

[54] **CHIPPER SHREDDER**  
[72] Inventors: **Myron D. Tupper, Sandy; Arvin A. Hille,**  
Oswego, both of Oreg.  
[73] Assignee: **Omark Industries, Inc.,** Portland, Oreg.  
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Primary Examiner—Granville Y. Custer, Jr.  
Attorney—R. L. Harrington

[57] **ABSTRACT**

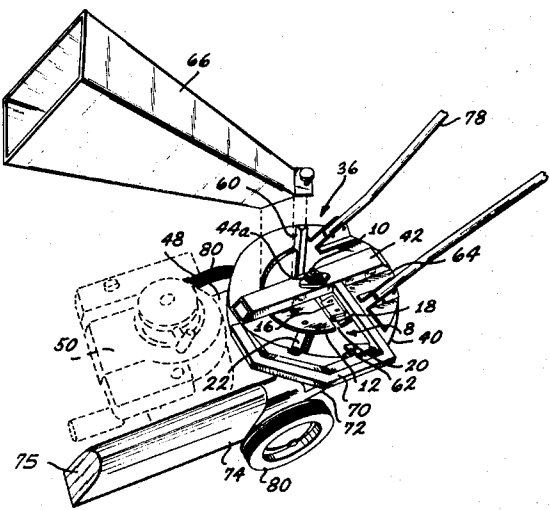
A chipping knife and shredder flails are mounted for rotation about a common axis. The chipping knife is mounted in radial alignment with and adjacent the center of axis and a hopper directs branches, etc. to be chipped into that central portion dominated by the chipping knife. The flails extend outside of the chipping knife and a second hopper directs material to be shredded into that area dominated by the flails.

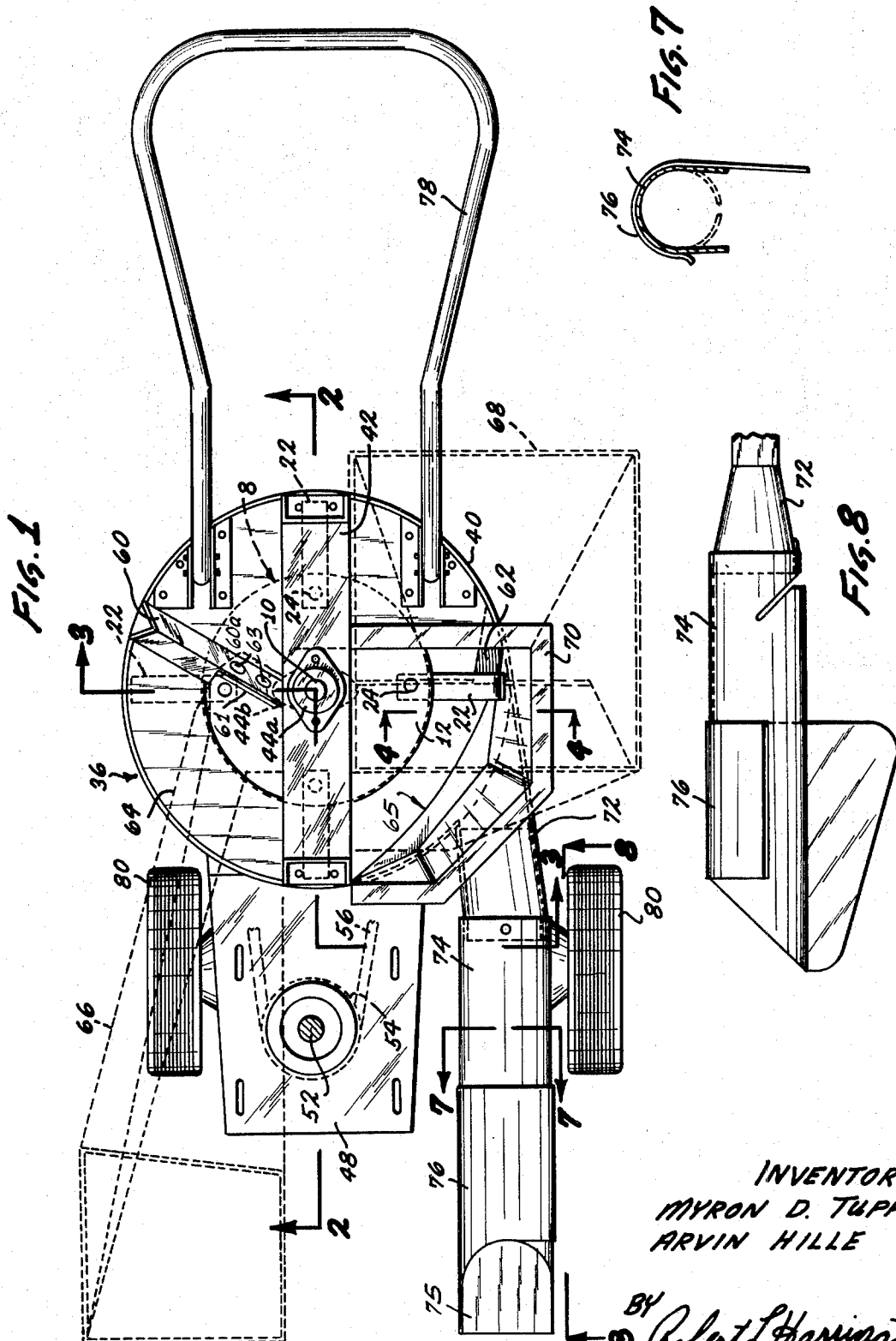
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**9 Claims, 8 Drawing Figures**





