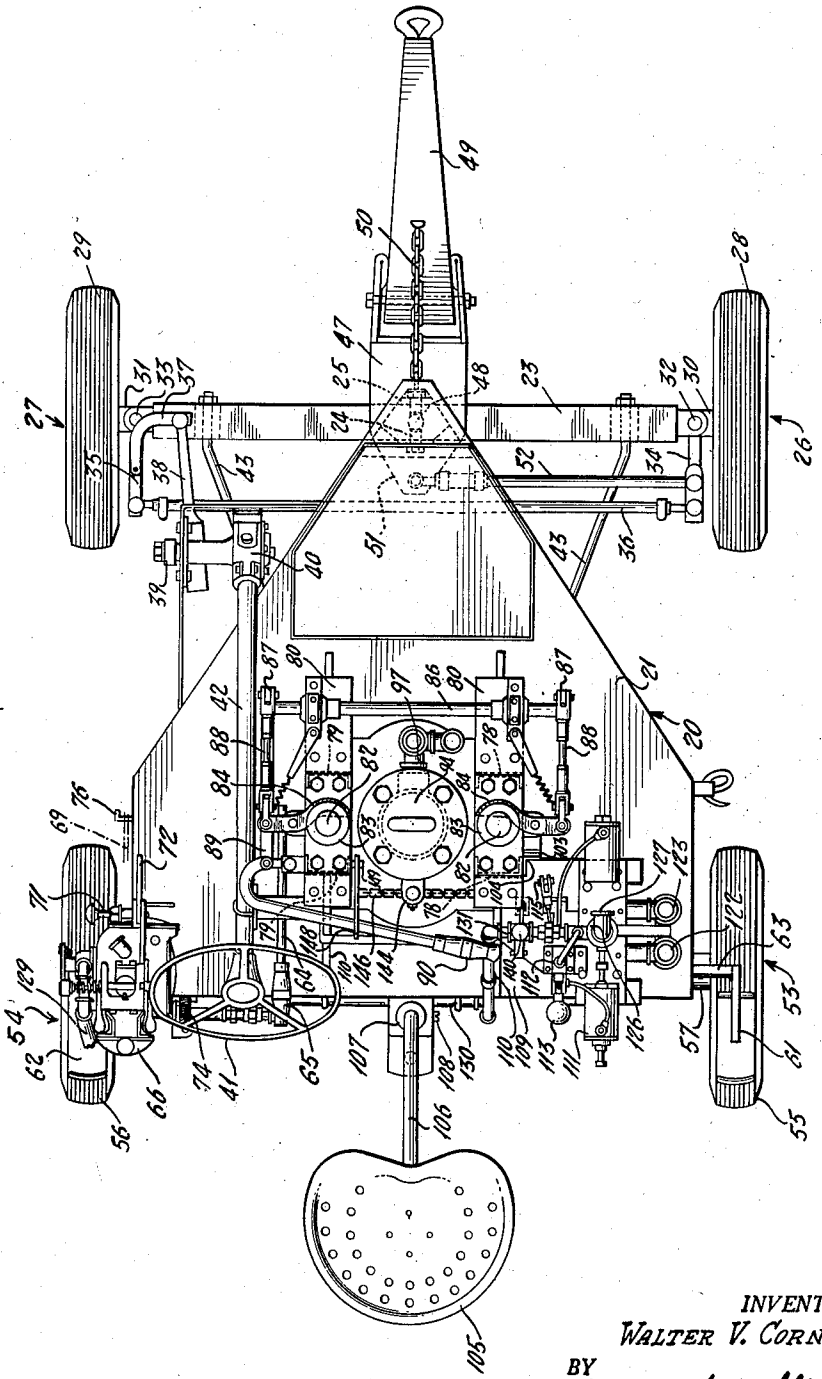
INVENTOR.
WALTER V. CORNETT
BY
Van Devanter & Shively.
ATTORNEYS

July 29, 1958 W. V. CORNETT 2,845,258

IMPACT TYPE CONCRETE BREAKING MACHINE

Original Filed July 13, 1949 4 Sheets-Sheet 2

Fig. 2.



