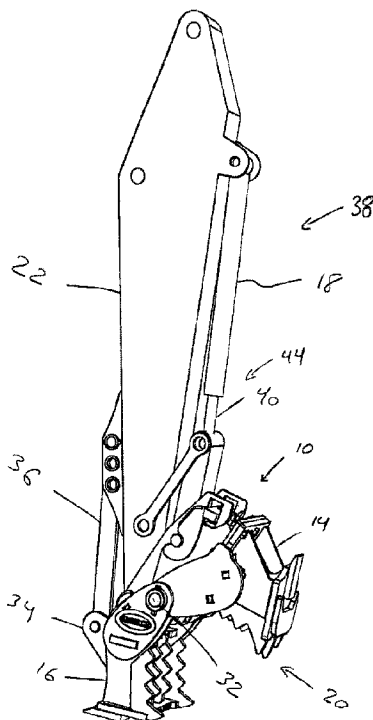




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(54) Titre : PULVERISATEUR DE BETON DECALE  
(54) Title: OFF-CENTERED CONCRETE PULVERIZER



(57) **Abrégé/Abstract:**

An off-centered concrete pulverizer linkage assembly adapted for mounting on an actuating arm of a vehicle. The linkage assembly comprises a coupler pivotally attachable to the actuating arm, a front jaw mounted on the coupler, a rear jaw, having a rear end section, pivotally connectable to the front jaw. The linkage assembly is activated by a single actuator comprising a telescopic arm slideable between a retracted position and an extended position. The actuator is pivotally attachable to the actuating arm and to the coupler to drive a coupled movement of both the front and rear jaws. Upon extension of the telescopic arm from the retracted position, the front jaw rotates and moves towards the rear jaw and, the rear jaw rotates and moves away from the front jaw. The front jaw reaches the rear jaw as the telescoping arm reaches the extended position.

### **Abstract**

An off-centered concrete pulverizer linkage assembly adapted for mounting on an actuating arm of a vehicle. The linkage assembly comprises a coupler pivotally attachable to the actuating arm, a front jaw mounted on the coupler, a rear jaw, having a rear end section, pivotally connectable to the front jaw. The linkage assembly is activated by a single actuator comprising a telescopic arm slideable between a retracted position and an extended position. The actuator is pivotally attachable to the actuating arm and to the coupler to drive a coupled movement of both the front and rear jaws. Upon extension of the telescopic arm from the retracted position, the front jaw rotates and moves towards the rear jaw and, the rear jaw rotates and moves away from the front jaw. The front jaw reaches the rear jaw as the telescoping arm reaches the extended position.

## OFF-CENTERED CONCRETE PULVERIZER

### Field of the invention:

The present invention relates to demolition pulverizers. More particularly, the present invention relates to an off-centered concrete pulverizer adapted for mounting on the end of an arm of a vehicle or a machine.

### Background of the invention:

Concrete pulverizers are commonly used for the disposal of large pieces of concrete paving or reinforced concrete. One of the steps of operation for demolition and removal of such concrete structures involves crushing the structures into smaller pieces.

There are many variations in the design of concrete pulverizers and crushing devices. For example, known pulverizers are mounted on the end of a dipper arm of an excavator and include two jaws coupled by way of a centered hinge pin for opening and closing on one another.

Pulverizers hold material between the two jaws and apply sufficient compressive force to bring the jaws together generating enough energy to break the material. The compressive force of these pulverizers is typically the product of a force and its distance from an axis, which causes rotation about that axis. With such an arrangement, there is a limited way to increase the compressive force. The first relates to increasing the force applied onto the jaws and the second to increase the distance between the force and the axis of rotation, i.e. the hinge pin axis.

However, there is a need for increasing the compressive force by minimizing the inconvenience of providing larger pulverizers and/or more powerful actuators.

Hence, in light of the aforementioned, there is a need for an improved system which, by virtue of its design and components, would be able to overcome some of the above-discussed prior art concerns.

**Summary of the invention:**

The object of the present invention is to provide a device which, by virtue of its design and components, satisfies some of the above-mentioned needs and is thus an improvement over other related pulverizers known in the prior art.

