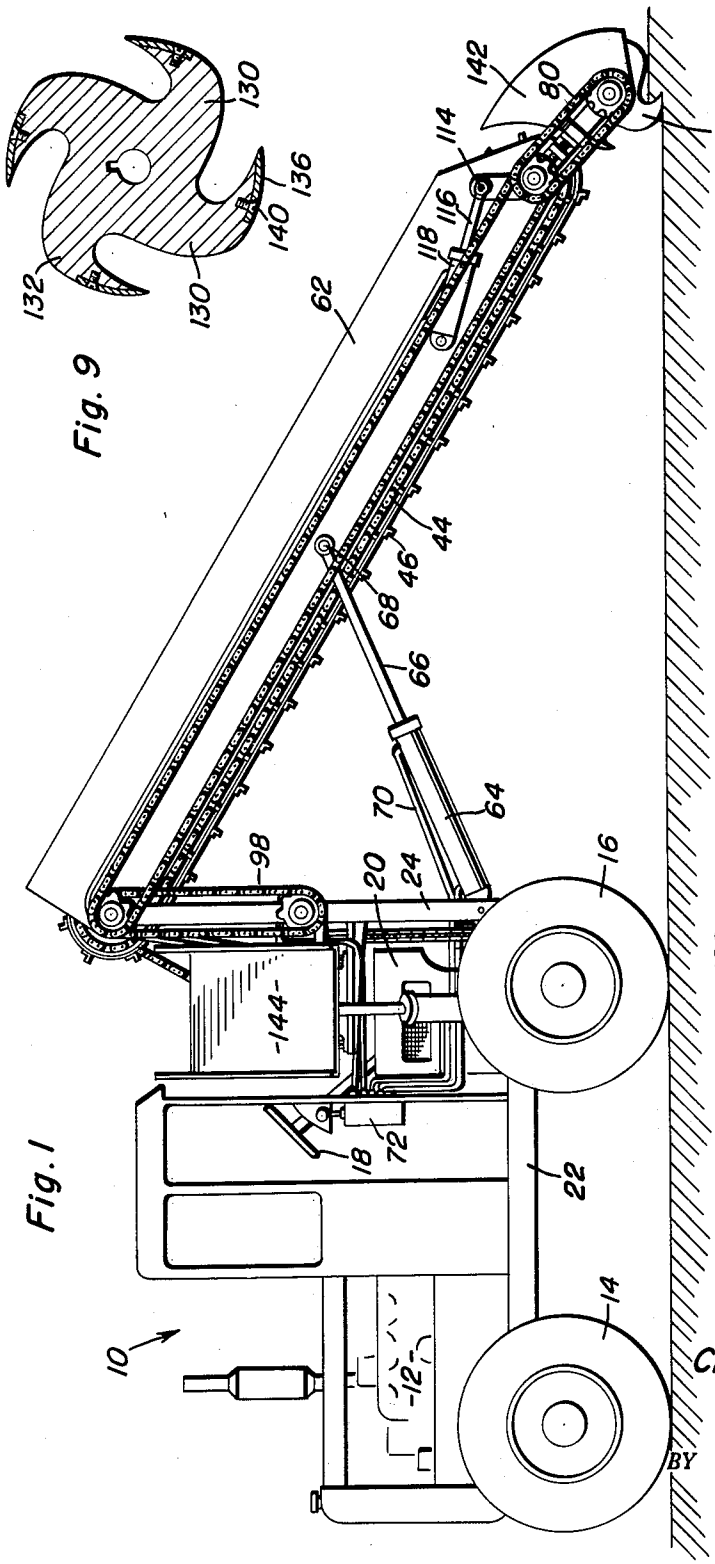
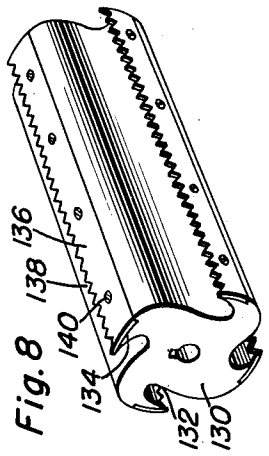
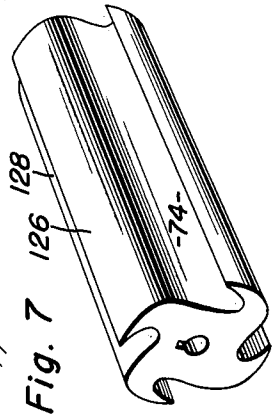
Jan. 3, 1956 C. W. HEDGECOCK 2,729,002