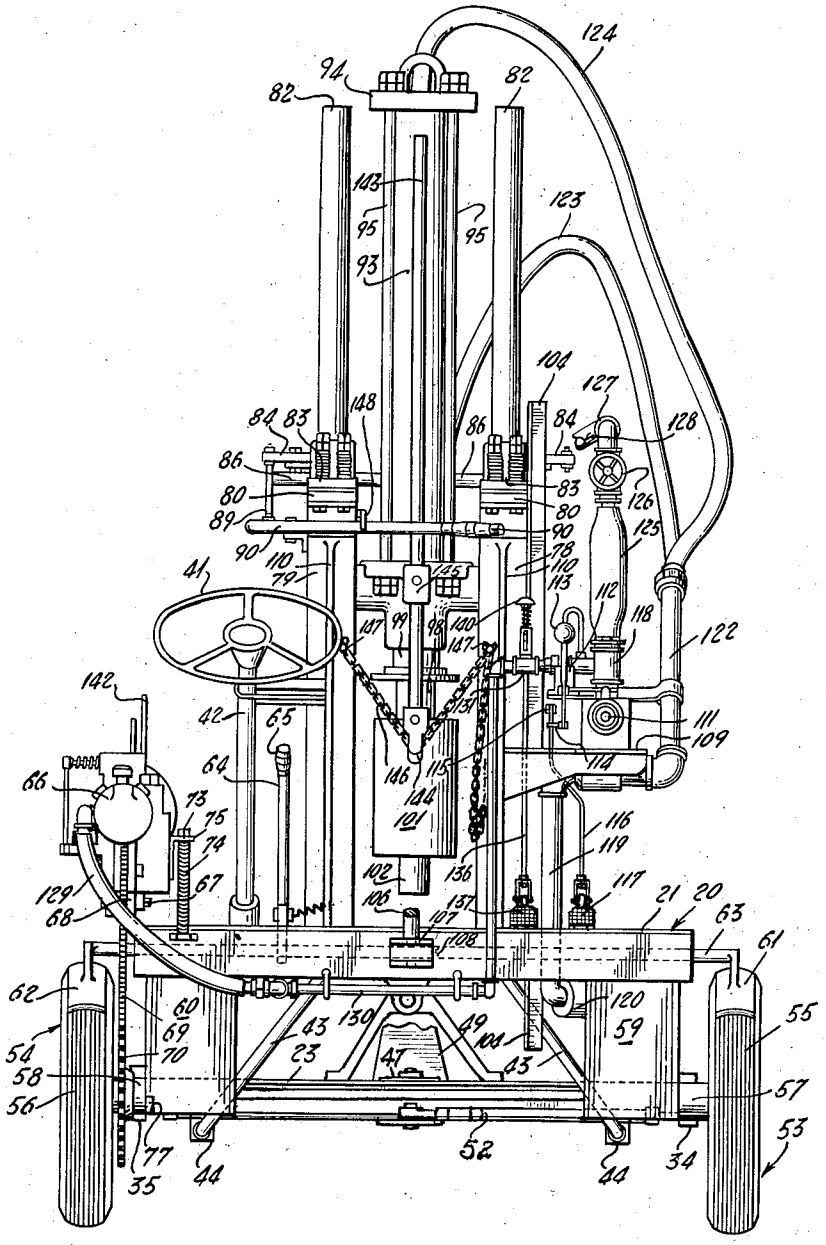
INVENTOR.
WALTER V. CORNETT
BY
Van Deventer & Shively
ATTORNEYS

July 29, 1958 W. V. CORNETT 2,845,258

IMPACT TYPE CONCRETE BREAKING MACHINE

Original Filed July 13, 1949 4 Sheets-Sheet 3

Fig. 3.



INVENTOR.
WALTER V. CORNETT
BY
Van Dercenter & Shively
ATTORNEYS

July 29, 1958 W. V. CORNETT 2,845,258

IMPACT TYPE CONCRETE BREAKING MACHINE

Original Filed July 13, 1949 4 Sheets-Sheet 4

Fig. 5.

