

[54] **WOOD AND BRUSH CHIPPER**
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 Williams

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 241/241, 277, 278 R, 282.1, 282.2

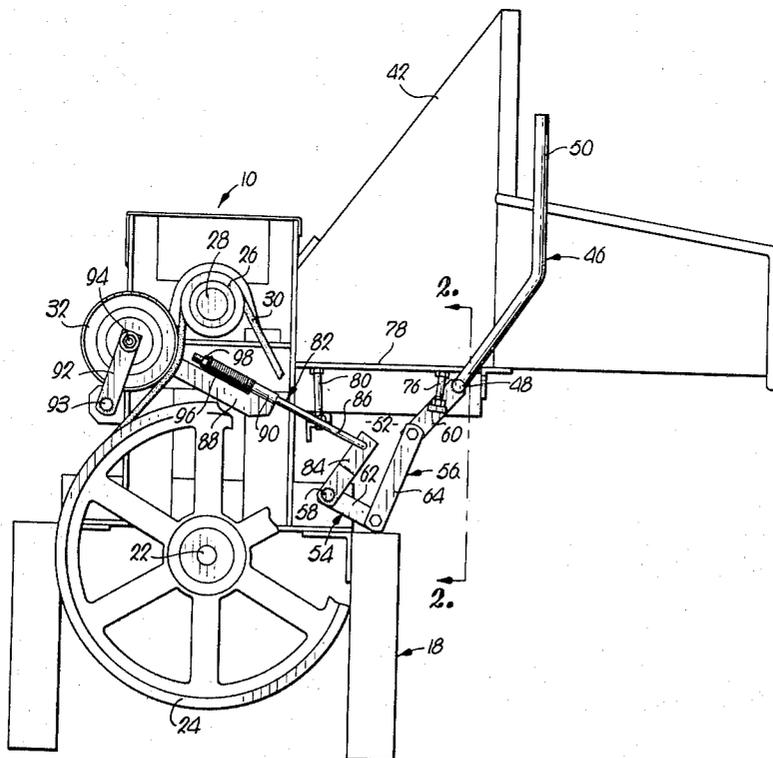
[57] **ABSTRACT**

A safety control for wood and brush chippers, in the nature of a manually movable throw-out assembly, is operably coupled with a material-receiving platform such as to virtually eliminate the possibility of injury to workmen from the standpoint of being accidentally drawn into the machine through its housing inlet. The arrangement also permits controlled feeding so that relatively large pieces of material may be handled easily and quickly with a substantial saving in horsepower requirements.

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4 Claims, 7 Drawing Figures



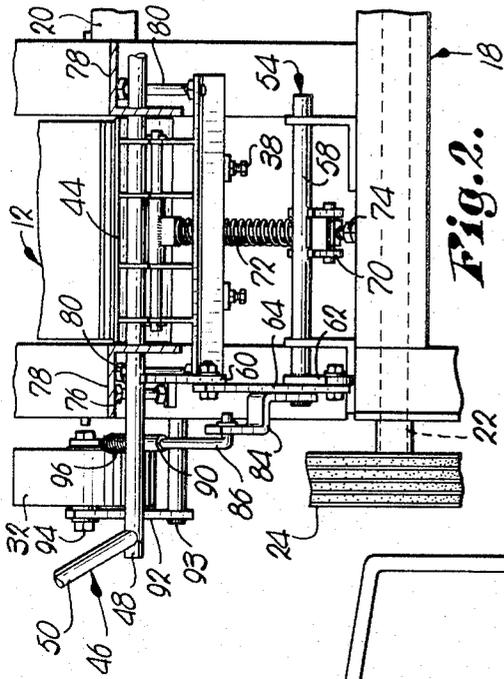


Fig. 1.