5 In accordance with the present invention, the above mentioned object is achieved, as will be easily understood, by an off-centered concrete pulverizer linkage assembly such as the one briefly described herein and such as the one exemplified in the accompanying drawings.

10 According to a first aspect of the present invention, there is provided an off-centered concrete pulverizer linkage assembly adapted for mounting on an actuating arm of a vehicle, the concrete pulverizer linkage assembly comprising:

a coupler pivotally attachable to the actuating arm by a coupler pivot;

a front jaw mounted on the coupler and adapted to receive a pivot pin mechanism;

15 a rear jaw, having a rear end section, pivotally connectable to the front jaw by the pivot pin mechanism and wherein the rear end section is pivotally attachable to the actuating arm; and

20 a single actuator comprising a telescopic arm, wherein the telescopic arm is slideable between a retracted position and an extended position, said actuator is pivotally attachable to the actuating arm and to the coupler, the actuator driving coupled movement of both the front and rear jaws,

25 wherein an axis of the pivot pin mechanism is positioned relative to an axis of the coupler pivot, such that upon extension of the telescopic arm from the retracted position, the front jaw rotates about the coupler pivot and moves towards the rear jaw and, the rear jaw rotates about the pivot pin mechanism and moves away from the front jaw, and wherein the front jaw reaches the rear jaw as the telescopic arm reaches the extended position.

In some implementations, the coupler is a reversible coupler.

In some implementations, the actuator comprises a hydraulic or pneumatic actuator.

The objects, advantages and features of the present invention will become  
5 more apparent upon reading of the following non-restrictive description of  
preferred embodiments thereof, given for the purpose of exemplification only,  
with reference to the accompanying drawings.

**Brief description of the drawings:**

Figure 1A is a perspective view of a concrete pulverizer linkage assembly  
10 mounted on an actuating arm according to the prior art, with the actuator in a  
retracted position.

Figure 1B is another view of what is shown in Figure 1A, with the actuator in  
an extended position.

Figure 2A is a perspective view of an off-centered concrete pulverizer  
15 mounted on an actuating arm according to an embodiment of the present  
invention, with the actuator in a retracted position.

Figure 2B is another view of what is show in Figure 2A, with the actuator in a  
partially extended position.

Figure 2C is another view of what is shown in Figure 2A, with the actuator in  
20 an extended position.

Figure 3 is a perspective view of a coupler attached to a concrete pulverizer  
according to an embodiment of the present invention.

Figure 4 is another view of what is shown in Figure 3, with a rear jaw  
removed.

**Detailed description of preferred embodiments of the invention:**

In the following description, the same numerical references refer to similar elements. Furthermore, for the sake of simplicity and clarity, namely so as to not unduly burden the figures with several reference numbers, not all figures contain  
5 references to all the components and features, and references to some components and features may be found in only one figure, and components and features of the present invention illustrated in other figures can be easily inferred therefrom. The embodiments, geometrical configurations, materials mentioned  
10 and/or dimensions shown in the figures are optional, and are given for exemplification purposes only.

Furthermore, although the present invention may be used with various objects, such as concrete pulverizers, for example, it is understood that it may be used with other tool and attachments. For this reason, expressions such as  
15 "concrete pulverizer", "pulverizer", "shear jaw", "shear", "tool", "attachment", etc. as used herein should not be taken as to limit the scope of the present invention to these machine attachments in particular. These expressions encompass all other kinds of attachments, tools and/or purposes with which the present invention could be used and may be useful, as can be easily understood.

As shown in Figures 2A to 4, there is provided an off-centered concrete  
20 pulverizer linkage assembly 10 adapted for mounting on an actuating arm 22 of a vehicle. It is understood that the linkage assembly 10 may also be used with other attachments, such as a crusher or a grapple, as known by a person skilled in the art.

In some implementations, the linkage assembly 10 comprises a coupler 12, a  
25 front jaw 14, a rear jaw 16 and an actuator 38.

The coupler 12 allows a rapid change of attachments, such as concrete pulverizers 20, crushers and the like, on the machine, by connecting the concrete pulverizer 20 to the actuating arm 22. The coupler 12 is pivotally attachable to the actuating arm 22. According to an embodiment, the coupler 12 is attached to the

actuating arm 22 by a coupler pivot 24. The coupler 12 is adapted to receive the front jaw 14. The coupler 12 may also include a reversible coupler.