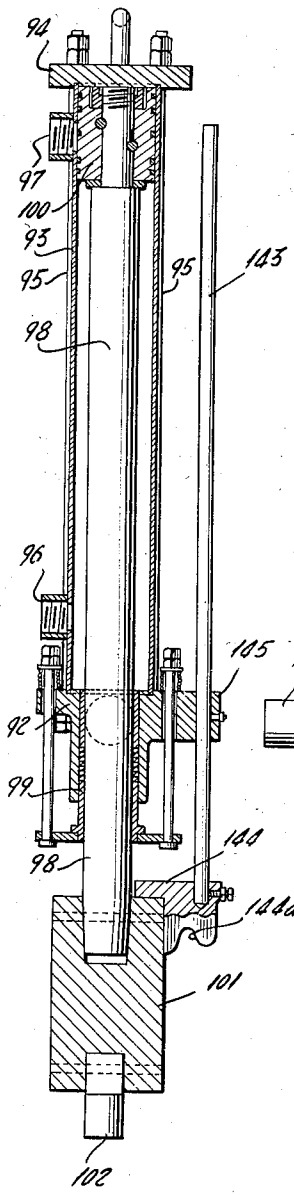


Fig. 4.

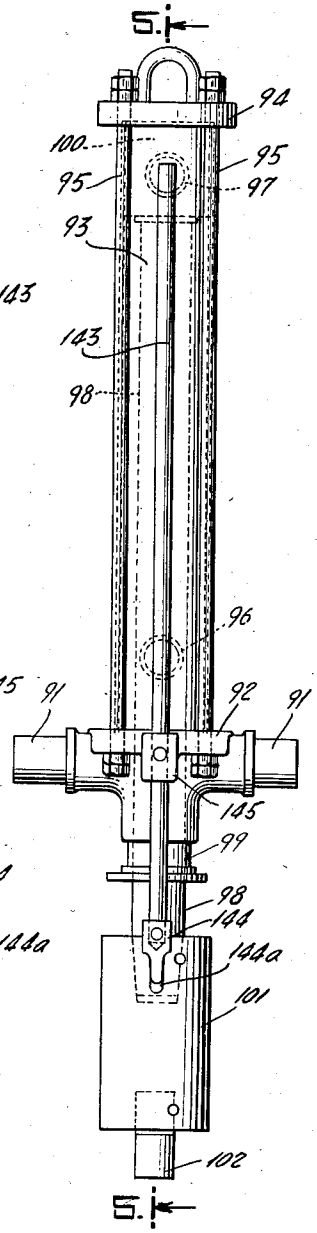
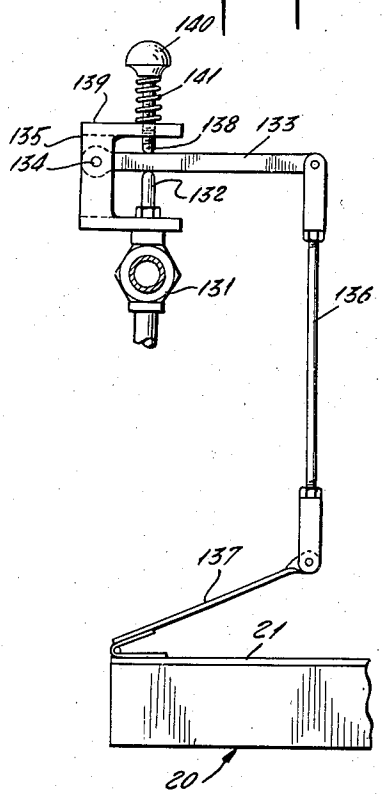


Fig. 6.



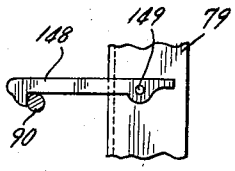


Fig. 7.

INVENTOR.
WALTER V. CORNETT
BY
Van Deventer & Shively
ATTORNEYS

United States Patent Office 2,845,258 Patented July 29, 1958

2,845,258

IMPACT TYPE CONCRETE BREAKING MACHINE

Walter V. Cornett, Los Angeles, Calif.

Continuation of abandoned application Serial No. 104,569, July 13, 1949. This application March 31, 1955, Serial No. 498,381

1 Claim. (Cl. 262—15)

The present invention pertains to improvements in concrete breaking machinery, the instant application being a continuation of application Serial No. 104,569, filed July 13, 1949, now abandoned.

In the above mentioned prior application which in turn was a continuation in part of application Serial No. 33,603, filed June 17, 1948, now Patent No. 2,672,331, there is disclosed and claimed a concrete breaking machine of novel and compact construction including an air powered hammer so disposed as to deliver controlled blows in a line of action falling within the polygon formed by a plurality of resilient supports for the machine, the supports being illustrated in preferred form as pneumatic-tired wheels.