INVENTORS  
MYRON D. TUPPER  
ARVIN HILLE

BY *Robert L. Harrington*  
ATTORNEY

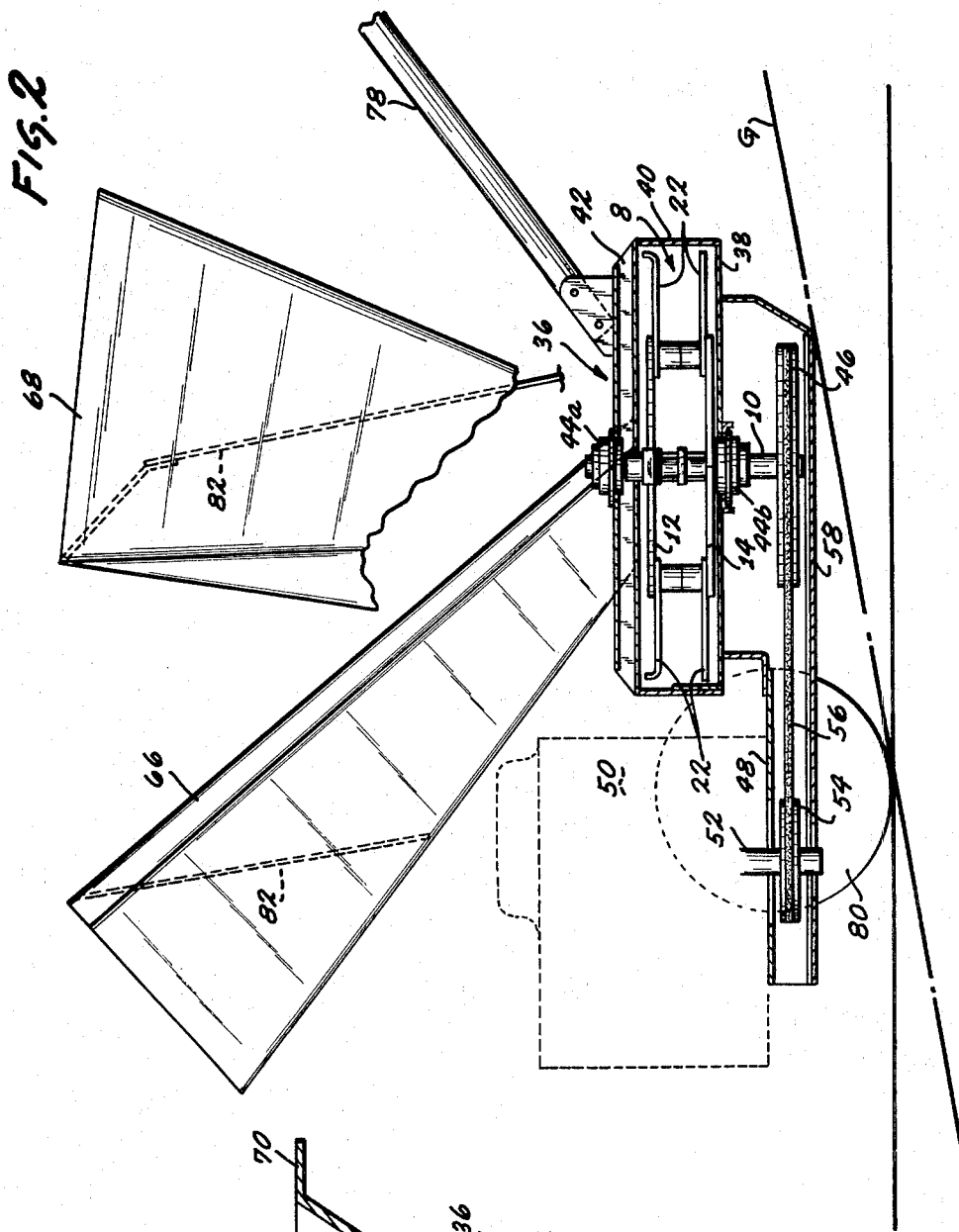
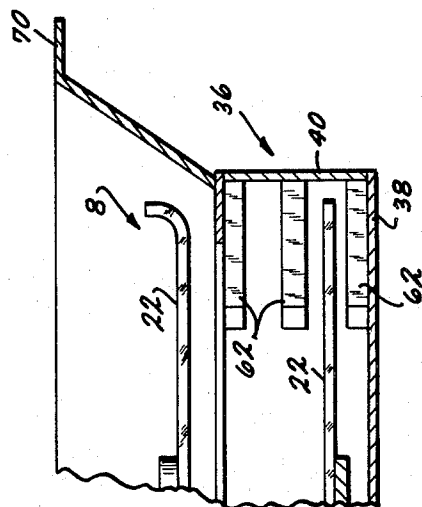