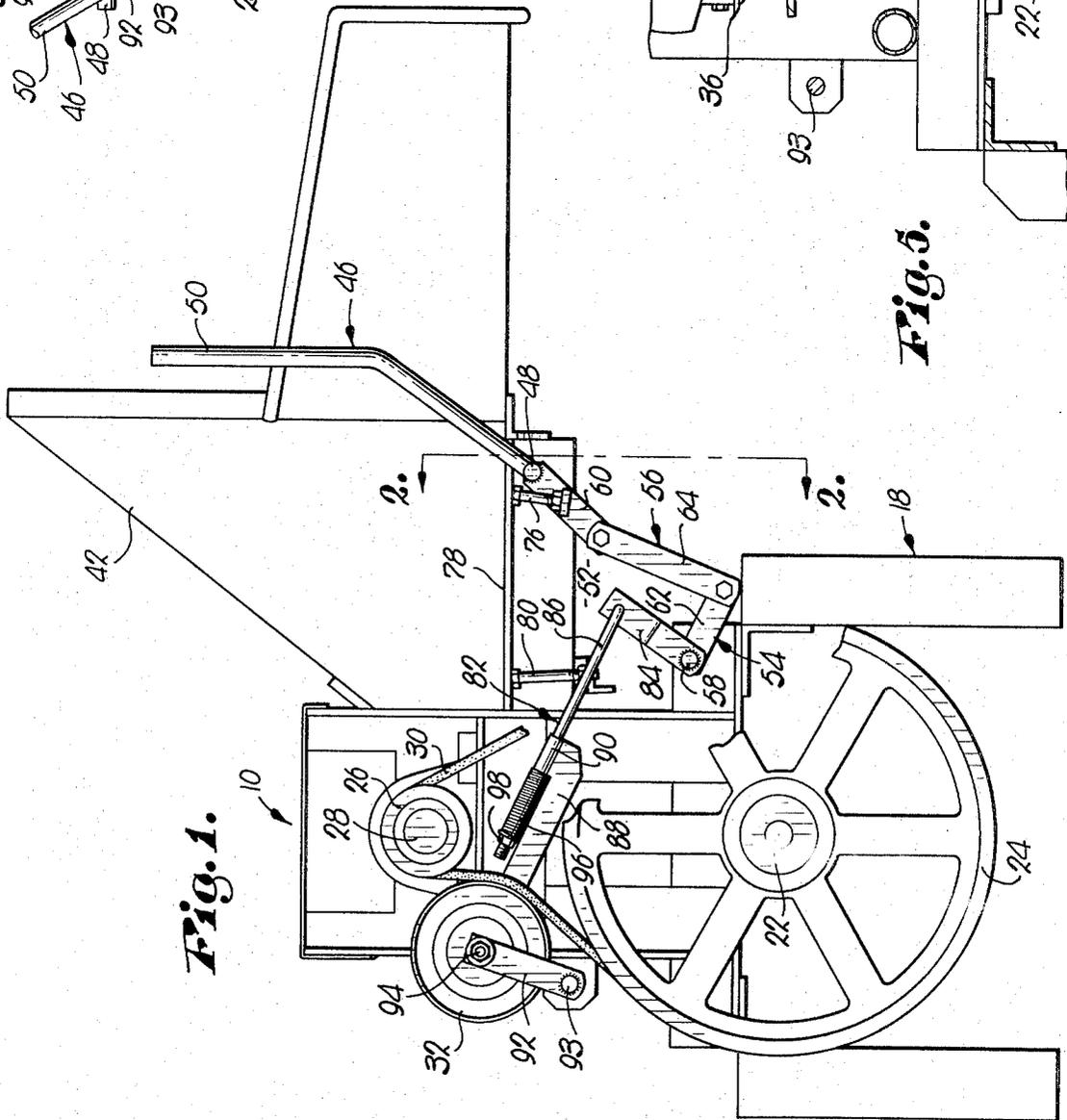


Fig. 2.

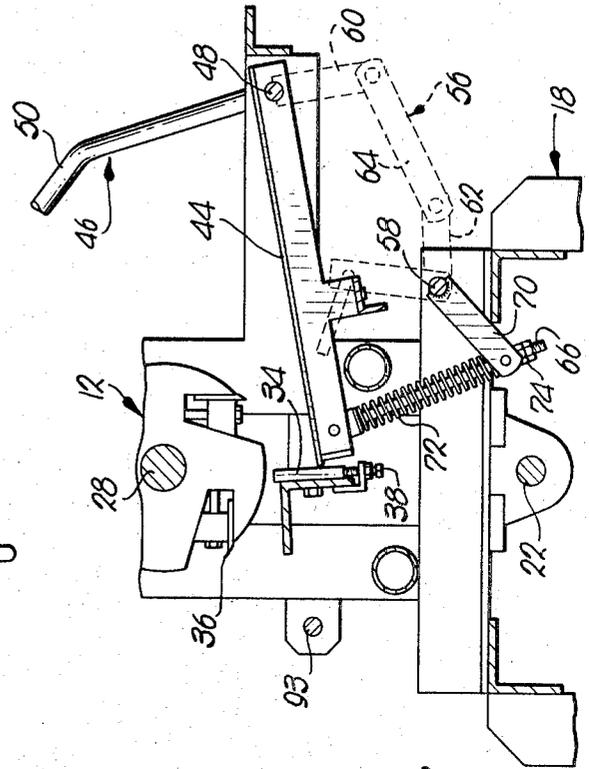


Fig. 3.

