March 24, 1959 D. C. PERSYN ET AL 2,879,007

STONE CHIPPER

Filed June 14, 1957 2 Sheets-Sheet 1

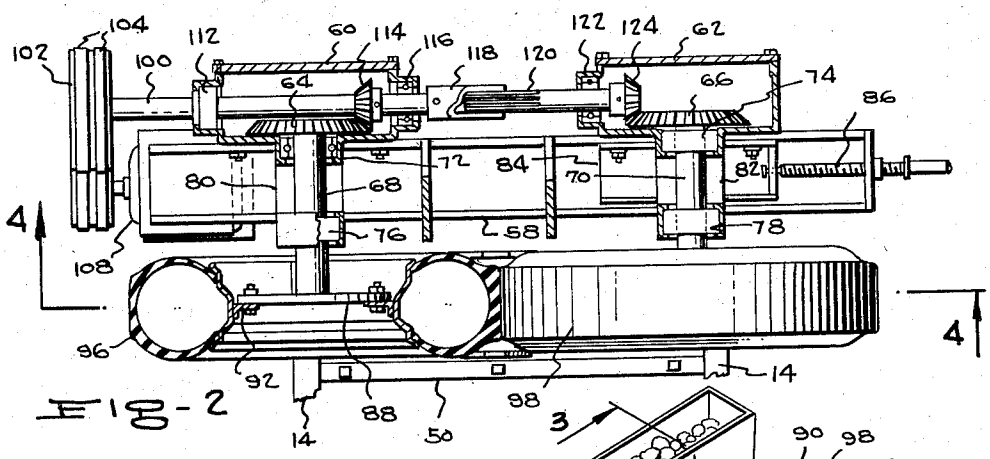


Fig-2