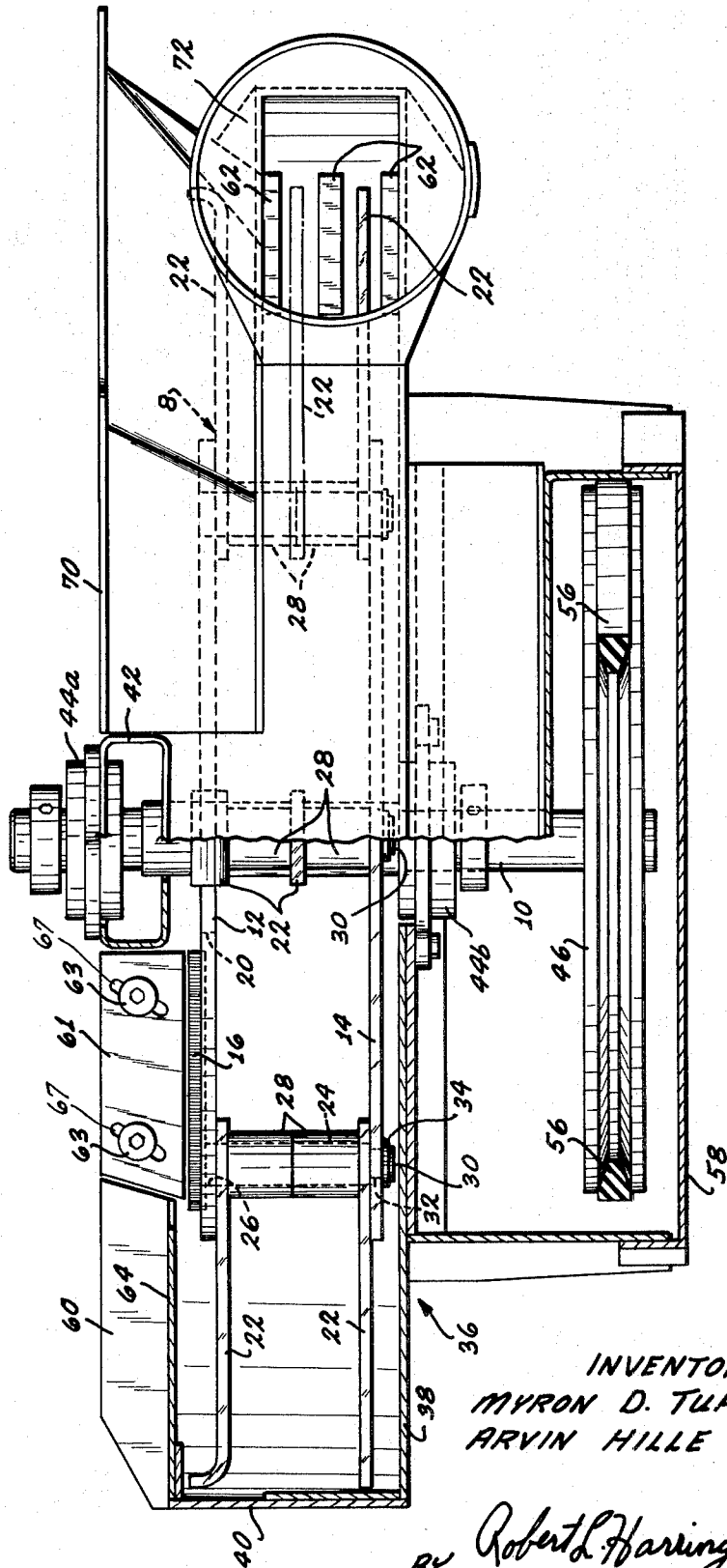
FIG. 4



INVENTORS  
MYRON D. TUPPER  
ARVIN HILLE

BY *Robert L. Harrington*  
ATTORNEY

FIG. 3



INVENTORS  
