March 1, 1966 C. M. DAVIS, JR 3,237,554

CRUSHING MACHINE

Filed Aug. 3, 1964 2 Sheets-Sheet 1

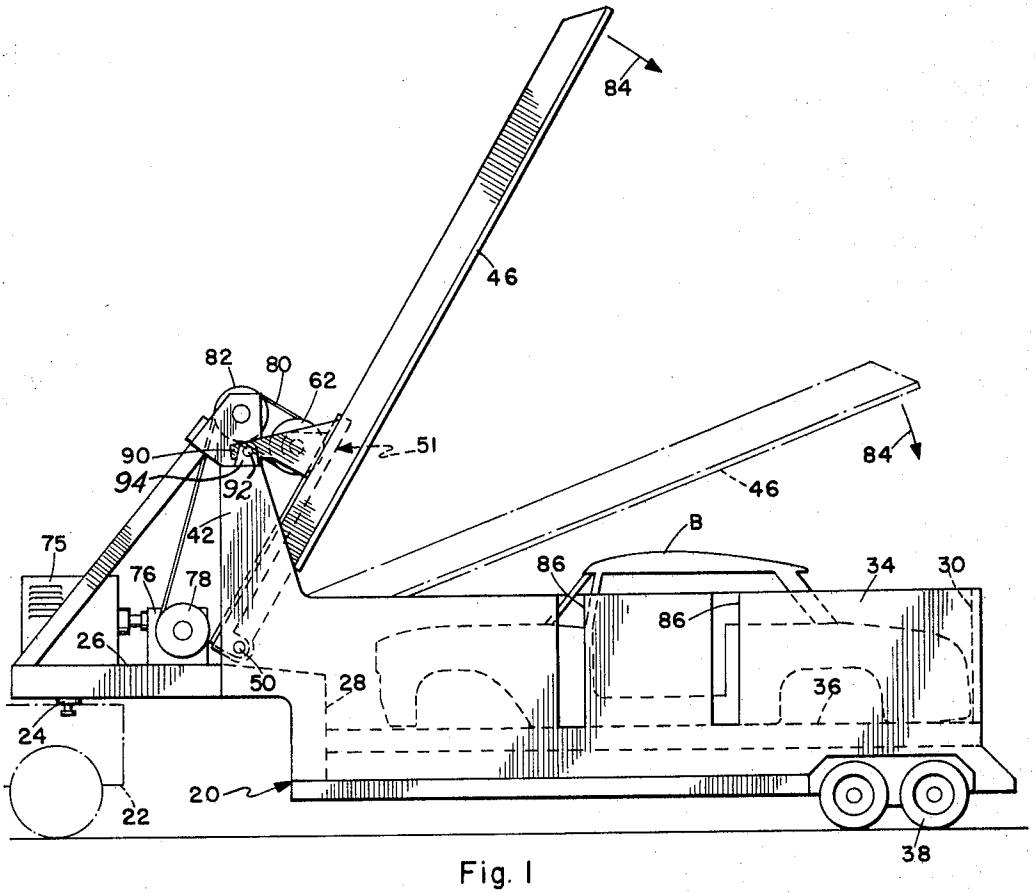


Fig. 1

