

- [54] **AUTO FLATTENING PRESS**
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- [22] **Filed:** June 19, 1972
- [21] **Appl. No.:** 264,050
- [52] **U.S. Cl.:** 100/233, 100/DIG. 1
- [51] **Int. Cl.:** B30b 7/00
- [58] **Field of Search:** 100/DIG. 1, 269 R, 233

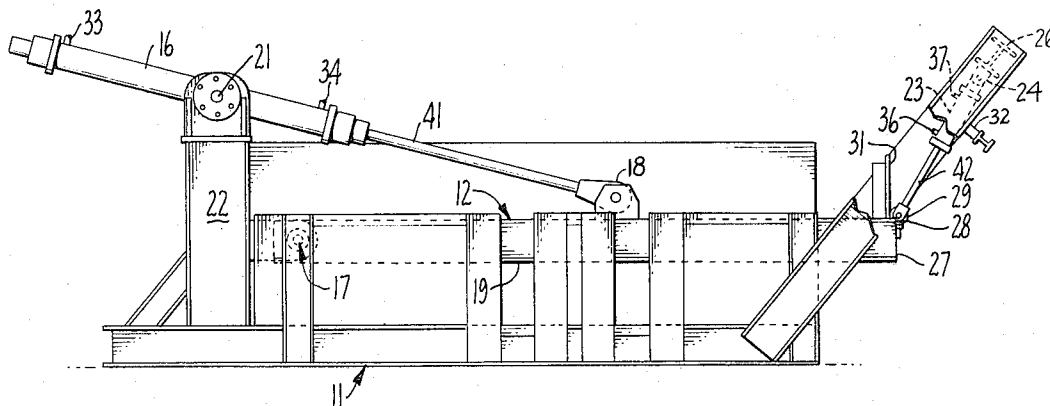
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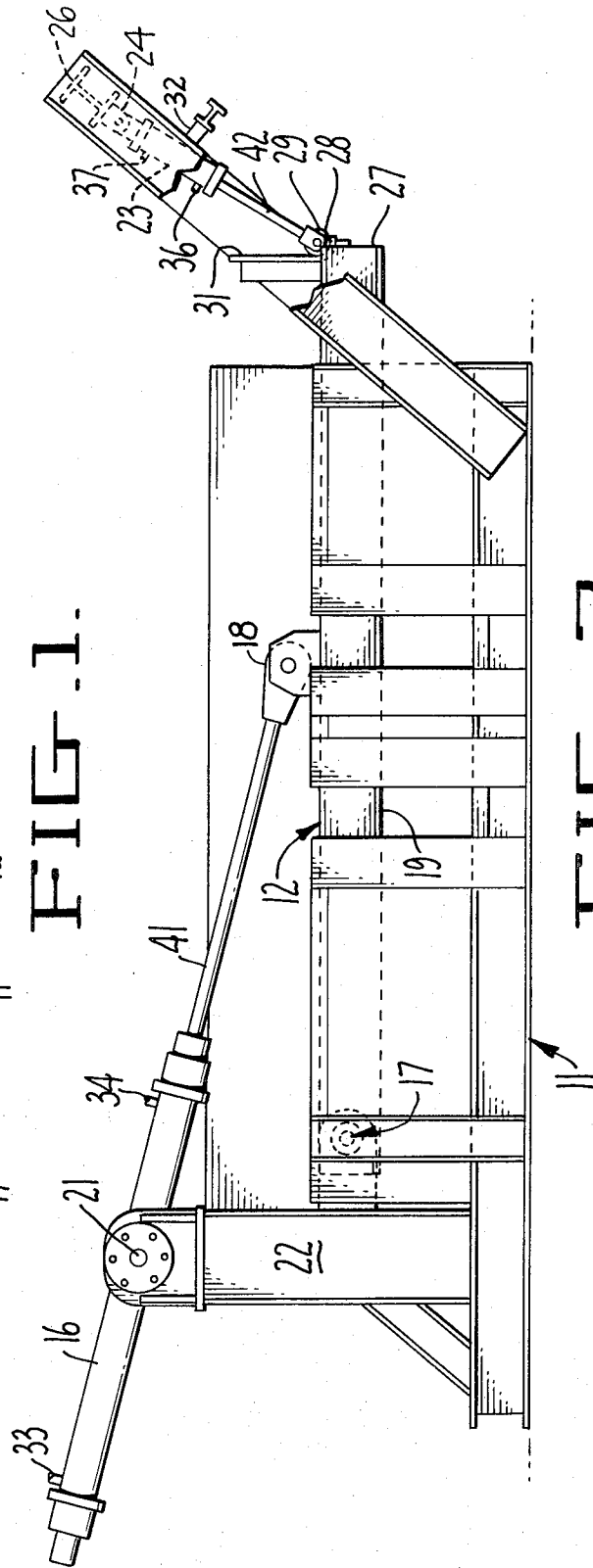
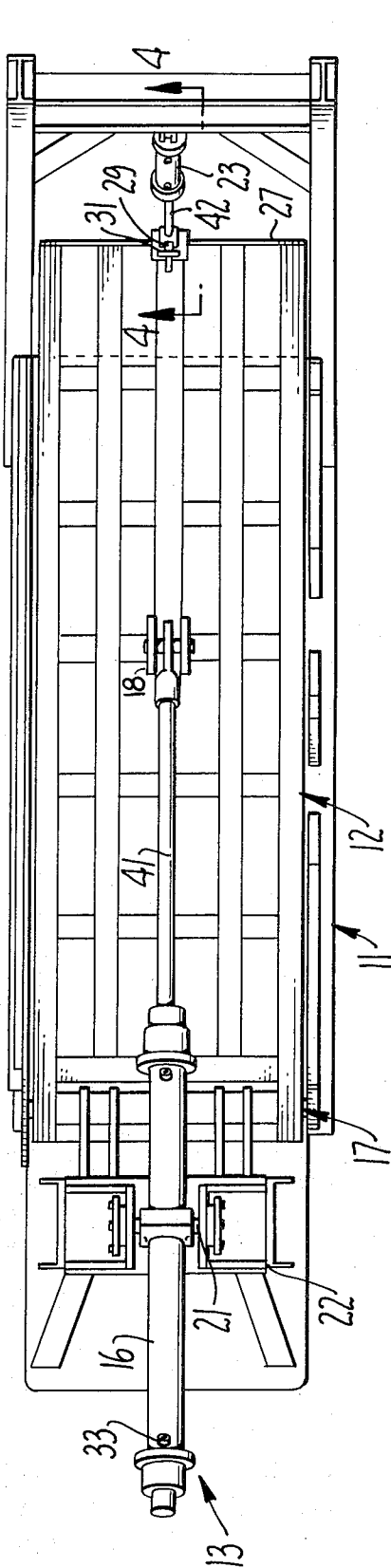
[57] **ABSTRACT**