An object of the present invention is to provide improved chassis, wheel arrangements and steering means.

Further advantages and improvements will become evident during the course of the following description in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of a preferred form of the device;

Figure 2 is a plan view of the same;

Figure 3 is a rear elevation of the device;

Figure 4 is a detail rear elevation of the air-hammer sub-assembly;

Figure 5 is a vertical sectional view of the same in the plane 5—5, Figure 4;

Figure 6 is a detail view of the alternative hand or foot control for the air-motor;

Figure 7 is a detail view of the locking means for the latch-release lever; and

Fig. 8 is an enlarged view of the bracket 47 and the swivel 48 taken from a point between the tow bar and the bracket, looking at the right side of Fig. 1.

Referring to Figures 1 and 2, the numeral 20 denotes a frame on which is secured a platform 21. A structural steel axle 23 is mounted on a longitudinal central pivot 24 in a bracket 25 secured under the front end of the frame 20. A pair of wheels 26 and 27, equipped with pneumatic tires 28 and 29, are mounted on spindle members 30 and 31 which in turn are pivoted on king-pins 32 and 33 in the ends of the axle 23. Rearwardly extending arms 34 and 35 on the members 30 and 31 are linked by a transverse tie-rod 36. A knuckle lever member 37, formed on or secured to the arm 35, is connected by a rod 38 with the downwardly extending arm 39 of a steering gear 40. The gear 40 is operable in the usual manner by a suitable steering wheel 41 mounted on a rearwardly inclined post 42.

A pair of angular radius rods 43 are horizontally pivoted at their rear ends to the frame 20. The front ends of the rods 43 are slidably secured in downward angles 44 of the axle 23 as shown in Fig. 1, compression springs 45, between the angles 44 and nuts 46 being provided to ensure firm but flexible guiding of the axle 23 as the latter rocks laterally on the pivot 24.

A tow-bar bracket 47 is mounted on a vertical pivot pin 48 disposed in the middle of the axle 23. The

bracket 47 carries a horizontally pivoted tow-bar 49 which when not in use may be held in upwardly retracted position by a chain 50 as shown in Fig. 1. A rearward extension 51 of the bracket 47 is linked by a rod 52 with the spindle lever 34, Figure 2.

From the foregoing description it will be evident that the device may be steered by the wheel 41 and related mechanism after the manner of an automobile or truck. When the machine is being towed, the provision of the link rod 52 causes the wheels 26, 27 to be steered in response to the lateral swings of the bracket 47, thus causing the device to follow readily the changes in course of the towing vehicle. The steering gear 40 is of a type sufficiently reversible to prevent interference with the latterly described steering action when towing is done without a rider on the machine to manipulate the steering wheel 41.

A pair of rear wheels 53 and 54, also equipped with pneumatic tires 55 and 56, are mounted on spindles 57 and 58 fixed in legs 59 and 60 extending downward from the rear corners of the frame 20, Figure 3.

Brake shoes 61 and 62, adapted to engage the rear tires 55 and 56, are mounted on a transverse rocker shaft 63. A brake lever 64, having its handle 65 disposed below the steering wheel 41, is adapted to operate the shaft 63 through linkage similar to that shown in the previously mentioned application Serial No. 33,603 and therefore not requiring detail description herein. A reversible air motor 66 is horizontally pivoted at 67 to an upwardly extending lug 68 on the frame 20, Fig. 3. A drive chain 69 normally connects the motor 66 with a large sprocket 70 secured to the left rear wheel 54. A latch pin 71, Fig. 2, engaging a plate 72 on the frame 20, is adapted to hold the motor 66 in normal position on the pivot 67. A rod 73, hinged at its lower end to the frame 20, carries a compression spring 74 engaging a small bracket 75 on the rear portion of the motor 66, the rod being slidable through the bracket.