As shown in Figure 4, the front jaw 14 is mounted on the coupler 12. The front jaw 14 can be secured on the coupler 12 by means of bolt and nut combinations  
5 26. According to an embodiment, the front jaw 14 includes two opposite plates 28, each plate 28 having one aperture 30. The apertures 30 are adapted to receive a pivot pin mechanism 32. The pivot pin mechanism 32 allows the front jaw 14 to pivotally connect to the rear jaw 16.

The rear jaw 16 has a rear end section 34 pivotally attachable to the actuating  
10 arm 22. According to an embodiment, the rear jaw 16 includes two opposite plates 46, each plate 46 having one aperture 48. The apertures 48 are adapted to receive the pivot pin mechanism 32. The rear jaw 16 may also be provided with an elongated, rearwardly pivoting arm 36 to connect the rear jaw 16, about a rear jaw pivot point 60, to the actuating arm 22, about a pivoting arm pivot point  
15 62. The rearwardly pivoting arm 36 may be a structural element pivotally connected to the rear jaw 16 and to the actuating arm 22.

A single actuator 38 is also provided in order to operate the concrete pulverizer 20 by driving the coupled movement of both the front 14 and rear 16 jaws. The actuator 38 comprises a telescopic arm 40 which is slideable between  
20 an extended position 42 and a retracted position 44. The actuator 38 can be operated by different sources of energy, such as hydraulic, electrical, pneumatic, etc. The actuator 38 is pivotally attachable to the actuating arm 22 and to the coupler 12.

In operation, the coupler 12 is able to pivot about a coupler pivot axis 50  
25 thereby pivoting the front jaw 14 about the same axis 50. The rear jaw 16 is able to pivot relative to the front jaw 14 about a pivot pin mechanism axis 52. The two axes 50, 52 are positioned relative to each other, such that when the telescopic arm 40 is extending from the retracted position 44 to the extended position 42, the pivot pin mechanism axis 52 is displaced about the coupler pivot axis 50

allowing the rear jaw 16 to move away from the front jaw 14 and therefore further extending the telescopic arm 40. During this movement, the front jaw 14 rotates about the coupler pivot axis 50 and moves towards the rear jaw 16 until it reaches the rear jaw 16 in the extended position 42. Hence, the compressive force may vary as the distance, between a force applied by the actuator 38 and the rear jaw pivot point 60, may vary during the displacement of the linkage assembly 10. The compressive force may approach its highest value when an imaginary axis, defined between the rear jaw pivot point 60 and the apertures 48, is close to forming a 90 degrees angle with the rearwardly pivoting arm 36

10 Of course, numerous modifications could be made to the above-described embodiments without departing from the scope of the invention, as defined in the appended claims.

**CLAIMS**

1. An off-centered concrete pulverizer linkage assembly adapted for mounting on an actuating arm of a vehicle, the concrete pulverizer linkage assembly comprising:

a coupler pivotally attachable to the actuating arm by a coupler pivot;

a front jaw distinct and separate from the coupler and mounted on the coupler and adapted to receive a pivot pin mechanism;

a rear jaw, having a rear end section, pivotally connectable to the front jaw by the pivot pin mechanism and wherein the rear end section is pivotally attachable to the actuating arm; and

a single actuator comprising a single telescopic arm, wherein the single telescopic arm is slideable between a retracted position and an extended position, said single actuator is pivotally attachable to the actuating arm and to the coupler, the single actuator driving coupled movement of both the front and rear jaws,

wherein an axis of the pivot pin mechanism is positioned relative to an axis of the coupler pivot, such that upon extension of the single telescopic arm from the retracted position, the front jaw rotates about the coupler pivot and moves towards the rear jaw and, wherein the single telescopic arm has a line of action which is not aligned with the pivot pin mechanism to act as a lever onto the pivot pin mechanism to rotate the rear jaw away from the front jaw about the pivot pin mechanism and relative to the front jaw simultaneously while the front jaw rotates about the coupler pivot towards the rear jaw, and wherein the front jaw reaches the rear jaw as the telescopic arm reaches the extended position.