MYRON D. TUPPER  
ARVIN HILLE

BY *Robert L. Harrington*  
ATTORNEY

Fig. 5

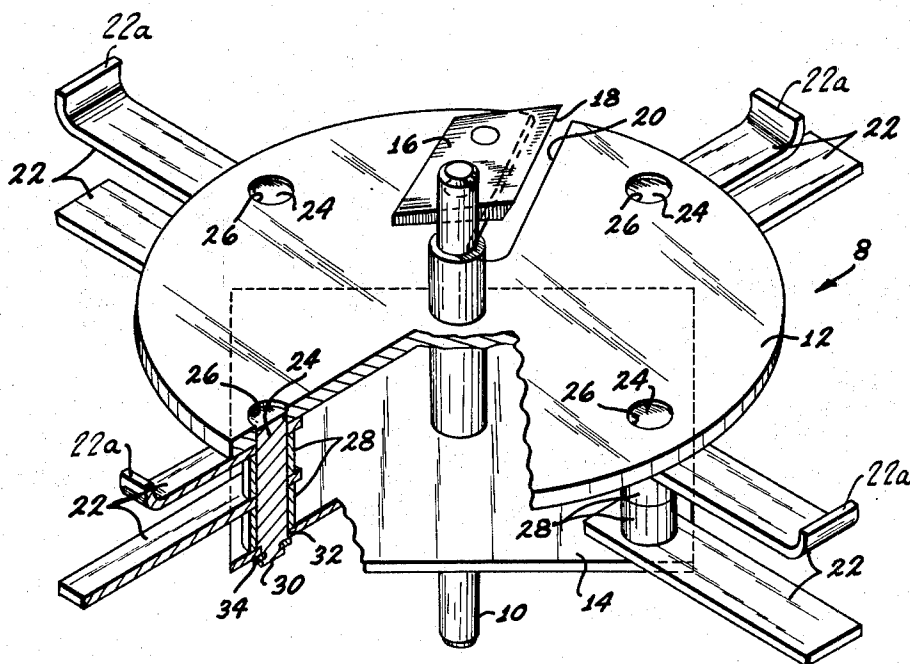
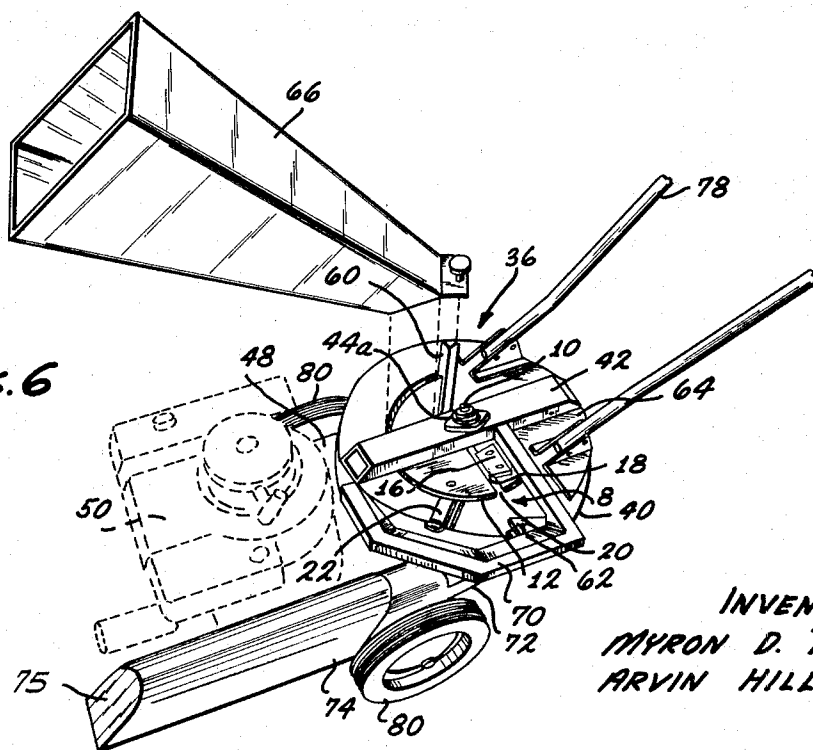