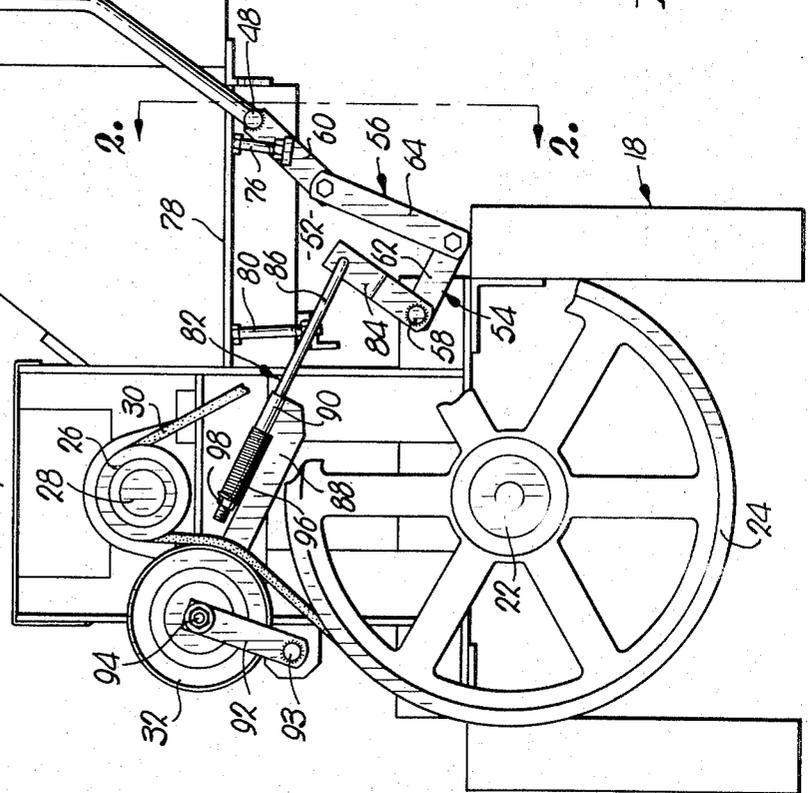


Fig. 4.