2. An off-centered concrete pulverizer as claimed in claim 1, wherein the coupler is a reversible coupler.
3. An off-centered concrete pulverizer as claimed in claim 1 or 2, wherein the single actuator comprises a hydraulic or pneumatic actuator.

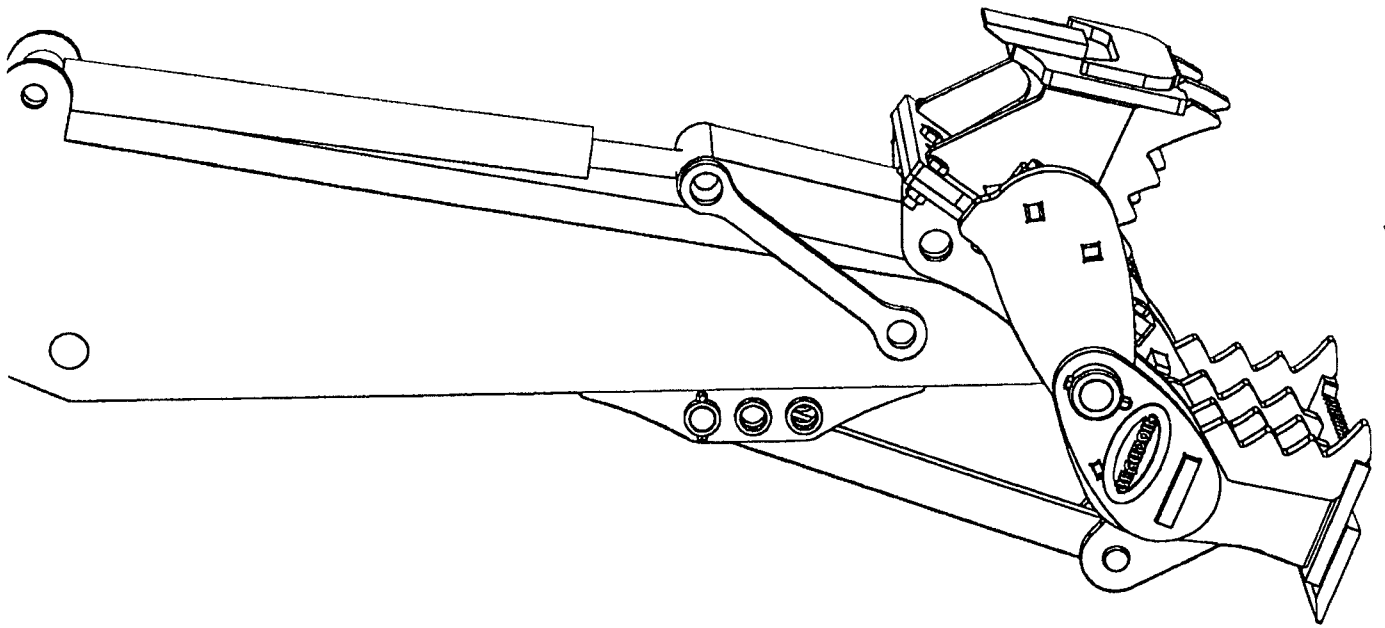


Fig. 1A (PRIOR ART)