Fig. 6



INVENTORS  
MYRON D. TUPPER  
ARVIN HILLE

BY *Robert L. Harrington*  
ATTORNEY

## CHIPPER SHREDDER

## HISTORY

This invention relates to an apparatus having the dual capability of cutting up branches and the like into fine chips and also mulching or shredding bulk type materials such as leaves and the like.

The apparatus contemplated for the present invention is for use in disposing of hedge trimmings, tree trimmings, leaves etc. that accumulate in residential areas. More specifically the apparatus reduces the material into fine particles in which form they are easily handled. Leaves, small twigs and the like are most easily broken up by beating or flailing whereas branches with limbs approaching one inch diameter and larger should be cut in a shearing operation. Either form of reducing is unsuitable for both types of material. Thus it is desirable for an apparatus to provide both flailing and shearing operations with means for selectively feeding material thereto. However, whereas the apparatus is contemplated for use by the average home owner, it should also be inexpensive, simple but safe to operate, maintenance free and highly maneuverable.

The present invention is believed to provide a means for combining the flailing and shearing operations which achieves all of the desired features. Very briefly a plate is rotated at high speeds within a housing. A chipping knife is affixed to the plate while flailing blades are pivoted to the periphery of the plate. The housing is designed with a central opening and a hopper directs large limbs into the face of the plate and against the clipping knife. A stationary anvil affixed to the housing cooperates with the chipping knife for shearing the limbs. A second hopper directs leaves and the like toward a second opening in the housing at the periphery of the plate where they are broken or mulched on impact with the flailing blades.

Other features are provided to insure optimum performance of the apparatus which is more specifically described in the following detailed description and drawings wherein:

FIG. 1 is a plan view with portions broken away illustrating a preferred embodiment of the invention;

FIG. 2 is a sectional view taken on lines 2—2 of FIG. 1;

FIG. 3 is a sectional view taken on lines 3—3 of FIG. 1;

FIG. 4 is a fragmental view as taken on lines 4—4 of FIG. 1;

FIG. 5 is a perspective view of the chipping and flailing assembly as mounted in the apparatus shown in FIG. 1;

FIG. 6 is a perspective view of the apparatus of FIG. 1;

FIG. 7 is a cross section of the discharge chute as taken on lines 7—7 of FIG. 1; and

FIG. 8 is a side view of a portion of the discharge chute as taken from lines 8—8 of FIG. 1.

Referring to FIG. 5 the chipping and shredding assembly 8 includes a spindle 10 that is adapted to be mounted for rotation about its axis within the housing 36 of the apparatus as will be explained hereafter. A disc-shaped top plate 12 is mounted to the spindle 10 and a square bottom plate 14 is mounted to the spindle 10 spaced from and parallel to the disc-shaped top plate 12. A chipping blade 16 is fastened to the top plate with the cutting edge 18 spaced slightly above the top plate and extending radially from the spindle 10. A slot 20 is provided in the plate below cutting edge 18. The maximum size of the chip cut from a branch is determined by the spacing of the blade 16 from the plate. The slot 20 is large enough to pass the chips which are then thrown toward the sidewall of the housing 36 and discharged as explained in a later section.