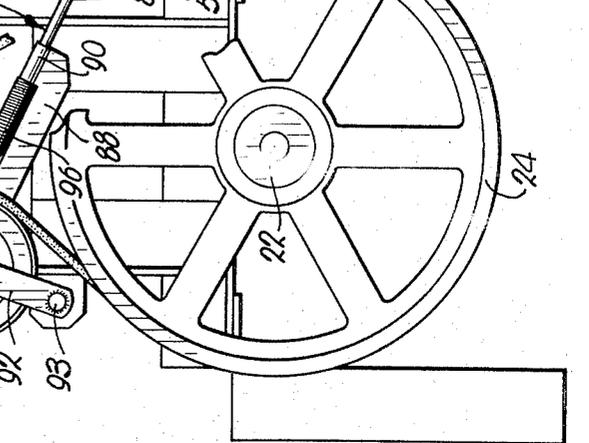
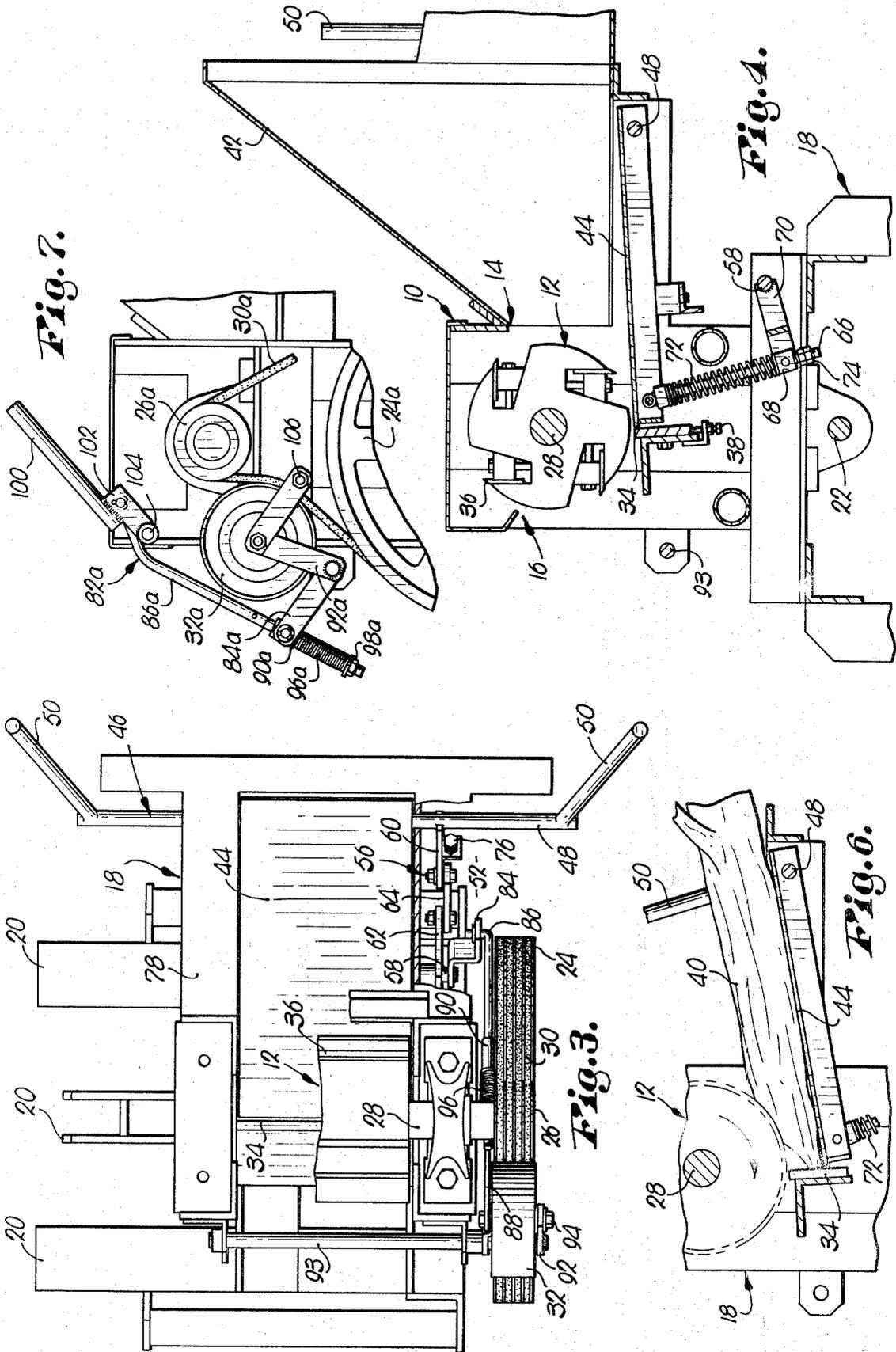


Fig. 5.



WOOD AND BRUSH CHIPPER

Wood and brush chippers are inherently dangerous. In order to be effective and practical they require the use of a relatively heavy, high speed cutter drum which develops a rotative momentum that cannot be safely stopped as quickly as may be required on occurrence of a hazardous condition. Potential death and injury factors in machines of this type necessitate, therefore, the provision of satisfactory improvements which meet present-day standards of protection.

In addition to the high accident rate, conventional wood and brush chippers are characterized by the need for a great amount of power and by the fact that even when the power requirements are present, the machines are in no sense trouble-free. They are easily overloaded, resulting in exasperating engine kill and loss of time in restart. On the other hand, careful feeding to avoid overload results in substantial slowdown. Improvements to meet these drawbacks are also long overdue.

It is accordingly an important object of the present invention to provide a wood and brush chipper which is safe from undergoing or causing injury to workmen.

Another important object of the present invention is the provision of an assembly of parts in a machine of the aforementioned type which permits any operator working in proximity to the machine to easily and instantaneously stop the feeding of the material to the cutting drum the moment he senses any danger which might possibly result in injury to himself or to fellow workmen.