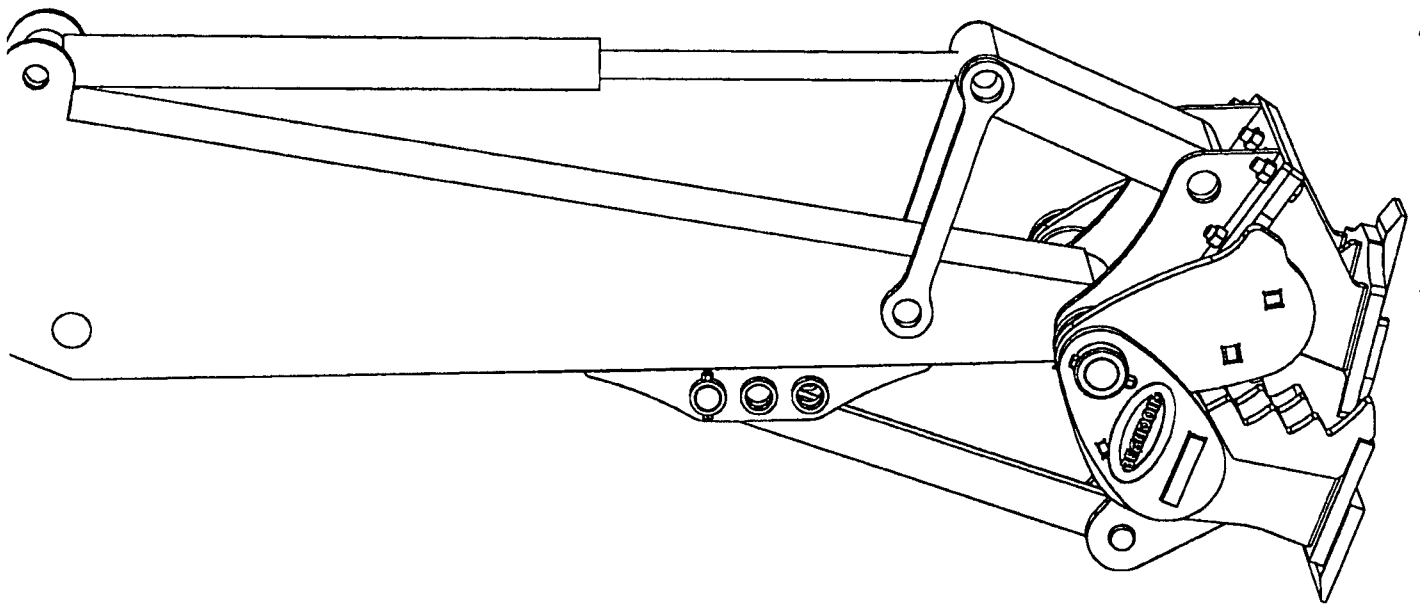


Fig. 1B (PRIOR ART)