Flailing or shredding blades 22 are mounted on pins 24 which are fastened between the top and bottom plates 12 and 14. As seen in the drawings, the pins are inserted through openings 26 in the top plate and through the flailing blades that are held in position vertically on the pins by spacers 28. As will be noted particularly in FIGS. 3 and 5, these spacers are arranged to vary the vertical spacing of certain ones of the flailing blades. A head portion 30 on each of the pins 24 fits through a reduced opening 32 in the bottom plate 14 and

secured against removal by fastening clip 34. The pins 24 and spacers 28 are aligned to provide free pivoting of the flailing blades which normally are radially extended by centrifugal forces, i.e., when the chipping and shredding assembly is rotatably driven as will be explained. Hard objects inadvertently fed to the flailing blades will merely force pivoting of the blades.

The manner in which the chipping and shredding assembly 8 is mounted in the housing 36 is most clearly illustrated in FIGS. 2 and 3. The housing 36 includes a bottom wall 38, a cylindrical side wall 40 and a reinforced channel member 42 over the top of side wall 40. The spindle 10 is mounted between bearing assemblies 44a and 44b in the channel member 42 and bottom wall 38 respectively. The spindle 10 extends down through the bearing member 44b and pulley 46 is connected to the lower end.

The housing 36 further includes a support 48 that extends laterally from the bottom wall 38. A motor 50 is mounted on the support 48 as shown schematically in dotted lines only. A suitable motor will be apparent to those skilled in the art and further explanation and illustration are unnecessary. The motor 50 rotatably drives a shaft 52 on which is mounted a pulley 54. Pulley 54 is aligned with pulley 46 and power transmission belt 56 entrained thereon rotatably drives pulley 46 and the chipping and shredding assembly 8. A shield 58 interfits with support 48 to protectively encase the pulleys and belt.

Referring now to FIGS. 1 and 3, an angle iron 60 is mounted to the top of the housing extending outwardly from the spindle bearing 44a. A leg portion of the angle iron is removed and an anvil 61 is adjustably mounted to leg portion 60a opposite that portion removed. The anvil 61 is adapted to be adjusted up or down to the desired position just above the path of the chipping blade 16, e.g., by adjusting the location of the screws 63 within slots 67. This stationary anvil cooperates with the rotating chipping blade 16 for shearing limbs or branches of trees, etc.

A plurality of deflectors 62 are mounted on the side wall 40. As seen in FIG. 3 the deflectors are spaced so that flailing blades 22 pass between them. The top of the housing is closed by a sheet metal covering 64. Appropriate openings are provided in the covering 64 for passing branches into the chipping blade are adjacent the leg portion 60a and also for passing leaves and twigs into the flailing blades at the periphery of the plate 12 on the opposite side of the first mentioned opening. Hoppers 66 and 68 are mounted to the top of the housing through which the operator can feed the appropriate material. Hopper 66 adapted to receive larger diameter limbs of branches, etc. is mounted directly to the angle iron 60 over the first mentioned opening while hopper 68 adapted for leaves and such is mounted to a funnel like support 70 of the housing 36 over the second mentioned opening.

The means for discharging the reduced material is shown in FIGS. 1, 3, and 6 through 8. The chips upon falling through opening 20 and the leaves upon being fed into the flailing blades are thrown by centrifugal force against and around the side walls 36. This centrifugal force is utilized to discharge the material through a discharge opening 65 in the side wall. The deflectors 62 are positioned relative to the discharge opening to prevent oversized pieces from passing through. Such pieces are merely continuously flailed by the flailing blades until broken into small enough pieces. The discharge chute 72 receives the material thrown through the opening and directs it to an open-bottomed trough 74. Although not shown, a bag can be placed over the trough 74 and held there by clip 76 to receive the discharged material. The side extension on the clip protects the bag from the motor 50. The deflector 75 on the end of the trough 74 deflects the material to avoid hard material that may be thrown at high velocity from causing damage or injury to property and persons nearby.