EXCAVATING AND LOADING MACHINE

Filed March 2, 1953 3 Sheets-Sheet 1







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EXCAVATING AND LOADING MACHINE

Filed March 2, 1953 3 Sheets-Sheet 2

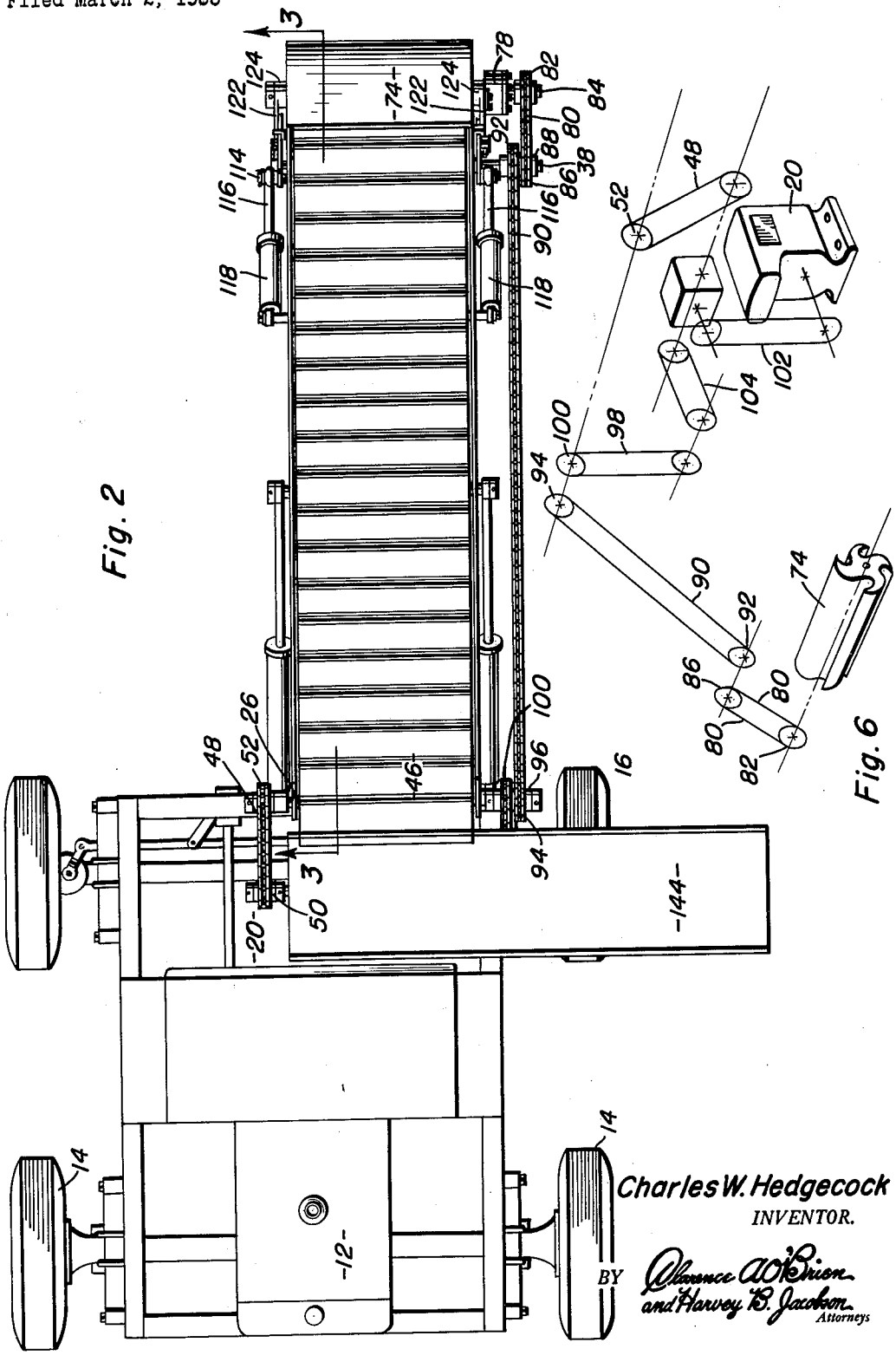

Fig. 2

Fig. 6

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EXCAVATING AND LOADING MACHINE