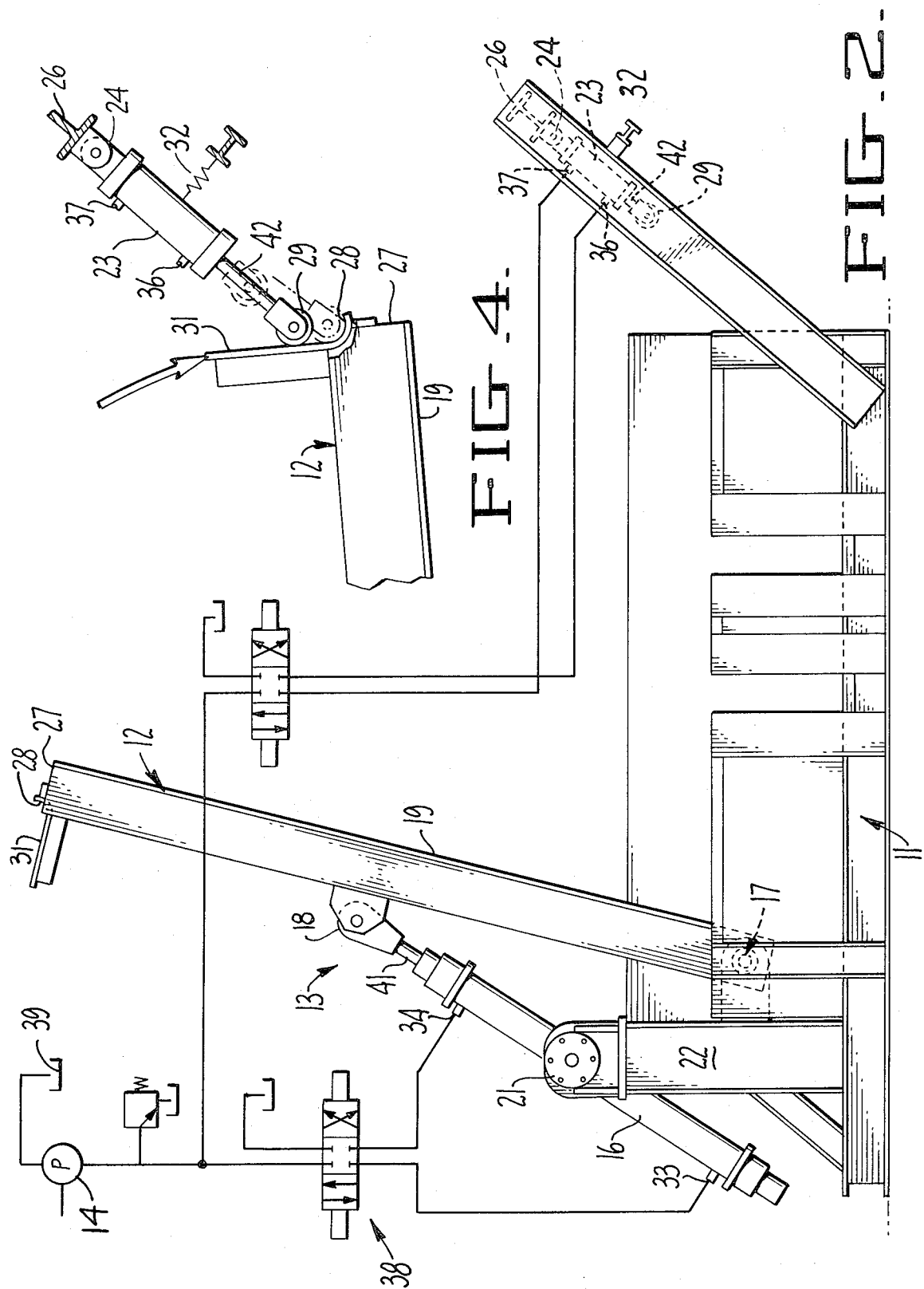
An apparatus for flattening junked vehicles having a rectangular bed and a crushing head pivoted to swing downwardly and crush flat a vehicle positioned on the bed. The swinging movement is accomplished by a first long throw hydraulic ram, which moves the head through most of its arc, and a second shorter hydraulic ram which engages the head and adds its force to that of the first ram in urging the head downwardly through the final stages movement of the head so as to overcome the increased resistance to crushing encountered as the vehicle body is progressively flattened. Manually operable valving means is provided for effecting the sequential action of the rams.