As shown in FIG. 5 each of the top flailing blades 22 have an upturned portion 22a. This upturned portion is located at different lengths and is believed to be beneficial in assisting the gravity feed of leaves, etc. into the housing. The handle bar 78

and wheels 80 are mounted to the housing 36 as shown in FIGS. 1, 2 and 6 to provide easy movement of the apparatus from place to place. Curtains 82 are provided in hoppers 66 and 68 to discourage the operator from inserting his hand through the hopper into the knives and also to prevent chips, etc. from being thrown back at the operator.

Many advantages will be apparent from the above description some of which are listed below. The chipping operation is accomplished with but a single chipping knife mounted on the disc. It will be understood that assuming a constant feed rate for the branches and a constant rpm of the disc, the difference in using one knife versus several is that one knife will cut larger sized chips. It has been surprisingly found that under the above conditions chipping with one knife requires less horsepower.

The rotation of the flails around the vertical axis leads to a simple low cost design which is compact in height and can be mounted very close to the ground. This permits the use of a relatively deep, safe hopper with an overall height that is not inconvenient to use. The elevation of the discharge tube, also provided by the design, facilitates in bagging the material processed. This elevation will be realized by reference to FIG. 2 wherein centerline G represents the ground level and the relative position of the apparatus when ready for operation.

Numerous variations and modifications will be apparent to those skilled in the art. The invention is not limited however to the specific embodiment described but encompasses the full scope of the claims appended hereto.

What is claimed is:

1. A chipper shredder apparatus comprising a housing, a chipping and shredding assembly mounted for rotatable movement within the housing, drive means for rotatably driving said chipping and shredding assembly, said chipping and shredding assembly including a disc-like plate, said disc-like plate adapted for rotation on an axis passing through the center of the plate and perpendicular to the plane defined by the plate, a chipping knife mounted to the face of the plate, shredding blades mounted for rotation about the same axis and extending beyond the periphery of the plate, a first hopper mounted to the housing for directing material to be chipped through an opening in the housing to the face of the plate and into the pathway of the rotating chipping knife, and a second hopper mounted to the housing for directing material to be shredded through an opening in the housing outwardly of the periphery of the plate and into the pathway of the rotating shredding blades.

2. A chipper shredder apparatus as defined in claim 1

wherein the chipping and shredding assembly is rotated on a substantially vertical axis, and said hoppers both being adapted to feed material gravitationally into the top of the housing substantially normal to the plane of rotation.

3. A chipper shredder apparatus as defined in claim 2 wherein the flailing blades are freely pivoted on the disc-like plate and said housing including a shearing anvil adjustably mounted for close adjustment to cutting edge of the chipping knife.

4. A chipper shredder apparatus as defined in claim 3 wherein the chipping and shredding assembly includes a second plate below and in spaced parallel relation to the disc-like plate, said flailing blades being pivoted on pins held between the two plates, at least one of said flailing blades pivoted at a height between the plates different than other of said flailing blades.

5. A chipper shredder apparatus as defined in claim 4 wherein at least one of the flailing blades includes a projecting portion projected upwardly from the blade to facilitate feeding of material from the hopper into the housing.

6. A chipper shredder apparatus as defined in claim 5 wherein a plurality of said pins are located symmetrically around the periphery of the disc-like plate, at least two of the flailing blades rotating in a plane immediately adjacent the top plate, at least two of the flailing blades rotating in a second plane midway between the disc-like plate and bottom plate, and at least two of the flailing blades rotating in a third plane immediately adjacent to the bottom plate.

7. A chipper shredder apparatus as defined in claim 1 wherein the housing is cylindrical shaped with a cylindrical side wall, said chipping and shredding assembly mounted for rotation about an axis parallel to and substantially common with the axis of the cylindrical side wall whereby material within the housing is thrown by centrifugal force around the cylindrical side wall, a discharge opening in said side wall for ejecting such material, and deflectors on the side wall projecting into the housing between the rotating flailing blades, said deflectors placed relative to the discharge opening to limit the particle size of the material being discharged.

8. A chipper shredder apparatus as defined in claim 7 including a discharge tube that receives material from the discharge opening, and an open bottomed trough with an angular end wall connected to the discharge tube to deflect the material downwardly to a receptacle.

9. A chipper shredder apparatus as defined in claim 1 wherein said chipping and shredding assembly is provided with one chipping knife for maximum chipping action.

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