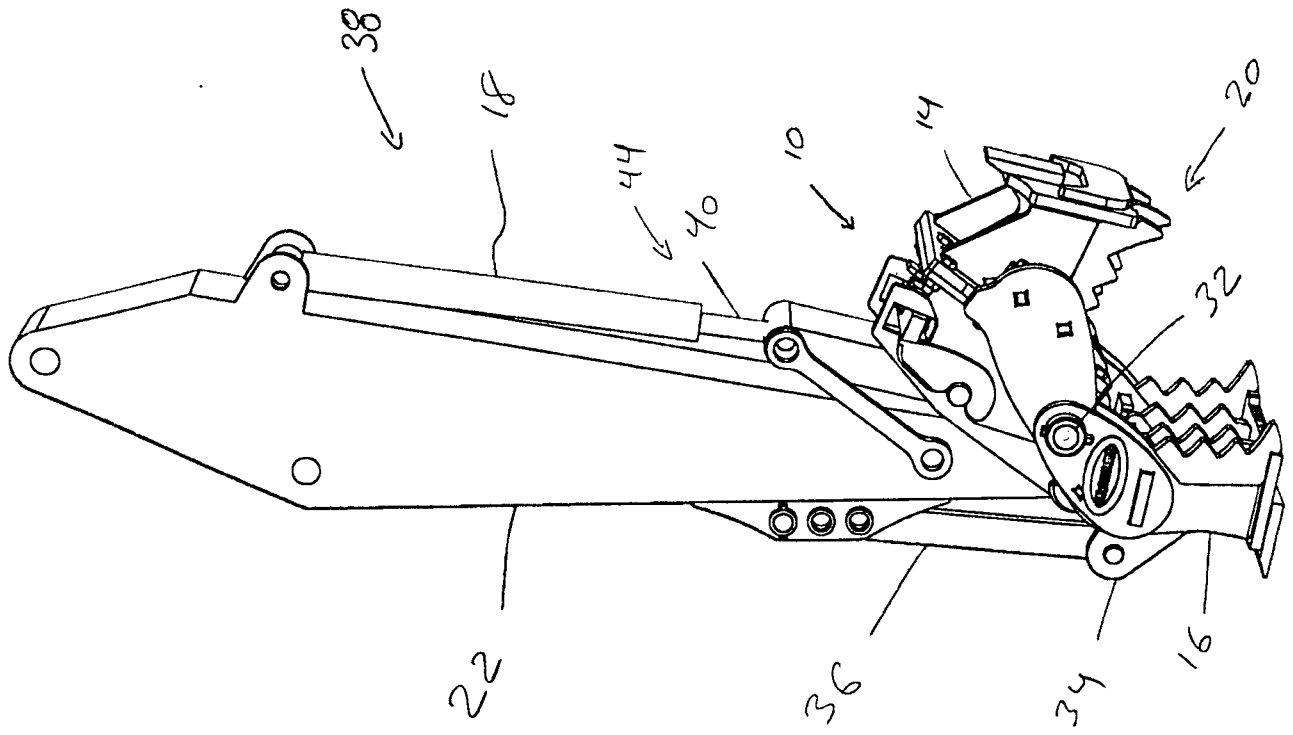


Fig. 2A

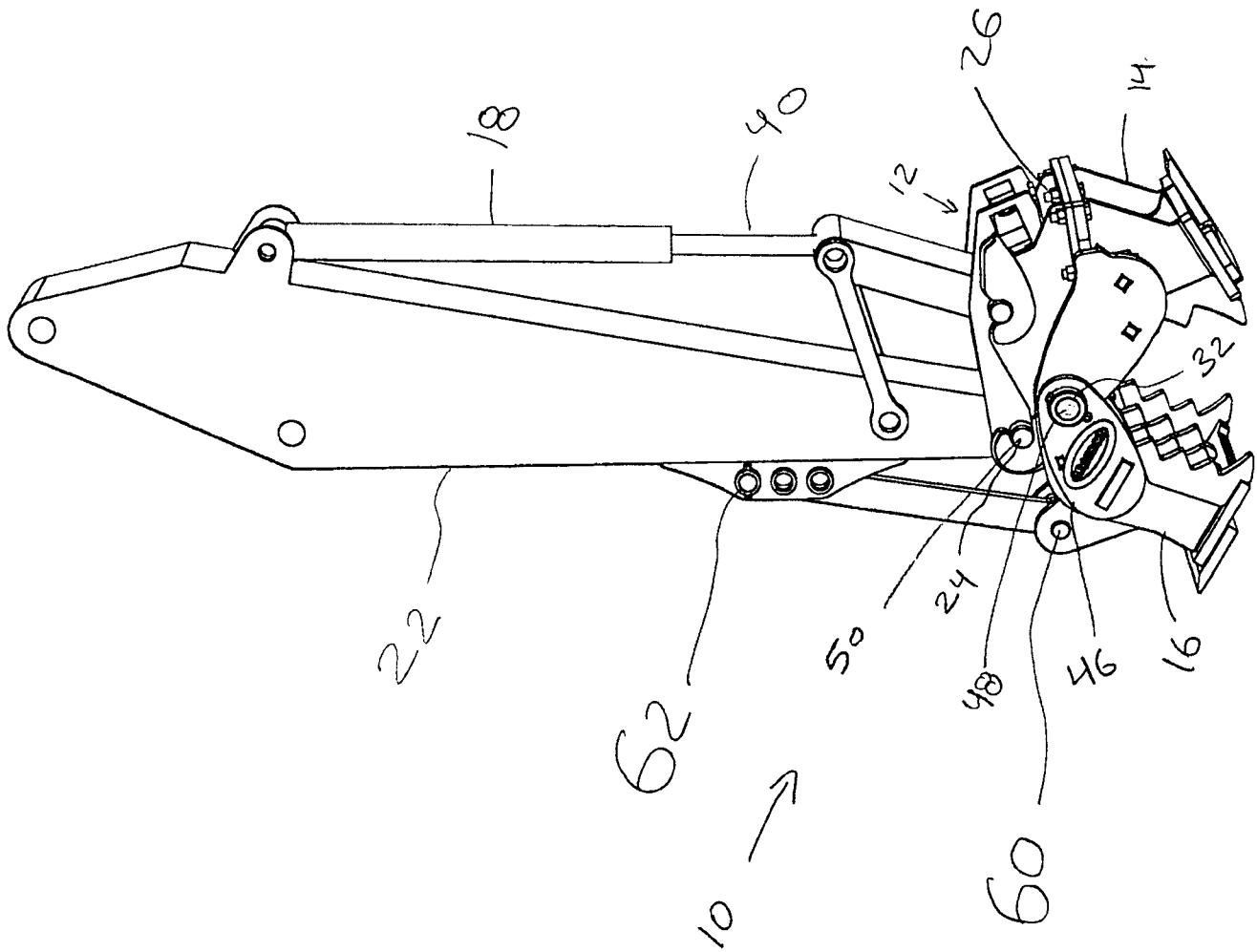