Still another important object of the present invention is the provision of a safety throw-out for the purposes above outlined which may be actuated instinctively or as the result of direction of natural movement of the operator at the moment of commencement of a possible accident, eliminating the loss of time which might result from the need for thought processes in order to take the necessary steps to cause the feeding to cease before injury occurs.

A further object of the present invention is to provide for incremental feeding of the material to the cutter drum under the direct control of the operator such that regardless of the load on the drum at any given moment, engine kill can be entirely eliminated.

A still further object of the present invention is to provide a chipper that is capable of readily handling all material at the full capacity of its housing inlet, including relatively large diameter logs, limbs and pieces of wood by virtue of the fact that prevention of overchoke is always under the control of the operator.

In the drawings:

FIG. 1 is a side elevational view of a wood and brush chipper made according to one form of the present invention;

FIG. 2 is a fragmentary cross-sectional view taken on line 2-2 of FIG. 1;

FIG. 3 is a top plan view thereof, parts being removed and broken away for clearness;

FIG. 4 is a fragmentary, essentially central, vertical cross-sectional view taken at a right angle to FIG. 2;

FIG. 5 is a view similar to FIG. 4 but with certain parts at a different position;

FIG. 6 is a view similar to FIG. 5 demonstrating the effect of feed throw-out; and

FIG. 7 is a fragmentary view similar to FIG. 1 showing a modified form of clutch throw-out.

A housing 10, containing a rotatable cutting drum 12 between its inlet 14 and its outlet 16, is supported by a framework 18 which may, in turn, if desired, be coupled with the three-point hitch of a tractor (not shown) so as to permit use of the power take-off of the latter. Such coupling is effected by provision of three connecting extensions 20 on the framework 18 as best seen in FIG. 3, and a U-joint (not shown) may be used to connect the power take-off shaft of the tractor with a driven shaft 22 rotatably carried by the framework 18 beneath the housing 10.

At that end of the shaft 22 opposite to the U-joint connection, a pulley 24 is secured to the shaft 22 and coupled with a pulley 26 on shaft 28 of the drum 12 by belts 30. A clutch in the nature of an idler pulley 32 may be swung to the position shown in FIG. 1 to tighten the belts 30 and thereby establish the transmission of power from the tractor to the drum 12.

The tractor-chipper hookup above described not only permits transportation of the chipper by the tractor when the power lift of the latter is actuated, but causes the chipper to be stabilized by the tractor during use when the chipper is lowered to the ground. However, a separate engine on the framework 18 may be used to drive the shaft 22 and either the connection to the power take-off or to the power lift of the tractor, or both, may be eliminated. This suggests, of course, mounting of the framework 18 on a truck or trailer, or providing a separate running gear for the framework 18.

A cutter bar 34 mounted in the housing 10 beneath the drum 12 and coextensive in length with the latter may be shifted toward and away from knives 36 of the drum 12 by manipulation of adjusting bolts 38 to predetermine the size of the chips cut from material being fed to the drum 12, such as a log 40, tree branches and limbs, pieces of wood, or the like. Such feeding is through an open bottom hopper 42 communicating with the inlet 14, and along a platform 44 which extends through the inlet 14 and terminates adjacent the bar 34.

A throw-out assembly 46 for the platform 44 includes an oscillatory control shaft 48 carried by the framework 18 and spaced outwardly of the inlet 14, and a pair of manually movable members 50 disposed exteriorly of the housing 10 and the hopper 42. The horizontal shaft 48, parallel with the shafts 22 and 28, carries the outer end of the platform 44 for vertical swinging movement of the latter between the positions shown in FIGS. 1 and 5, 6 respectively.

The members 50, in the nature of elongated rods or arms, extend radially from the shaft 48 at their point of rigid connection to the latter and their movement from the position shown in FIGS. 1-4 to the position shown in FIGS. 5 and 6 is in the same general direction of movement of the log 40 along the platform 44 toward the drum 12.

Mechanism 52 operably interconnecting the assembly 46 and the platform 44 for shifting the latter about the axis of the shaft 48 includes a rocker 54 and a toggle connection 56. Rocker 54 includes an oscillatory rock shaft 58 carried by the framework 18 in spaced parallelism to the shaft 48, and radial cranks 60 and 62, provided on the shafts 48 and 58 respectively, are pivotally interconnected by a link 64 presenting the toggle

joint or connection 56 between the assembly 46 and the rocker 54.