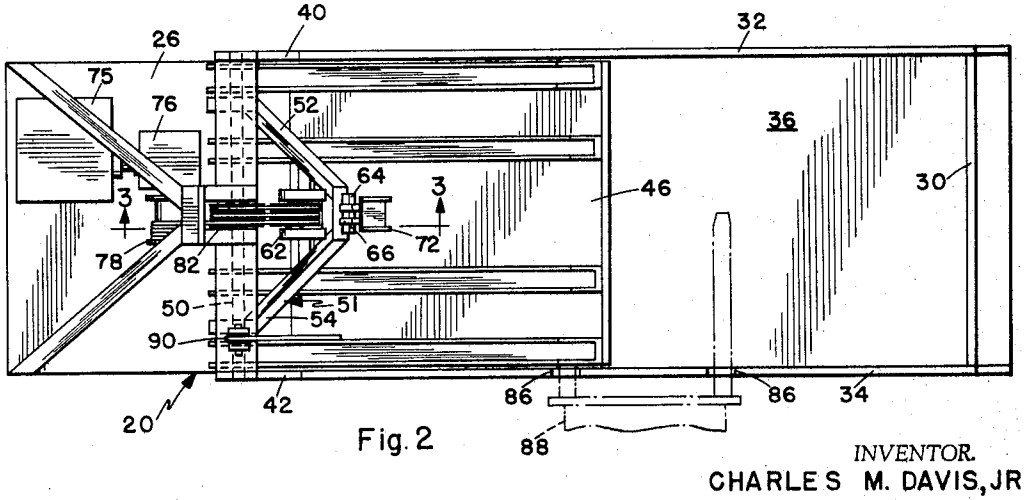


Fig. 2

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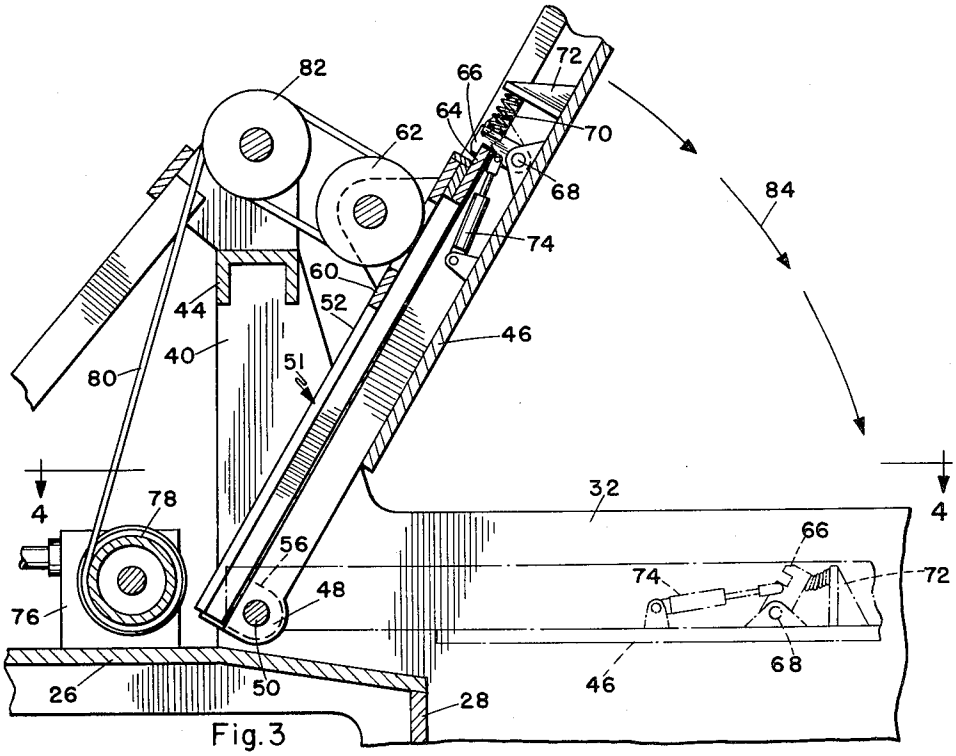