- [56] **References Cited**
UNITED STATES PATENTS
- | | | | |
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8 Claims, 4 Drawing Figures







AUTO FLATTENING PRESS

BACKGROUND OF THE INVENTION

This invention relates to an AUTO FLATTENING PRESS and more particularly to apparatus for flattening junked vehicles in which the vehicles are crushed between a downwardly swinging crushing head and a supporting bed or anvil.

In previous apparatus of this type, the head was often made very heavy and was allowed to fall and slam down against the vehicle being junked, crushing the vehicle by impact. Often, a number of successive impacts were required to flatten the vehicle by the desired amount. The shattering impacts tended to create hazards by the explosive scattering of shrapnel-like debris throughout adjacent areas.

It has been found that a slower pressing down of the flattening head is much less hazardous by virtually eliminating flying debris. Pressing the vehicle flat also requires considerably less time than the impact method because of the elimination of repetitious strokes. However, certain problems have been encountered in pressing the swinging head downwardly against the vehicle, and the present invention was perfected to overcome these problems.

To speed up the crushing action and make it more efficient, the crushing head should move as rapidly as possible. However, the resistance to downward movement increases as the vehicle is crushed flatter and flatter, until nearing the end of the stroke the vehicle may be crushed to a height of 18 to 24 inches. In the final stages of flattening, resistance of the vehicle to crushing is greatly increased as the structure is compacted and the heavier cast parts, such as the engine block, are crushed. Accordingly, during the final stages of the crushing greatly increased pressure may be required.

SUMMARY OF THE INVENTION

The present invention is constructed to provide maximum speed of movement through the entire arc described by the crushing head and, at the same time, to provide greatly increased and more powerful crushing action as the head nears the end of its downward stroke. This is accomplished with a hydraulic unit of minimum size by providing rapid movement where there is less resistance, and by slowing down the movement and increasing the pressure where increased resistance is encountered.

It is therefore a principle object of the present invention to provide an apparatus for flattening junked vehicles in which a flattening head is swung rapidly downward against the vehicle to be junked during the initial stages of its movement and is swung more slowly and with increased pressure during the final stages of its movement.

Another object of the invention is to provide an apparatus of the character described in which the crushing head is unobstructed when the head is in open position.

A further object of the invention is to provide an apparatus of the character described in which a plurality of sequentially operable hydraulic cylinders or rams provide the desired movement of the crushing head, with less than the entire number of cylinders providing the initial movement and an increased number of cylinders providing the final movement.

A still further object of the present invention is to provide an apparatus of the character set forth which is capable of operating rapidly and efficiently in the manner described on an essentially constant supply of hydraulic fluid under pressure.

Another object of the invention is to provide an apparatus of the character described which is simple and sturdy in construction and is easy and simple to operate with unskilled labor.

Further objects and features of advantage will become apparent as the specification progresses.

DESCRIPTION OF THE DRAWINGS

A preferred embodiment of the invention is shown in the accompanying drawings, in which:

FIG. 1 is a plan view of an apparatus for flattening junked vehicles constructed in accordance with the present invention;

FIG. 2 is a side elevational view of the apparatus of FIG. 1, with the apparatus being shown in open position to receive a vehicle to be crushed;

FIG. 3 is a side elevational view similar to that of FIG. 2, but illustrating the apparatus in its closed position assumed during the final stages of flattening the vehicle; and

FIG. 4 is a vertical longitudinal sectional view on an enlarged scale taken substantially on the plane of line 4-4 of FIG. 1, but illustrating the positioning of the parts just before entering the final stages of crushing of the vehicle.

While only the preferred embodiment of the invention has been illustrated in the drawings, it will be apparent that other modifications and forms of the invention may be made within the ambit of the claims herein.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings in detail, it will be seen that the apparatus for flattening junked vehicles of the present invention basically comprises a generally flat bed structure 11, a generally flat crushing head 12 mounted for a swinging movement toward and from the bed 11, the bed 11 and crushing head 12 being proportioned to receive a vehicle (not shown) therebetween and to flatten said vehicle as they move together, and sequential power means 13 formed for swinging the head 12 toward the bed 11 with an initial force, for preliminary crushing of the vehicle, and thereafter with an increased force, for final crushing of the vehicle to a desired flat condition.

In accordance with the present invention, the power means 13 preferably includes a plurality of hydraulic cylinders, with less than the entire number of cylinders providing the initial force and an increased number of cylinders providing the final, increased force. In order to provide maximum efficiency, the major portion of the movement of the crushing head 12 toward the bed 11 is accomplished at a relatively rapid rate of speed with the described initial force, and the increased final force is applied only during a relatively short distance as the head 12 approaches the bed 11.