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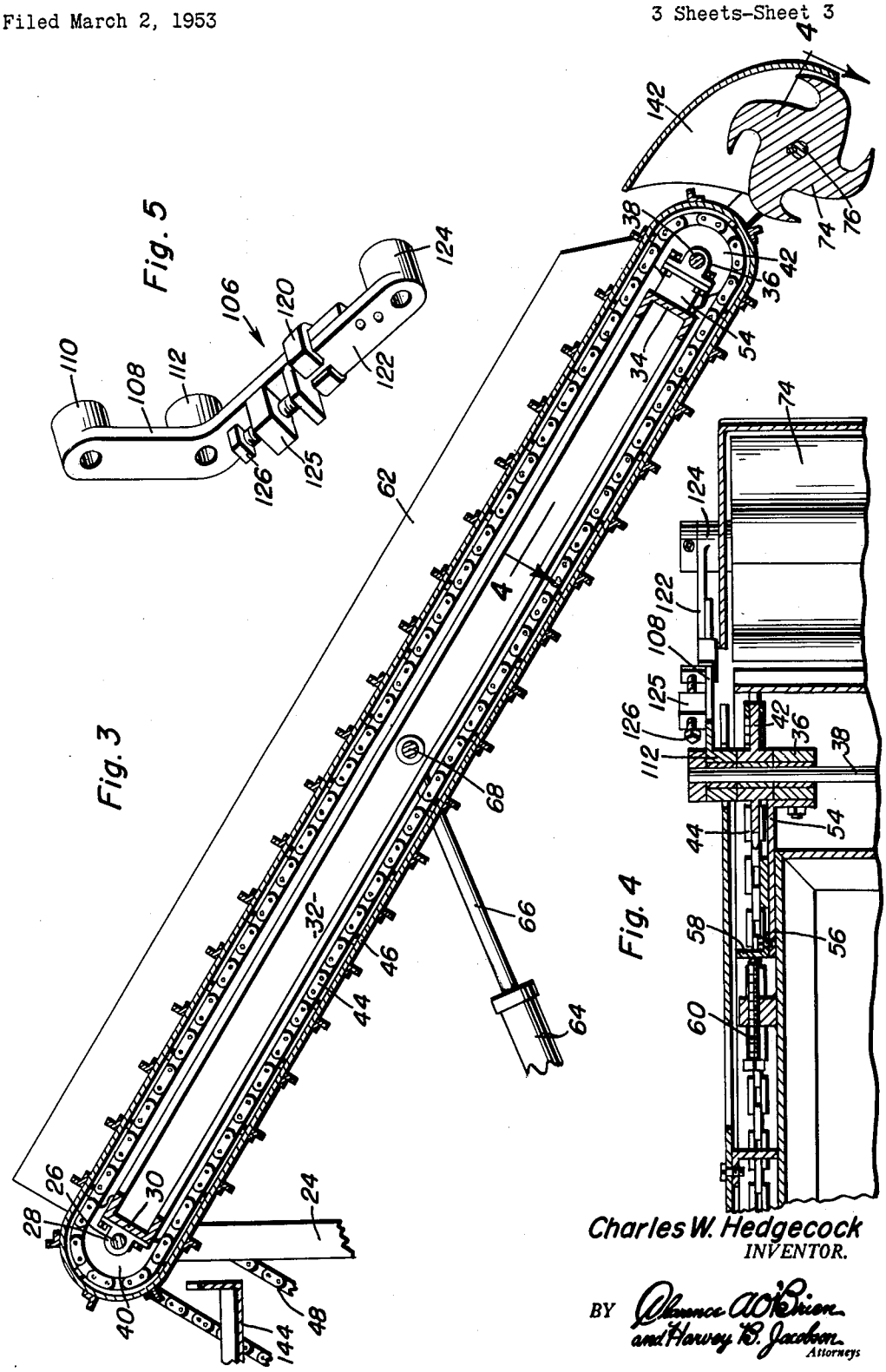

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EXCAVATING AND LOADING MACHINE

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Application March 2, 1953, Serial No. 339,690

2 Claims. (Cl. 37—190)

This invention relates to the class of earth moving apparatus and more particularly to an excavating and loading machine.

An object of this invention is to provide an excavating and loading machine capable of excavating, ditching, and loading of gravel, sand, soil and equally adaptable for the loading of other substances such as grain.

The construction of this invention features the use of a cutting wheel which is rotated and by centrifugal force cuts and throws the substance being excavated against an enclosing shield which directs the continuous flow of the substance onto a conveyor which carries the material to a loading chute from whence the material may be deposited in a dump truck or other cart or vehicle.