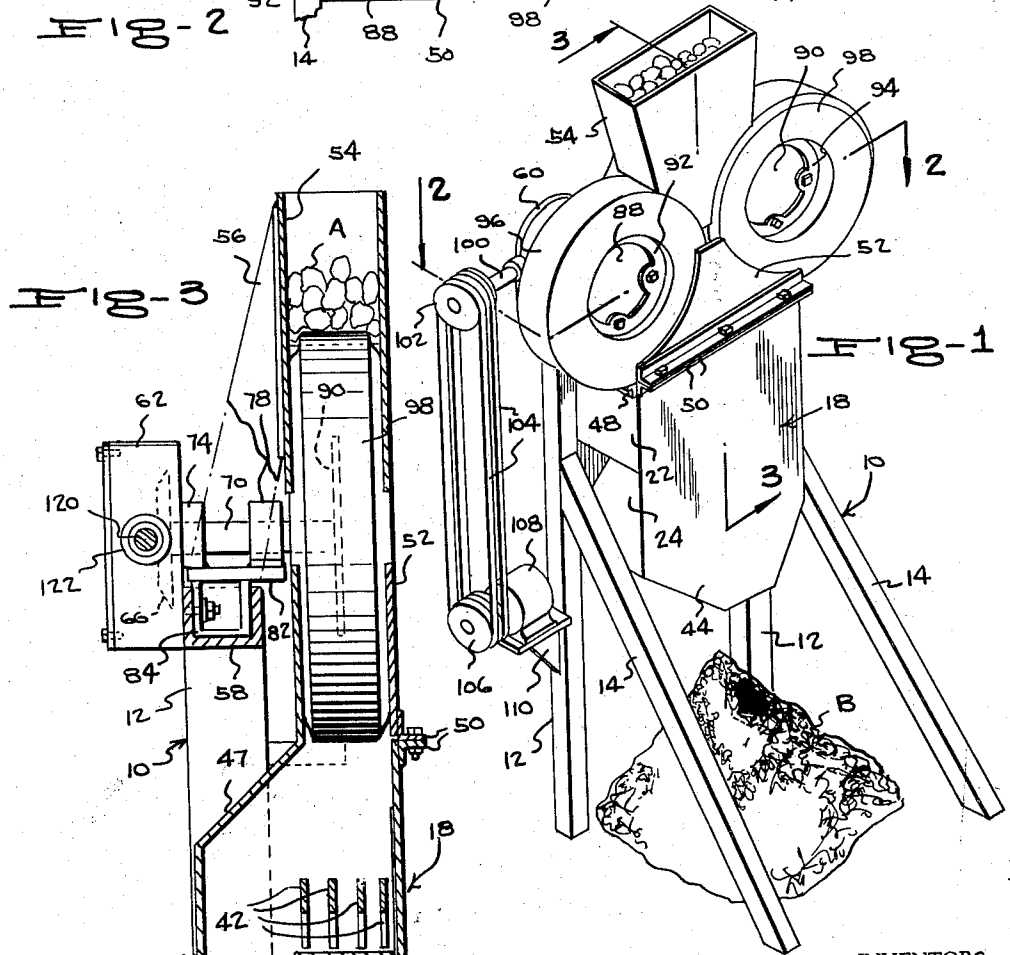


Fig-3

Fig-1

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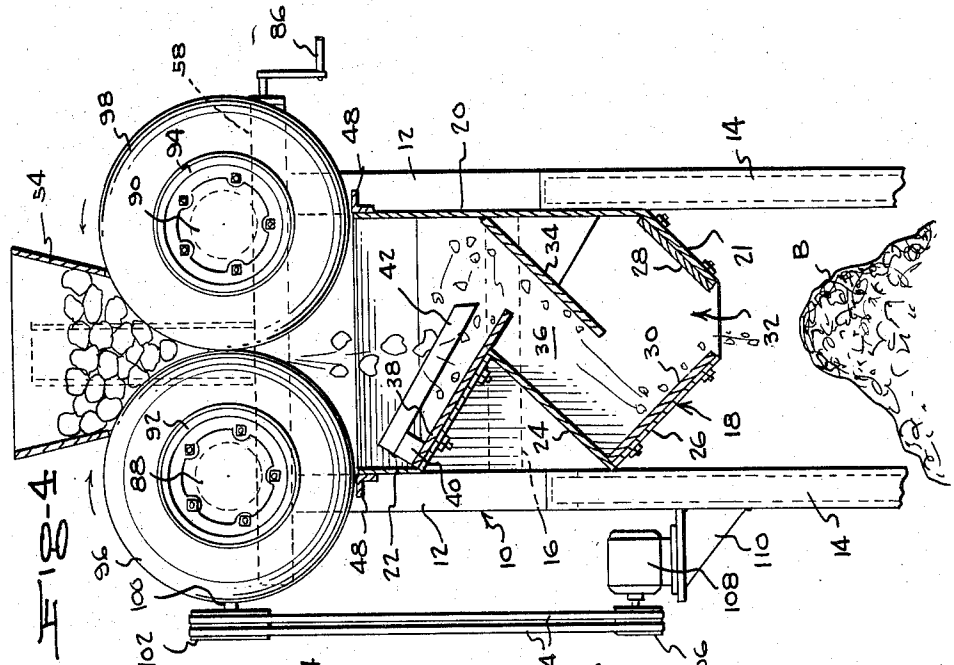