The purpose of the above described pivotal motor mounting is to facilitate disconnecting the chain drive when it is desired to tow the machine at speeds which would otherwise over-speed the idling air motor. To accomplish this purpose, the latch pin 71 is first withdrawn. The major portions of the motor 66, including its driving sprocket, are disposed rearwardly of the pivot 67, but when the latch pin 71 is withdrawn the spring 74 prevents the motor from toppling sharply downward. By this means possible injury to the operator is avoided. The motor is then pressed downward, allowing the chain 69 to be disengaged from the sprocket 70 and placed on retaining hooks 76 and 77 on the frame 20, Figs. 2 and 3. Thereafter the motor 66 may be re-latched in normal position, the hooks 76 and 77 holding the chain 69 clear of the sprocket 70 to permit free towing. The spring 74, in addition to its above-noted safety functions, facilitates return of the motor 66 to normal position either after disengagement or during replacement of the chain, by providing a counter-balance effect against the motor's weight.

Two pairs of upright channel guides 78 and 79, of the general type described in detail in the previously noted application, Serial No. 33,603, are secured to the frame 20 and deck 21, being provided with bracing top plates 80. Cross-head members or blocks 81, vertically slidable in the channels 78 and 79, are attached to vertical rods 82 disposed in spring-backed guides 83 mounted on the top plates 80. Spring-pressed swing latches 84, pivotally mounted on the top guides 83, normally engage selected notches 85 in the rods 82, thereby holding the air cylinder assembly at any desired vertical position in the manner also set forth in the above-mentioned appli-

cation. A transverse shaft **86** having short levers **87** connected by pull rods **88** with the latches **84**, is rockable via a link **89** by a transverse control lever **90** to withdraw the latches from the notches **83** when setting the cylinder height, as hereinafter described in detail.

The cross-head blocks **81** have rockably mounted therein a pair of trunnions **91** extending laterally from a lower air cylinder head **92**, the latter being shown in detail in Figures 4 and 5. A cylinder **93**, held between the lower head **92** and an upper head **94** by bolts **95**, is provided with lower and upper air ports **96** and **97**. A piston rod **98**, slidably guided in the lower head **92** and provided with a spring-pressed packing gland **99**, carries on its upper end a piston **100** slidable in sealing relation in the cylinder **93**. A heavy hammer **101** is secured to the lower end of the piston rod **98**. The hammer is adapted to interchangeably hold tools **102** of any type suitable to the work required, such as cutters, breakers, tampers, etc.

A semi-elliptic leaf spring **103**, Figure 1, attached to the outer end of one trunnion **91**, engages a vertical angle guide member **104** to normally hold the air-cylinder assembly vertical but to allow a small degree of resiliently controlled swing in the cross-head blocks **81** during certain types of work.

A suitable driving and operating seat **105** is secured to a rearwardly extending angular post **106** pivotally held in a coupler member **107** centrally attached to the rear of the frame **20**. By means of the above pivotal mounting the seat **105** may be adjusted to various lateral positions with respect to the center line of the machine or may be lined up directly thereon, the desired position being retained by suitable clamping means such as a set-screw **108**, Figures 2 and 3.

A bracket **109**, secured to the rear angular brace **110** of the rear guide channel member **78**, carries a main air valve **111** controllable via a pilot valve **112** by a rocking handle **113**. A linkage including a push-rod **114**, a rocker combination **115** and a pull-rod **116** also operatively connects the pilot valve **112** with a pedal **117** hinged to the deck **21**. By this means optional hand or foot control of the pilot valve **112** and main valve **111** is provided.

The main valve **111** has an upwardly extending inlet conduit **118** and a downwardly extending exhaust pipe **119** terminating in a muffler **120**, Figure 1. Two delivery pipes **121** and **122**, Figures 1 and 3, are connected by flexible hoses **123** and **124** respectively with the lower and upper ports **96** and **97** of the air cylinder **93**, the hoses being cut away in Figure 2 to avoid concealing underlying parts.

The air inlet conduit **118** receives compressed air via an oil feeder **125**, an auxiliary throttle valve **126** and a coupling **127** adapted to be connected by a long hose **128**, Figure 3, to any suitable source of supply such as the usual portable air compressor (not shown).

The motor **66** receives its compressed air supply through a flexible hose **129**, Figure 3, a pipe **130**, and a control valve **131** from the main inlet conduit **118**. The control valve **131** and its operating means are shown in detail in Figure 6. Referring to the latter figure, the valve **131** is of the well-known "whistle" type having a plunger **132** normally pressed outward by an internal spring (not shown) to hold the valve in closed position. A lever **133**, pivoted at **134** to a stationary yoke **135**, engages the top of the plunger **132**. A pull-rod **136** connects the free end of the lever **133** with a second pedal **137** hinged to the deck **21**. A stem **138**, threaded through the upper arm **139** of the yoke **135**, is surmounted by a hand knob **140**. A compression spring **141** is disposed on the stem **138** under the knob **140**.