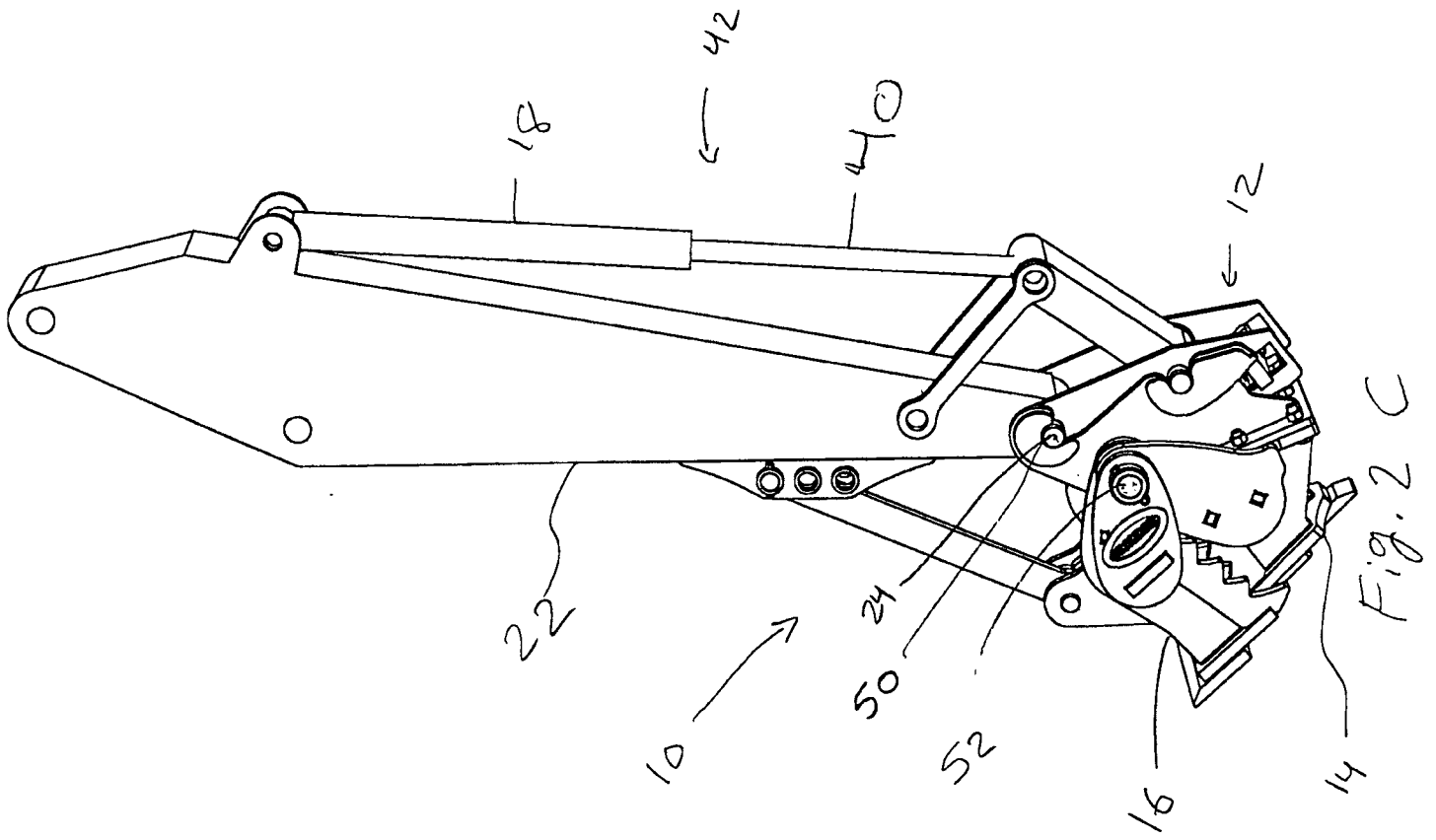


Fig. 2B.