FIG-4

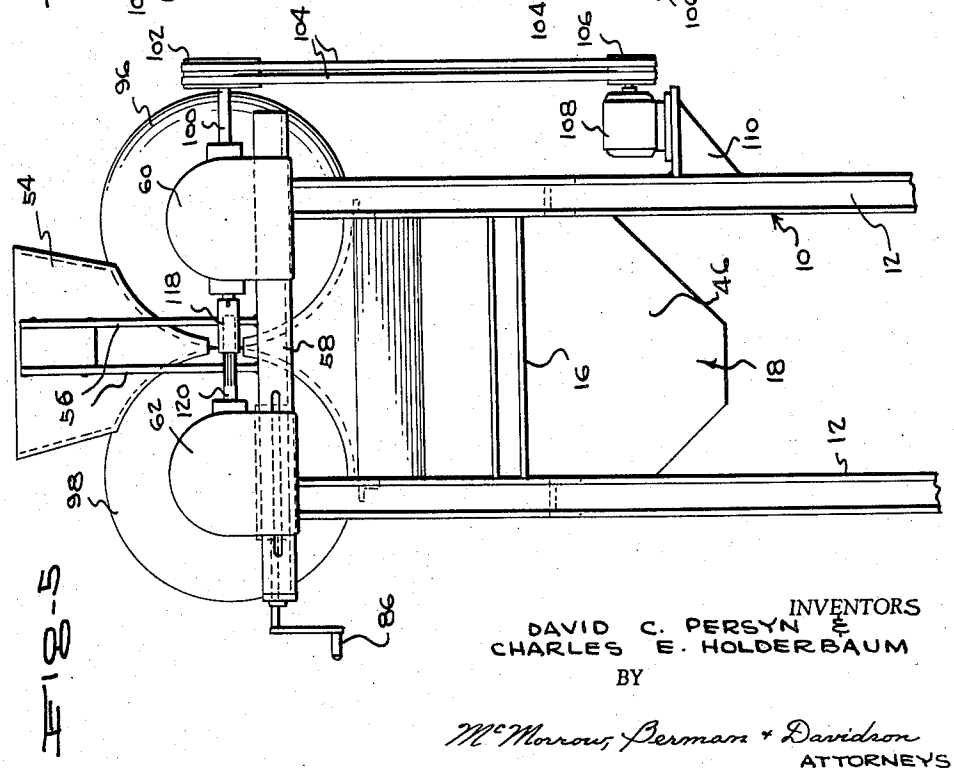


FIG-5

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STONE CHIPPER

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1 Claim. (Cl. 241—230)

This invention, a device for chipping or breaking stones during the process of reducing the stones to gravel, has among others the following important objects:

To effect the stone chipping through the use of co-operating, side-by-side, pneumatic tires;

To effect the chipping action by passing the stones between the tires in a manner to cause the tires to grip the stones, regardless of the size thereof, between the tire casings and forcibly hurl the stones against surfaces adapted to break the same;

To include, in the surfaces against which the stones are hurled, a breaking grate as the first surface against which the stones are thrown, to produce an initial breakage or chipping of the stones;

To provide, as additional surfaces against which the chipping action may be carried out while the stones are still traveling under the force imparted thereto by the rotating wheels, angularly related, successively following baffles or deflectors, causing the stones to strike a plurality of surfaces in succession while traveling a tortuous path;

To permit adjustment of the distance between the peripheries of the pneumatic tires for handling stones of different size;

To maintain both tires under positive drive in each position to which the tires are adjusted in respect to the spacing of their axes from each other; and

To effect adjustments in the weight and force of the chipping action, either independently of or in combination with the adjustments in the spacing between the tires.

Other objects will appear from the following description, the claim appeanded thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a perspective view of a stone chipper according to the invention;

Figure 2 is an enlarged horizontal section transversely through the device, substantially on line 2—2 of Figure 1;

Figure 3 is a longitudinal, vertical section on an enlarged scale, substantially on line 3—3 of Figure 1;

Figure 4 is a vertical sectional view on a scale substantially the same as in Figure 1, taken substantially on line 4—4 of Figure 2; and

Figure 5 is a front elevational view on the same scale as Figure 4.

The stone chipper constituting the present invention includes a support frame generally designated 10. The frame includes vertical standards 12 braced by inclined brace members 14 fixedly secured at their upper ends to intermediate portions of standards 12. The standards are connected and cross braced by a cross member 16 (Figure 5) intermediate opposite ends of the posts, welded at its opposite ends to the respective posts or standards.

Carried by the frame 10, between the standards 12, is a vertically extending housing generally designated at 18, formed of sheet metal or the like, and including at

one side a vertical, continuous side wall 20 merging at its lower end into an inwardly, downwardly inclining outlet wall portion 21.

At its opposite side, the housing 18 is provided with a side wall 22 having a re-entrant portion 24 merging into a downwardly, inwardly inclining outlet wall portion 26 that is in convergent relation to the portion 21. Reinforcing plates 28, 30 are fixedly secured to the inner surfaces of the portions 21, 26 respectively and between said portions there is defined an outlet generally designated 32, through which the chipped stone B gravitates as shown in Figures 1 and 4.