The mechanism 52 also includes a rod 66 pivotally connected with the platform and slidable within a block 68 that is, in turn, swingably attached to a third crank 70 rigid to the shaft 58. The tension of a spring 72 coiled on the rod 66 may be adjusted by virtue of the provision of nuts 74 threaded on the rod 66.

An adjustable stop bolt 76 on the crank 60 strikes a flange 78 forming a part of the framework 18 to limit the extent of over center break of toggle 56 in one direction (FIG. 1), and a pair of similar stops 80 on the platform 44 also strike the flange 78 to limit the extent of upward bias of the platform 44 by the action of the spring 72.

In addition to the safety throw-out control for the platform 44 as above described there is provided a throw-out structure 82 for the idler pulley 32 which is operated by the assembly 46 simultaneously with the lowering of the platform 44. It includes a Z-shaped crank 84 rigid to the shaft 58, a pull rod 86 pivotally connected to the crank 84, and a pull bar 88 having a tubular boss 90 slidably receiving the rod 86. The pulley 32 is supported by a yoke 92 swingable on a shaft 93, and the bar 88 is coupled with axle 94 of the pulley 32. A spring 96 is coiled about the rod 86 between the boss 90 and a nut 98 is provided on the rod 86 for adjusting the tension of the spring 96.

In the embodiment of FIG. 7, on the other hand, a throw-out structure 82a is separate from the assembly 46. A crank 84a as well as yoke 92a are rigid to shaft 93a. A pull rod 86a slides in a tubular boss 90a that is in turn swingably attached to the crank 84a. A spring 96a is coiled on the rod 86a between the boss 90a and an adjusting nut 98a. A handle 100 has a short bar 102 thereon which is rigid to a shaft 104, and the rod 86a is pivotally connected to the bar 102. A second handle (not shown) may be similarly attached to the shaft 104 and located at the opposite side of the machine in a manner comparable to the two arms 50, 50.

OPERATION

With all components in the positions shown in FIGS. 1-4 the materials are thrown along the platform 44 through the hopper 42 and the inlet 14 to the rotating drum 12 by operators standing alongside the machine behind either or both of the arms 50. The toggle 56 releasably locks the stop bolts 76 against the flange 78 and the heavy, high tension spring 72 biases the stops 80 tightly against the flange 78. Except when pieces of metal, for example, are accidentally fed to the drum 12, the spring 72 will not normally permit the platform 44 to yield downwardly about the shaft 48, but when the spring 72 does yield, the metal piece then comes into abutment with the bar 34. Chips shaved off or cut from the material by the knives 36 are projected from the housing 10 through the outlet 16.

In the event of any condition which might appear to be hazardous, such as entanglement of the clothing of an operator with the material being pulled rapidly and with great force through the inlet 14 by the drum 12, he simply pushes on or falls against the closest arm 50, swinging it toward the housing 10 to break the toggle joint 56. The cranks 60 and 62 and the link 64 snap instantaneously to the position shown by dotted lines in FIG. 5 causing immediate stoppage of the feeding.

Note in FIG. 6 that the log 40 drops so as to abut the bar 34.

As a double safety, when the rock shaft 58 rotates anticlockwise, viewing FIG. 5, to cause the crank 70 to pull on the rod 66, the crank 84 on the shaft 58 pushes on the rod 86 to release the pulley 32 and break the drive from the shaft 22 to the shaft 28. An L-shaped hook 106 (FIG. 7) on the yoke 92a, looped inside the belts 30a, pulls the latter to their loosened condition, and such further safety may also be provided on the yoke 92.

It has been determined in practice that the throw-out assembly 46 is quite adequate for safety purposes and that the latter has a distinct advantage other than safety which can be utilized if the throw-out structure 82a is separated from the assembly 46 as shown in FIG. 7. In that event, either of the arms 50 may be manipulated from time to time without disconnecting the belt drive 30a from pulley 24a to pulley 26a.

Not infrequently operators are confronted with choke feeding to the drum 12 of such magnitude as to actually kill the engine driving the shaft 22, and such can be avoided by proper operation of the assembly 46. For example, when a relatively large log 40 causes the engine to throttle down to a point where, by sound, it appears that engine stoppage is likely, the operator need merely throw out the assembly 46 permitting the engine to speed up while the feeding is discontinued. As soon as the rotational momentum of the drum 12 resumes, the platform 44 may be gradually raised so as to again raise the log 40 to a position where the knives 36 continue their cutaway action.