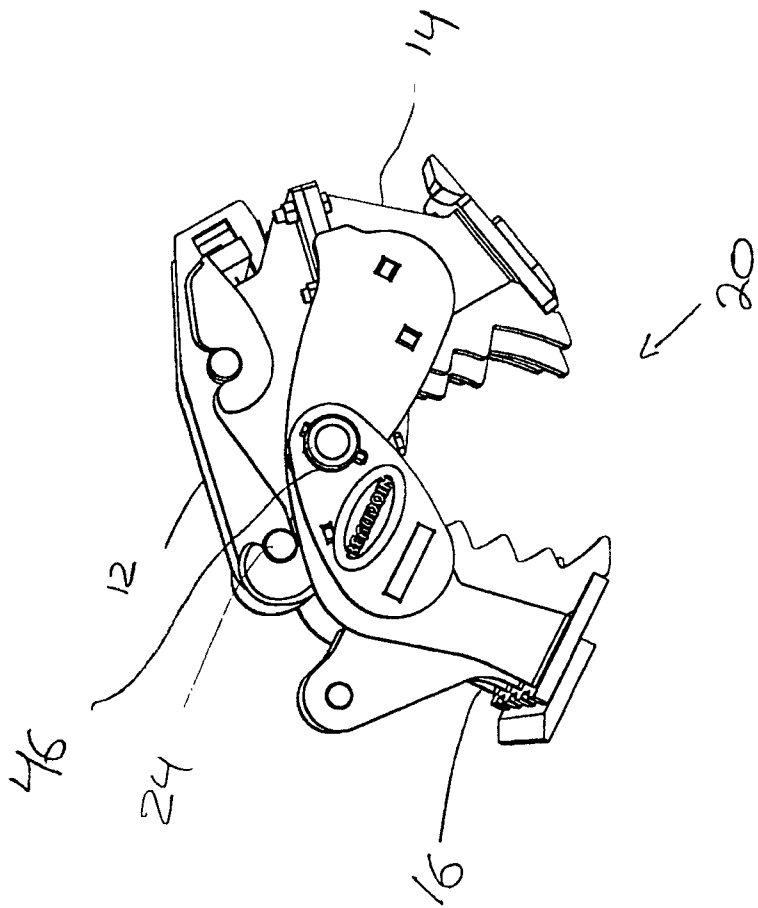


Fig 3

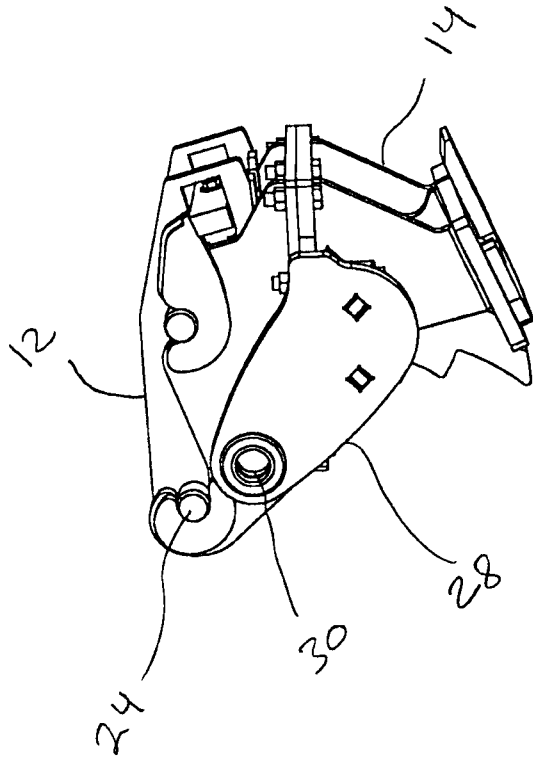


Fig 4