The described action makes it possible to utilize a constant speed hydraulic pump 14 as a source of hydraulic fluid under pressure. The pump 14 may be of smaller capacity than would otherwise be required because of the increased speed of movement of the head

12 obtained by pumping fluid only to a limited number of cylinders to accomplish the major portion of the movement of the crushing head. When increased pressure is required, because of increased resistance, the additional cylinders are brought into play and increased pressure is obtained at the expense of speed. However, the resulting slowing down of the movement is comparatively negligible because of the relatively short final distance through which the crushing head must move.

As here shown, two hydraulic cylinders, or rams, are provided. The first ram 16 is of relatively long stroke and is pivotally mounted at the end of the bed 11 adjacent to the pivot means 17 which supports the head 12 for the described swinging movement. Ram 16 has an operative connection at 18 to the head 12 for urging the crushing surface 19 toward the bed 11 on the extension stroke of ram 16.

The pivotal mounting of ram 16 preferably is intermediate its ends and is here provided by a bearing member 21 mounted on a post 22 connected to the framework of bed 11. This mounting makes it possible to provide a relatively long stroke of ram 16 in a relatively small area. The stroke of ram 16 may best be seen by a comparison of FIGS. 2 and 3 of the drawings, with head 12 being in fully raised position in FIG. 2 and in fully down position in FIG. 3.

In accordance with the present invention, a second hydraulic ram 23 is pivotally mounted at the end of the bed 11 remote from the pivot means 17. Ram 23 is formed for operative engagement with the crushing head 12 in a manner urging surface 19 toward the bed 11 on the extension stroke of such ram. The force exerted by ram 23 is thus added to the lessening force being exerted by ram 16 during the last portion of the downward movement of head 12, and the combined forces complete the flattening action.

As may best be seen in FIG. 4 of the drawings, the rear end of ram 23 is pivotally supported in bearing member 24 mounted on a frame 26 attached to bed structure 11. Ram 23 is positioned outside the arcuate path of movement of the distal end 27 of the crushing head 12. Ram 23 is also above the lower-most position of head 12 and is inclined in the manner shown so that the distal end of ram 23 can be extended to bear against a shoulder 28 formed on end 27 of head 12. In this way, extension of the ram 23 serves to urge head 12 downwardly to the position illustrated in FIG. 3.

As shown in FIG. 4 of the drawings, the distal end of ram 23 is equipped with a roller 29 adapted to be guided onto shoulder 28 by a camming surface 31 provided on head 12 adjacent to shoulder 28. When in its retracted position, ram 23 is resiliently maintained in the position illustrated in FIG. 4 of the drawings as by a suitable spring 32. As soon as shoulder 28 has passed downwardly past roller 29, ram 23 is extended. This cams roller 29 down surface 31 into contact with shoulder 28, and thereafter further extension of ram 23 assists in pushing head 12 downwardly to its lowermost position.

As shown diagrammatically in FIG. 2 of the drawings, ram 16 is connected to supply and discharge hoses 33 and 34, and ram 23 is likewise connected to supply and discharge hoses 36 and 37. The output of hydraulic pump 14 is selectively communicated with the desired hoses 33, 34, 36 and 37 by a control valve means 38, and is supplied from a conventional fluid reservoir 39.

In operation, with head 12 lifted to the position shown in FIG. 2 and a vehicle positioned on bed 11, control valve means 38 is operated to supply fluid under pressure from pump 14 through hose 33 to the rear end of ram 16, causing piston rod 41 to extrude from the cylinder. This causes crushing head 12 to be swung about pivot means 17 downwardly against the top of the vehicle, crushing the vehicle between head 12 and bed 11. When head 12 reaches the position illustrated in FIG. 4 of the drawings, control valve means 38 is operated to supply hydraulic fluid under pressure through hose 37 to the rear end of ram 23. This causes piston rod 42 to extend from the cylinder.