By turning the knob **140** the end of the stem **138** may be brought into engagement with the lever **133** to depress the latter and thus open the valve **131** to any set degree. By this means manual control of the valve is provided, a typical use being when the valve is set to admit air at a constant set rate to the air motor **66** in order to propel the machine at any desired fixed speed. If during a constant speed setting of the valve a temporary increase in speed is desired, the pedal **137** may be depressed to widen the valve opening for the time required, after which release of the pedal allows the original speed to be resumed automatically. It will be obvious that the stem **138** may also be set to allow full closure of the valve **132** and the latter may then be controlled entirely by the pedal **137**, thus freeing the operator's hand for other operations when necessary or convenient. The spring **141** serves to prevent changes in the adjustment of the stem **138** by vibration. A reversing control lever **142** is disposed on the motor **66**, Figure 3.

In a typical use of the machine, for example cutting a trench in a concrete pavement, the operator controls all normal operative functions from his position on the seat **105**. He actuates the valve **111** to admit compressed air alternately to the upper and lower ends of the cylinder **93**, thereby causing the hammer **101** to drive the tool **102** into the material to be cut in successive blows. At the same time he controls the air motor **66** to propel the device and steers the latter along the cutting line by means of the wheel **41**. A vertical rod **143**, Figure 5, is secured to a rearward extension **144** of the hammer **101** and slides through a guide **145** on the lower cylinder head **92** as the hammer reciprocates, thus preventing the hammer and hence the tool **102** from turning with respect to the cutting line.

It will be evident that the grouping of all controls within easy reach of the operator and the provision of optional hand and foot control for both the hammer and the propelling motor permit the user a wide degree of flexibility in adapting his control operations to the particular type of work in progress, thus contributing to maximum speed and efficiency of performance. As an illustration, for ordinary cutting or breaking work the operator may readily steer the device with his left hand while actuating the hammer valve **111** manually and the controlling air motor valve **131** by means of his right foot on the pedal **117**. In types of work where it is necessary to follow a cutting line with great accuracy, as for example in curb-stone trenching and the like, the operator may control the hammer action by his left foot on the pedal **137** and the propulsion by his right foot, thus making both hands available for precision steering. In either of the above cases, if desired, a fixed normal speed of propulsion may be provided by initially setting the valve **131** by means of the knob **140**.

In the previously mentioned application Serial No. 33,603 is set forth a method of raising the operating position of the air cylinder by resting the hammer against a supporting surface, releasing vertical retaining latches, and admitting compressed air to the upper end of the cylinder. Obviously the operation may be carried out in the same manner with the device described herein, but the present embodiment includes means by which pneumatic elevation of the cylinder **93** may be accomplished independently of the nature or availability of a suitable surface under the hammer, and also means to prevent too violent elevation of the cylinder by careless admission of full air pressure with consequent danger of injury to the machine and operator.

Referring to Figure 5, it will be seen that the lower side of the hammer extension **144** comprises a hook **144*a***. The numeral **146**, Figures 2 and 3, designates a heavy chain attached to both ends to the channel guides **78** and **79**. During normal operation of the device the chain **146** is looped up over a retaining cleat **147** so as to clear the hammer extension **144**. Assuming the device to have been working with the air cylinder in low position, when it is desired to raise the assembly the hammer **101** is first brought to its top relative

position and the chain **146** is slung down so as to loop under the extension **144** as shown in Figure 2. Thereafter, when the latches **84** are released by the lever **90** and compressed air is admitted to the top of the cylinder **93**, the chain **146** prevents the hammer **101** and consequently the piston **100** from moving downward, with the result that the cylinder assembly is moved upward until it is relatched in the desired elevated position.

It is believed evident that the above described arrangement is advantageous in confining the lifting stresses to the structure of the machine itself, removing any danger of tipping or shifting the machine by pressure against an outside surface, and also in permitting pneumatic elevation in cases where no external backing surface is available for the hammer, as for example when the device has been working over and in a deep trench or hole at the lowest level in its range. The chain **146** may also be used to support the hammer while the machine is being towed.