Directly opposite the re-entrant portion 24 there is provided a baffle 34 fixedly mounted within the housing in an inclined position, said baffle being disposed within a plane parallel to the plane of the wall portion 21 and parallel also to the plane of the lower part of the re-entrant wall portion 24. There is thus defined within the housing a tortuous passage 36 through which the stones A must pass, while being chipped or broken during operation of the device.

Mounted upon the upper part of the re-entrant wall portion 24 is a breaker plate including a flat base plate 38 fixedly mounted upon the top part of the re-entrant portion 24, said plate 38 projecting partway across the tortuous passage 36 as shown in Figure 4. On the end of the plate 38 adjacent wall 22 there are fixedly mounted a plurality of closely spaced, upwardly projecting support bars 40, to which are welded a plurality of parallel breaker grate bars 42, spaced upwardly from and paralleling the plane of base plate 38 (see Figures 3 and 4).

It will thus be seen, from the description so far provided, that stones gravitating into the upper end of the housing 18 (see Figure 4) will initially strike the narrow breaker grate bars 42, so as to produce an initial breakage of the stones, assuming that the stones are hurled downwardly against the breaker bars with substantial force. The stones are deflected, when they strike the breaker bars or plate 38, laterally to the right in Figure 4, against the baffle 34, and gravitating along the baffles strike the plate 30, again with substantial force, to complete the chipping, after which the chipped stone gravitates through outlet 32.

Referring to Figure 3, the front wall of the housing has been designated at 44, and lies in a plane parallel to that of the back wall 46, the back wall 46 merging into an upwardly, forwardly inclining portion 47 which reduces the width of the housing immediately above the breaker grates.

Fixedly secured to the upper end of wall 44 by face-to-face, transversely extending angle bars 50 is a vertically, upwardly extending closure plate 52 of generally triangular form, spaced downwardly from a feed hopper 54 in which is deposited the stones A to be chipped. Hopper 54 is mounted in the desired position (see Figure 3) by extension bars 56 of the frame 10, said extension bars being fixedly mounted upon and projecting upwardly from a horizontally, transversely extending, upwardly opening channel 58 (Figures 2 and 3) disposed in back of the housing.

Referring to Figures 2 and 5, spaced longitudinally of the back wall of the channel 58 are gear casings 60, 62 respectively, in which are rotatably mounted large, beveled, driven gears 64, 66 respectively, secured to and rotating driving shafts 68, 70 journalled in front bearings 72, 74 of the casings. Casing 60 is fixed to the channel; casing 62 is adjustable longitudinally of the channel.

Intermediate their ends, the shafts 68, 70 are journalled in bearings 76, 78 mounted upon the front walls of the channel 58, through the provision of bearing sup-

port plates **80**, **82** that extend above the channel as shown in Figures 2 and 3.

As previously noted herein, casing **60** is fixed to the channel, but casing **62** is to be adjustable longitudinally of the channel, together with its gear **66**, bearings **74**, **78**, and bearing support plate **82**.

Again referring to Figures 2 and 3, mounted in the channel **58** for slidable adjustment longitudinally of the channel is a channel-shaped slide **84**, on which the bearing support plate **82** is fixedly mounted, said slide carrying, as a result, not only the bearing support plate **82**, but also the bearing **74** and the housing **62**, together with gear **66** and shaft **70**. In other words, the slide, housing, and the associated components together constitute a shaft and a drive assembly, bodily adjustable longitudinally of the channel **58** toward and away from the generally similar shaft and drive assembly shown at the left in Figure 2 and including housing **60**, shaft **68**, and associated components.

For adjusting the slide, there is provided a screw **86** one end of which is swivelly connected to the slide, the other end being threadedly engaged in an end opening of the channel **58**, said screw at its outer end being provided with a crank as best shown in Figure 4.