Other specific features of the invention include the means for pivotally raising and lowering the free end of the conveyor to which there is pivotally and adjustably secured the cutter drum. The cutter drum is mounted by means of a novel cutter carrier consisting of a pair of spaced cutter crank arms which carry a shaft having a torque converter on which shaft there is mounted the cutter drum. Replaceable cutter blades having teeth are attached to the cutter drum when used in the excavation of relatively hard materials.

Still further objects and features of the invention reside in the provision of a loading and excavating machine that is strong and durable, capable of excavating and loading material at a relatively high rate so as to reduce the cost and time necessary in handling a unit volumn of material, while being relatively easy and inexpensive to operate.

These, together with the various ancillary objects and features of the invention which will become apparent as the following description proceeds, are attained by this excavating and loading machine, a preferred embodiment of which has been illustrated in the accompanying drawings, by way of example only, wherein:

Figure 1 is a side elevation view of the excavating and loading machine comprising the present invention;

Figure 2 is a top plan view of this earth moving apparatus;

Figure 3 is a longitudinal sectional view as taken along the plane of line 3—3 in Figure 2;

Figure 4 is a sectional detail view as taken along the plane of line 4—4 in Figure 3;

Figure 5 is a perspective view of one of the crank arms and cutting drum carriers comprising important elements of this invention;

Figure 6 is a schematic diagram of the drive means for operating the various elements of this earth moving apparatus;

Figure 7 is a perspective view of one of the cutter drums used;

Figure 8 is a perspective view of the cutter drum employing removable blades with tooth edges; and,

Figure 9 is a sectional view illustrating the cutter drum shown in Figure 8.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views, reference numeral **10** generally designates a vehicle of suitable construction and adapted to provide locomotion for the entire apparatus. The vehicle **10** includes an internal combustion engine **12** or other prime mover which can drive wheels **14**. The front wheels **16** of the vehicle may be turned through use of a conventional steering wheel **18** in order to direct the path of travel of the vehicle. A second prime mover **20** is carried by the vehicle at the front portion thereof for providing motor power to the cutting drum and conveyor. Upwardly extending from the frame **22** of the vehicle **10** are vertical supporting members **24**.

Carried by the supporting members **24** is a shaft **26**. Rotatably mounted on the shaft **26** by means of bearings **28** is a transverse frame member **30** of channel construction. Depending from the transverse channel beam **30** are longitudinally extending channel members **32** which carry a lower transverse cross-beam **34** to which there is attached bearing blocks **36** within which a lower shaft **38** is journalled. Mounted on the shaft **26** are pulleys **40** and mounted on the shaft **38** are pulleys **42** over which the endless chain **44** carrying the endless belt conveyor **46** are entrained. The conveyor **46** is driven by means of the endless chain **48** mounted on the pulley **50** attached to the drive shaft of the prime mover **20**. The endless belt is entrained over another pulley **52** mounted on the shaft **26**.

As can be readily seen by an inspection of Figures 3 and 4 there is provided means for taking up any slack in the chain **46**. This includes substantially L-shaped connecting members **54** which are terminally attached to the bearing blocks **36** and adjustably attached by means of fasteners **56** to L-shaped members **58** urged by the threaded member **60** to an extended position to tighten the chain **46**. An upper guard or shield **62** is provided for the entire conveyor and hydraulic means for pivoting the conveyor relative to the vehicle **10** are provided. These hydraulic means include a cylinder **64** carried by the vehicle **10** and having a piston therein to which a piston rod **66** is attached, the piston rod **66** being mounted on stub shaft **68** for pivotal movement. Hydraulic conduit **70** interconnect each end of the cylinder **64** with a hydraulic control mechanism including a pump as generally indicated at **72**. In this manner the height of the conveyor and of the elements depending therefrom may be adjusted.

A cutting drum **74** is keyed to a shaft **76** which is driven through a torque converter **78** by means of an endless belt **80** entrained about pulley **82** mounted on the torque converter driving shaft **84**. The endless belt is entrained about the pulley **86** mounted on a collar **88** driven by means of the endless belt **90** which is mounted on the pulley **92**. The endless belt **90** is further entrained about the pulley wheel **94** mounted on a collar **96** and driven by means of the endless belt **98** which is entrained about the pulley **100**. The pulley **100** is also mounted on the collar **96**. Power is transmitted by means of the endless belts **102** and **104** from the prime mover **20**. The torque converter **78** is provided to take up any shock or an unexpected load were the cutter drum **74** to encounter any unusually hard formations or be subjected to a stoppage by overload or any other reason. The cutter drum **74** is carried by means of a novel carrier **106** which is formed in two opposed portions each including a crank arm member **108** carrying bearing cups **110** and **112**. The bearing cups **112** are mounted on the shaft **38** and the bearing cup **110** is connected by means of a stub shaft **114** mounted therein to a piston rod **116** of a hydraulically actuated piston, not shown, mounted