When the cylinder assembly is being elevated pneumatically it is important to prevent a sudden rush of high pressure air from driving the cylinder upward with destructive violence, as previously noted. This is accomplished by means of the auxiliary throttle valve **126**. Prior to unlatching the cylinder assembly, the valve **126** is partially closed so as to allow only a slow passage of air to the main control valve **111**. The latches **84** are then released and the main control valve **111** opened wide, whereupon the throttled air flow raises the cylinder assembly with comparative slowness, allowing easy determination of the desired position and re-latching therein.

It is a well-known characteristic of the public, particularly children, to move any prominent lever on an unattended machine. When a device of the type described herein is left unattended no air pressure is normally connected thereto, so that tampering with the various air control devices under such circumstances is not dangerous. However, inadvertent release of the latches **84** could cause damage by allowing the air cylinder assembly to drop violently. To guard against such inadvertent release either by an unauthorized person or by the operator himself, a retaining hook **148** is pivoted to the rear channel guide **79** at **149** as shown in Figure 7. This hook rests by gravity on and around the rear of the transverse lever **90**, thus preventing the latter from being moved rearwardly to release the latches **84** unless the hook **148** is intentionally lifted for the purpose.

Referring to Figure 3, it will be seen that the vertical center-line of the air cylinder mechanism, that is the line of action of the hammer **101**, is located well within the polygon determined by the points of contact of four tires with the supporting surface, being disposed substantially at the geometric center of the frame **20**, the weight of the machine and an average operator being also approximately centered in this location.

This balanced construction, with the line of impact substantially centered within the frame **20**, provides the operational advantages of steadiness and absence of surging and rocking, high capacity in small space, utilization of the pneumatic tires for cushioning, and the related qualities which have been fully set forth in the above mentioned application Serial No. 33,603 and which consequently need not be set forth in detail herein. However, the present embodiment provides the additional advantages of four wheel construction with improved steering qualities, ability to straddle ditches, and the like, while at the same time the provision of the rocking pivot **24** preserves the principle of three-point support of the operating apparatus, with this principle's inherent quality of balance and stability on irregular surfaces.

While the invention has been described in preferred form it is not limited to the exact structures illustrated, as obviously various modifications and changes may be made without departing from the scope of the appended claim.

What is claimed is:

A concrete breaking machine comprising a frame, a pair of spaced front wheels supporting the forward end of said frame, a pair of spaced rear wheels supporting the rearward end of said frame, driving means for one of said rear wheels, control means at the rear of said frame for controlling said driving means, a vertically reciprocable hammer assembly mounted on the longitudinal center line of the vehicle adjacent the rear end thereof but forwardly of said rear wheels, means for steering said front wheels including a generally longitudinally extending steering shaft disposed in laterally offset relationship to the longitudinal center line of the vehicle to clear and pass by said hammer assembly and terminating at the rear of said frame in a steering wheel, control means for actuating said hammer assembly including mechanism terminating in a handle offset laterally from the longitudinal center line of the vehicle on the opposite side from said steering wheel, and an operator's seat disposed and mounted on the rear of said frame substantially on the longitudinal center line of the vehicle whereby an operator may manipulate said steering wheel and said control handle for the hammer assembly with opposite hands.

References Cited in the file of this patent

UNITED STATES PATENTS

693,939	Yeakley	Feb. 25, 1902
1,037,875	Craig	Sept. 10, 1912
1,164,925	Clapp	Dec. 21, 1915
1,541,392	Reaney	June 9, 1925
1,543,958	Sutherland	June 30, 1925
1,891,222	Cornett	Dec. 20, 1932
1,915,816	Cole	June 27, 1933
2,107,384	McQueen	Feb. 8, 1938
2,171,255	Keeler	Aug. 29, 1939
2,218,510	Albertson et al.	Oct. 22, 1940
2,293,396	Mathews	Aug. 18, 1942
2,335,172	Cornett	Nov. 23, 1943
2,348,445	Bayer	May 9, 1944
2,423,787	Mosena et al.	July 8, 1947
2,592,194	Schmalzried	Apr. 8, 1952

FOREIGN PATENTS

14,081	Netherlands	Jan. 15, 1926