As piston rod 42 is extended, roller 29 engages and rides on camming surface 31 until it encounters shoulder 28. Continued extension of ram 23 then adds its force to that being exerted by ram 16 increasing the downward pressure on head 12 to overcome the increasing resistance being encountered.

Once the crushing head 12 has been forced down to its desired lowermost position, control valve means 38 is operated to vent hydraulic fluid from the rear ends of rams 16 and 23 through hoses 33 and 37 respectively, and to supply hydraulic fluid under pressure to the front ends of rams 16 and 23 through hoses 34 and 36 respectively, causing them to retract the piston rods 41 and 42. Retraction of piston rod 41 swings the crushing head 12 upwardly back to the position shown in FIG. 2, and retraction of piston rod 42 moves roller 29 out of the way and permits the distal end 27 of crushing head 12 to swing upwardly along its arcuate path. The flattened vehicle is then removed from bed 11, another vehicle is placed on the bed, and the cycle is repeated.

From the foregoing it will be seen that the auto flattening press of the present invention provides a strong, sturdy and efficient device for flattening junked vehicles in a rapid, safe and efficient manner easily accomplished by unskilled operators.

I claim:

1. An apparatus for flattening junked vehicles, comprising

a generally flat bed,

a generally flat crushing head mounted for swinging movement toward and away from said bed and formed with a camming surface,

said bed and head being proportioned to receive a vehicle therebetween and to flatten said vehicle as they move together,

and sequential power means formed for swinging said head toward said bed with an initial force for preliminary crushing of said vehicle and thereafter with an increased force for final crushing of said vehicle to a desired flattened condition said sequential power means comprising at least one hydraulic ram provided with a roller at the distal end thereof,

whereby said camming surface is engagable by said roller for providing the increased force for final crushing of said vehicle to the desired flattened condition.

2. An apparatus for flattening junked vehicles as described in claim 1 and wherein said power means includes a plurality of hydraulic cylinders with less than the entire number of said cylinders providing said initial force and an increased number of said cylinders providing said increased force.

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3. An apparatus for flattening junked vehicles as described in claim 2 and wherein the major portion of said movement of said crushing head toward said bed is accomplished with said initial force.

4. An apparatus for flattening junked vehicles as described in claim 3 and wherein said power means includes a constant speed hydraulic pump capable of effecting said movement of said crushing head toward said bed at a faster speed at said initial force than at said increased force.

5. An apparatus for flattening junked vehicles as described in claim 4 and wherein said power means further includes control means formed for selectively operatively connecting said hydraulic pump to said hydraulic cylinders in a desired sequence.

6. An apparatus for flattening junked vehicles, comprising

a generally rectangular flat substantially horizontal bed proportioned to support a vehicle to be flattened,

a crushing head having a generally flat rectangular surface complementary to said bed and formed with a camming surface having a shoulder formed thereon,

pivot means operatively connecting an end of said crushing head to an end of said bed for swinging movement of said surface toward and away from said bed,

a first hydraulic ram pivotally mounted at the end of

said bed adjacent to said pivot means and having an operative connection to said head for urging said surface toward said bed on the extension stroke of said first hydraulic ram,

a second hydraulic ram pivotally mounted at the end of said bed remote from said pivot means and formed with a roller at the distal end thereof to operatively engage said head at said camming surface to guide said roller on to said shoulder and urge said surface toward said bed on the extension stroke of said second hydraulic ram,

a source of hydraulic fluid under pressure, and valve means operatively connected to said hydraulic cylinders and said source of hydraulic fluid under pressure and formed for selectively supplying hydraulic fluid under pressure to said first ram for initial movement of said head and to said first and second rams for final movement.

7. An apparatus for flattening junked vehicles as described in claim 6 and wherein said first hydraulic ram is journaled intermediate its ends above the plane of said bed.

8. An apparatus for flattening junked vehicles as described in claim 6 and wherein the end of said head remote from said pivot means describes an arcuate path as said head moves toward said bed, and said second hydraulic ram is positioned outside said arcuate path and above said bed.

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