Fig. 3

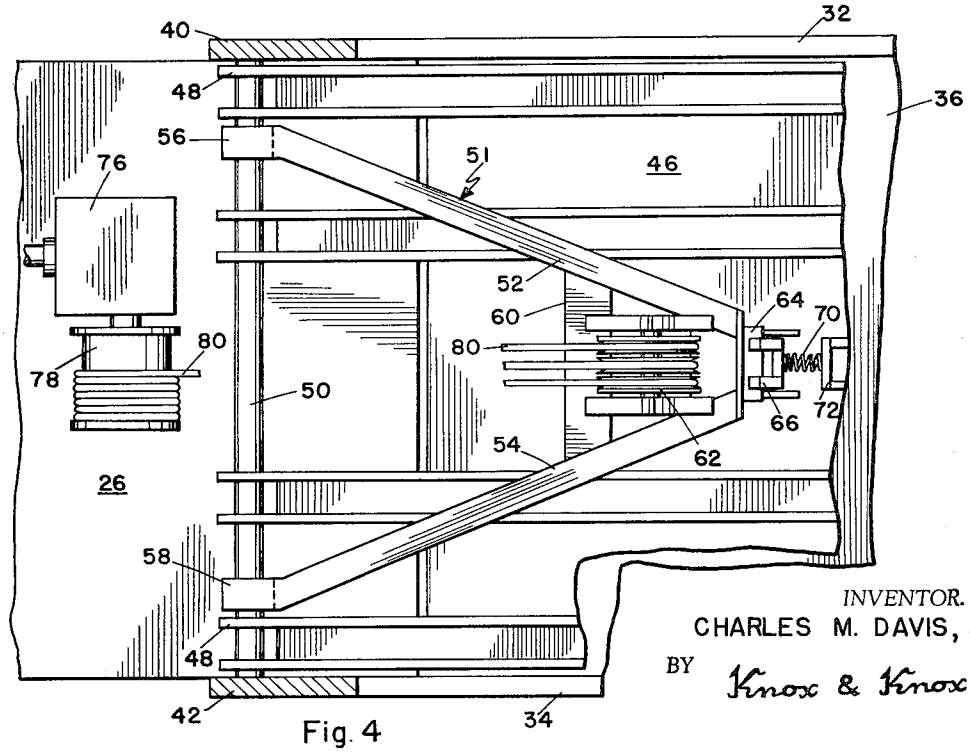


Fig. 4

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CRUSHING MACHINE

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5 Claims. (Cl. 100—218)

The present invention relates generally to a mobile crushing machine and more particularly to such a machine which is especially adapted to compress a pair of worn-out automobile bodies into a loosely compacted slab.

Bodies of worn-out and wrecked automobiles, from which the wheels and motor have been removed, provide a prime source of scrap metal. It is usual to compact these bodies in stationary baling presses to form tightly compressed bales for transportation to the steel mill to be remelted. However these bales contain a large percentage of contaminating material and are therefore becoming more and more undesirable for direct use in open hearth or electric furnaces. The latest method of processing automobile scrap requires a shredder or pulverizer which tears the material into small pieces and separates 99 percent of all contaminating material leaving a highly desirable form of scrap. Obviously a tightly compressed bale would be very difficult to process in this manner.

It is, therefore, the primary object of this invention to provide an improved crushing machine which will control the degree of compaction of worn-out automobile bodies.

It is a further object of this invention to provide an improved crushing machine which will utilize a freely falling weight to exert the crushing force.

It is a still further object of this invention to provide an improved crushing machine having means associated therewith by which the compacted slab may be removed from the machine by a standard fork-lift truck.

Finally, it is an object to provide a crushing machine of the aforementioned character which is simple and convenient to use and which will give generally efficient and durable service.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claims, and illustrated in the drawings which form a material part of this disclosure, and in which:

FIGURE 1 is a side elevation of the complete machine showing the action of the weight member;

FIGURE 2 is a top plan view;

FIGURE 3 is an enlarged section on the line 2—2 of FIGURE 2; and

FIGURE 4 is a section on the line 4—4 of FIGURE 3 but with the weight member and pick up frame lowered.

Referring now more specifically to the drawings, wherein like parts are designated by the same numerals throughout the various figures, there is represented an embodiment of the invention wherein the machine is incorporated in a trailer **20** which is connected to a tractor **22** by a fifth wheel **24** in a manner well known in the art. It will be understood, however, that the hereinafter described platform and walled body are not necessarily combined with a wheel assembly. Such a mounting of the machine represents a very desirable embodiment of the invention and the succeeding description is drawn to this embodiment as exemplary.

Trailer **20** is provided with a platform **26** and, extending rearwardly therefrom, a body portion formed by a front wall **28**, extending downwardly from platform **26**, a rear wall **30** opposite side walls **32** and **34** respectively, and a depressed floor **36**. The top of the end wall **30** and side wall **34** is coextensive and extends substantially above the level of the platform **26** as shown in FIGURE 1. The depressed body portion or floor **36** is formed of high impact strength metal and is heavily reinforced for a purpose that will be hereinafter described. Trailer **20** is supported at its rear end by the usual wheel assembly **38**.

Side walls **32** and **34** extend forwardly of front wall **28** and terminate in upwardly extending support arms **40** and **42** respectively. An inverted channel member **44** extends between and is supported by arms **40** and **42**.

The crushing force required to reduce automobile bodies to the proper size slab for shipment is generated by a falling weight member **46**, one end **48** of which is pivotally mounted on rod **50**. Any suitable means may be provided for supporting rod **50** in spaced relation to the platform **26**. As here shown the rod **50** is secured in support arms **40** and **42** respectively. It should be noted that rod **50** is mounted a substantial distance forward of the front wall **28** for a purpose that will be hereinafter explained.

Also pivotally mounted on rod **50** is a lifting arm or pick up frame indicated generally by the reference numeral **51** here shown as a generally V-shaped member having diverging arms **52** and **54**, the spaced ends of which are journalled as at **56** and **58** respectively on the rod **50**. A brace member **60** is secured to arms **52** and **54** adjacent the opposite ends thereof. This brace member forms, with the adjacent portion of arms **52** and **54**, a support for a multiple groove sheave member **62**.