within a cylinder 118 which is connected by means of a suitable hydraulic conduits to the hydraulic control mechanism 72. In this manner the cutting drum 74 may be adjusted to predetermine the pitch or cutting angle thereof. The crank arm 108 carries a retaining clip 120 which is welded thereto and which is adapted to retain the cutter drum supports 122. An adjusting block 125 is welded to each of the crank arms 108 and threaded adjusting bolts 126 are used to urge the cutter drum supports 122 away from the crank arms 108. This enables any slack to be taken out of the endless chain 80. The cutter drum supports 122 carry bearing members 124 through which the shaft 76 extends.

The cutter drums 74 have a plurality of annularly spaced spirally curved cutter blade elements 126 integrally formed therewith which terminate in cutting edges 128. If exceedingly hard material is being excavated, the cutter drum illustrated in Figure 8 may be used. This cutter drum 130 is provided with cutter blade elements 132 which are provided with grooves 134 therein for reception of cutter blades 136 provided with teeth 138 and secured thereto by means of screws 140 or other fasteners. As the cutter drum 74 or 130 rotates the substance being excavated and loaded will be carried upward within the cup-shaped confines between the helical cutter blade elements 126 or 132 and by centrifugal force directed and thrown upwardly. A curved baffle shield 142 is mounted over the cutter drum 74 or 130 and directs the substance being loaded into the space between the guard 62 and the conveyor 46 and onto the conveyor 46 whence it is carried upwardly and deposited upon the chute 144 for loading into a dump truck or other vehicle.

Since from the foregoing, the construction and advantages of this excavating and loading machine are readily apparent, further description is believed to be unnecessary.

However, since numerous modifications will readily occur to those skilled in the art after a consideration of the foregoing specification and accompanying drawings, it is not intended to limit the invention to the precise embodiment shown and described, but all suitable modifications and equivalents may be readily resorted to as desired.

What is claimed as new is as follows:

1. An excavating and loading machine comprising a vehicle, a conveyor frame mounted for pivotal movement at its upper end on said vehicle, an endless belt conveyor about said frame, hydraulic means for pivoting said conveyor to raise and lower the free end of said conveyor secured to said frame and said vehicle, a cutter drum carrier, a cutter drum journalled on said carrier, drive means for actuating said conveyor and rotating said cutter drum, said drive means being entrained about a shaft journalled in said conveyor frame, hydraulically actuated means for pivoting said carrier relative to said frame, said carrier including a pair of crank arms each having a pair of sockets, one socket of each pair of said

sockets of each of said crank arms being rotatably mounted on an end of said shaft, the other socket of each pair of said sockets having said hydraulically actuated means pivotally mounted therein, and cutter drum supports carried by said crank arms, said cutter drum being rotatably carried by said cutter supports, and means for urging the cutter drum supports away from the crank arms including clips secured to said crank arms, adjusting blocks secured to said crank arms, and threaded adjusting bolts threadedly secured in said adjusting blocks engaging said cutter drum supports.

2. An excavating and loading machine comprising a vehicle, a conveyor frame mounted for pivotal movement at its upper end on said vehicle, an endless belt conveyor about said frame, hydraulic means for pivoting said conveyor to raise and lower the free end of said conveyor secured to said frame and said vehicle, a cutter drum carrier, a cutter drum journalled on said carrier, drive means for actuating said conveyor and rotating said cutter drum, said drive means being entrained about a shaft journalled in said conveyor frame, hydraulically actuated means for pivoting said carrier relative to said frame, said carrier including a pair of crank arms each having a pair of sockets, one socket of each pair of said sockets of each pair of said crank arms being rotatably mounted on an end of said shaft, the other socket of each pair of said sockets having said hydraulically actuated means pivotally mounted therein, and cutter drum supports carried by said crank arms, said cutter drum being rotatably carried by said cutter supports, and means for urging the cutter drum supports away from the crank arms including clips secured to said crank arms, adjusting blocks secured to said crank arms, and threaded adjusting bolts threadedly secured in said adjusting blocks engaging said cutter drum supports, a baffle shield positioned over said cutting drum, said vehicle carrying a chute, said chute being in alignment with the upper end of said conveyor, said cutting drum being mounted on a driven shaft, said driven shaft including a torque converter for compensating for shock to said cutting drum.

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