Fixedly secured to the forward ends of the shafts **68**, **70** are flat, circular discs **88**, **90** respectively, to which are connected rims **92**, **94** carrying pneumatic tire casings **96**, **98**. Thus, the discs, together with their rims and casings, constitute wheels having resiliently depressible or deformable peripheral surfaces, capable of resiliently yielding to permit the passage of the stones A between the casings, with the peripheries of the wheels being spaced apart, normally, a distance less than the thickness of any stone that is expected to pass therebetween, so that stones of various thicknesses will all be gripped by and between the peripheral surfaces, which surfaces will yield in a direction away from each other to accommodate the thickness of the stone. With the wheels rotating in opposite directions as shown by the arrows in Figure 4, the stones so gripped will be forcibly impelled, at great speed, downwardly against the breaker grate.

A drive shaft **100** is driven by pulleys **102** connected to the drive shaft. About the pulleys are trained belts **104** trained also about pulleys **106** mounted upon the shaft of a drive motor **108** carried by a motor support bracket **110** fixedly secured to and projecting laterally from one of the standards **12**.

Drive shaft **100** (see Figure 2) is journalled in a bearing **112** of casing **60**, and within casing **60** is secured to a beveled drive gear **114** meshing with gear **64**. Shaft **100** is journalled also in bearing **116** of housing **60**, and exteriorly of the housing there is mounted on the shaft **100** a tubular extension **118** having internal spline grooves receiving the complementary spline ribs of a shaft **120** journalled in bearing **122** of casing **62** and secured, within casing **62**, to a gear **124** meshing with gear **66**.

Thus, both wheels are driven from a common source of motive power, with the positive drive for each wheel being maintained in all positions to which the wheel **98** is adjusted toward and away from the wheel **96**.

By rotation of the crank and screw **86**, the wheel **98** may be disposed at a selected distance from the wheel **96**, or can be adjusted into full contact with the wheel **96** as will be readily understood.

In use, with motor **108** operating at a selected speed, and with the wheel **98** adjusted to a selected distance horizontally in respect to wheel **96**, stones A within hopper **54** are brought into contact with the surfaces of the oppositely rotating wheels. The stones are drawn down between the peripheries of the wheels, with the surfaces of the wheels resiliently yielding in the manner previously described herein to grip the stones while also permitting their passage. The stones, as they continue to move downwardly during rotation of the wheels, will be forcibly impelled against the breaker grate. In this connection, normally, the wheels would rotate at approximately 500 r.p.m., but of course this speed can be either increased or decreased as desired.

The stones, when thrown forcibly against the breaker grate, are partially or completely chipped, but are continued in their downward movement, through a tortuous path, so as to strike successive surfaces within the housing, all of which contribute toward reducing the stone, finally, to a completely chipped state.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claim.

What is claimed is:

A stone chipper comprising: a support frame; a housing thereon comprising a conduit for stones to be chipped, said housing including deflector means against which stones may be forcibly impelled for chipping the stones; oppositely rotating wheels supported from the frame and extending into the housing, between which wheels the stones may be fed for impelling the same against the deflector means, said wheels having resiliently yielding peripheral surfaces; means for rotating the wheels; a trackway mounted upon the frame and extending adjacent the respective wheels; a slide mounted in the trackway for adjustment longitudinally thereof; shafts journalled on the slide and frame respectively and carrying said wheels, for adjustment of the shafts toward and away from each other responsive to movement of the slide to selected positions within the channel; and means for driving both of said shafts simultaneously in selected positions to which the shafts are relatively adjusted toward and away from each other, said driving means including beveled driven gears connected to the respective shafts for rotation therewith, beveled drive gears in mesh with the respective driven gears, a drive shaft having a driving connection with a source of motive power, said drive shaft being journaled on the frame with its axis perpendicular to the axes of the first named shafts, one of said beveled drive gears being connected to the drive shaft for rotation therewith, a shaft coaxial with and having a splined connection with the drive shaft, for conjoint rotation of the drive shaft and the last named shaft in all positions to which the last named shaft is axially moved in respect to the drive shaft, the other beveled drive gear being connected to the last named shaft for rotation therewith, and a gear housing mounted upon and movable with said slide, the last named shaft being journaled in said last named housing, said last named housing enclosing the meshed gears respectively carried by the last named shaft and by that one of the first named shafts that is journaled on the slide.

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