A releasable latch member is provided on weight member **46** for connection with a plate **64** rigidly connected to the free end of the pick up frame. This latch member consists of a hook **66** pivotally mounted at **68** to weight member **46**. Hook **66** is normally urged into engagement with plate **64** by a compression spring **70** mounted in a suitable manner between hook **66** and an abutment member **72** secured to the weight member **46**. Actuation of the hook member **66** is effected, according to well known techniques, by the double acting hydraulic cylinder **74**. While I have shown a hydraulically actuated latch member, it is to be understood that other forms of latching means, either mechanical or electrical, can be substituted therefor without departing from the scope of this invention.

Any suitable means may be utilized to raise the weight member **46** into operative position. The means shown consists of a motor **75** driving a winch **76** which has a drum **78** upon which is wound cable **80**. This cable passes several times over sheave **82** which is fixed to support **44** and sheave **62** according to well known techniques. As will be evident to those skilled in the art, rotation of the drum **78** will effect a shortening of cable **80** to elevate weight member **46** from a horizontal position to the position shown in solid lines in FIGURE 3.

Operation

The operation of the improved crushing machine will be evident from the above description taken in connection with the drawings. With the weight member **46** in the elevated position, shown in solid lines in FIGURE 1, body B of an automobile, the engine and wheels having been previously removed, is loaded into the recessed portion of the trailer by any suitable lifting means. Hook **66** is now released from engagement with plate member **64** through actuation of the hydraulic operator **74**. This frees the weight member from engagement with the pick up arm **51** and it is free to drop in an arc about rod **50** as indicated by the arrows **84**, FIGURES 1 and 3. Weight member **46** will continue to fall until it has reached a substantially horizontal position, as clearly shown by the broken lines in FIGURE 3. The force thus generated will crush the body B to the level of the platform **26**. Pick up arm **51** is now lowered by winch mechanism **76** and latch **66** re-engaged with plate **64**. Winch mechanism **76** is now actuated to raise the weight member to the full line position and a second automobile body is placed on top of the one that is partially crushed. Weight member **46** is dropped a second time, crushing the second body. This step will also force pieces of metal from each body at the junction of the two bodies to interlock so that the two bodies form an integral slab and may be handled as a unit. Slots **86** may, if desired, be provided in side wall **34** to permit insertion of the tines of a conventional fork-lift truck **88** for removal of the slab from the trailer. If desired, a manually operated safety lock **90** of any suitable construction may be applied to weight member **46** to lock it to support arm **42** during loading of the trailer unit. As illustrated this safety lock is a transverse lock pin **92** inserted through a hole in the lock flange **90** and registering holes in ears **94** on the top of the support arm **42**.

Although any number of bodies may be crushed at one time by varying the trailer dimensions, I have found that by forming a slab of two bodies the proper density can be maintained so that the slab can be fed through the shredder at the most efficient speed. With the trailer herein disclosed, the length of the weight member is approximately 22 feet and the weight approximately 16,000 pounds. When in horizontal position, the weight member extends substantially to the end wall **30** and fits with slight clearance between the side walls **32** and **34**. The side walls **32** and **34** and end wall **30** extend approximately four feet above the level of the floor **36** of the recessed portion of the trailer. I have also found that the finished slab when composed of two bodies should be approximately 20 inches thick. To accomplish this the floor **36** is dropped a distance of 20 inches below the platform **26**. The above dimensions may obviously be changed if it is desired to form a slab of three or more bodies and still maintain the desired density in the finished slab.

It is understood that minor variations from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawings are to be considered as merely illustrative rather than limiting.

I claim:

1. A crushing machine comprising:

a body having a platform and a depressed portion having side walls;

an elongated weight member;

pivot means adjacent one end of said depressed portion and connecting said weight member to said platform; and

hoisting means for pivotally raising said weight member above said depressed portion to a predetermined height about said pivot means including means for disengaging said weight member from said hoisting means whereby, upon disengagement, downward movement of said weight member will compress material in said recessed portion, said hoisting means including a pick-up frame pivotally mounted on said body, a winch mounted on said body with a hoisting cable operatively connected to said winch and said pick-up frame.

2. The structure of claim **1** further including slots in one side wall whereby the tines of a fork lift truck may be inserted to remove the crushed material.

3. The structure of claim **1** in which said means for disengaging said weight member includes a latch member carried by said weight member and adapted to releasably engage said pick up frame.

4. The structure of claim **3** further including a double-acting hydraulic motor for actuating said latch member and a spring normally forcing said latch member into engagement with said pick up frame.

5. The structure of claim **4** further including a safety lock between said weight member and body to secure said weight member in raised position.

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