It follows then that log 40 can be chipped in small increments as the operator moves one of the arms 50 fore and aft while he listens to the operation of the engine and causes the feeding action to take place only when the speed of rotation of the drum 12 is fast enough to handle the log 40 without killing the engine or unduly slowing down its speed of operation.

In any event, should any potentially dangerous condition come about which might require deactivation of the drum 12 as well as lowering of the platform 44, the handles 100 are close enough to the operators' stations to permit them to quickly release the pulley 32a almost simultaneously with the throw-out of the assembly 46. The reduction in horsepower requirements, the capability of handling heavy loads such as large logs, and the appreciable speedup of operation made possible by the improvements above described contribute significantly to the advantage of the embodiment of FIG. 7 over the double safety arrangement of FIGS. 1-6, the latter being optional, however, if an abundance of caution is desired.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a chipper for wood and brush material having:

- a housing provided with an inlet and an outlet;
- a cutting drum rotatably mounted in the housing between the inlet and the outlet;
- a cutter bar mounted in the housing beneath the drum and having an upper edge disposed adjacent the periphery of the drum; and
- a material-receiving platform extending into the housing through said inlet, terminating at its inner end adjacent said bar, and mounted for downward

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movement of its inner end to a position below said edge of the bar, the improvement of which comprises a safety control for said platform including: a throw-out assembly having a manually movable member disposed exteriorly of said housing for ready access by an operator feeding said material along the platform through said inlet to the drum; and

mechanism operably interconnecting said assembly and said platform for shifting the inner end of the latter to said position upon movement of the member in one direction by said operator, said mechanism including a rocker between said assembly and the platform, and a toggle connection between said assembly and said rocker.

2. The invention as claimed in claim 1 wherein said mechanism includes resilient means between said rocker and said platform for yieldably resisting downward movement of said inner end of the platform.

3. In a chipper for wood and brush material having:

a housing provided with an inlet and an outlet; a cutting drum rotatably mounted in the housing between the inlet and the outlet;

a cutter bar mounted in the housing beneath the drum and having an upper edge disposed adjacent the periphery of the drum; and

a material-receiving platform extending into the housing through said inlet, terminating at its inner end adjacent said bar, and mounted for downward movement of its inner end to a position below said edge of the bar, the improvement of which comprises a safety control for said platform including:

a throw-out assembly having a manually movable member disposed exteriorly of said housing for ready access by an operator feeding said material along the platform through said inlet to the drum; and

mechanism operably interconnecting said assembly and said platform for shifting the inner end of the latter to said position upon movement of the member in one direction by said operator,

said assembly including an oscillatory control shaft spaced outwardly of said inlet, said member being an arm rigid to and extending radially from the shaft,

said platform being mounted on the shaft remote from said inner end of the platform for vertical

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swinging movement of the platform about the shaft to and from said position,

said mechanism including a rocker between the platform and said shaft together with an operable connection between the shaft and the rocker,

said rocker including an oscillatory rock shaft in spaced parallelism to the control shaft, and said connection including cranks rigid to and extending radially from each shaft respectively together with a link pivotally interconnecting the cranks, presenting a toggle joint,

said mechanism further including a rod pivotally connected with the platform, a third crank rigid to the rock shaft, a pivotal connection between the rod and said third crank slidably receiving the rod, and a spring coiled about the rod for yieldably resisting downward movement of said inner end of the platform.

4. In a chipper for wood and brush material having:

a housing provided with an inlet and an outlet; a cutting drum rotatably mounted in the housing between the inlet and the outlet;

a cutter bar mounted in the housing beneath the drum and having an upper edge disposed adjacent the periphery of the drum; and

a material-receiving platform extending into the housing through said inlet, terminating at its inner end adjacent said bar, and mounted for downward movement of its inner end to a position below said edge of the bar, the improvement of which comprises a safety control for said platform including: a throw-out assembly having a manually movable member disposed exteriorly of said housing for ready access by an operator feeding said material along the platform through said inlet to the drum; and

mechanism operably interconnecting said assembly and said platform for shifting the inner end of the latter to said position upon movement of the member in one direction by said operator,

there being a driven shaft, transmission means between the shaft and the drum, clutch means for controlling said transmission means, and throw-out structure between said assembly and said clutch means for disconnecting the shaft and the drum when said member is moved to shift said inner end of the platform to said position.

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