United States Patent [19]

Nicholson et al.

[11] **3,783,916**

[45] **Jan. 8, 1974**

[54] **CHIPPER CHIP-REMOVING STRUCTURE**

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[73] Assignee: **Nicholson Manufacturing Company,** Seattle, Wash.

[22] Filed: **May 2, 1972**

[21] Appl. No.: **249,721**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 883,038, Dec. 8, 1969, Pat. No. 3,661,192.

[52] **U.S. Cl.** **144/172,** 144/162, 144/326, 241/93

[51] **Int. Cl.** **B27l 11/02**

[58] **Field of Search** 144/172, 162, 326; 241/93

[56] **References Cited**

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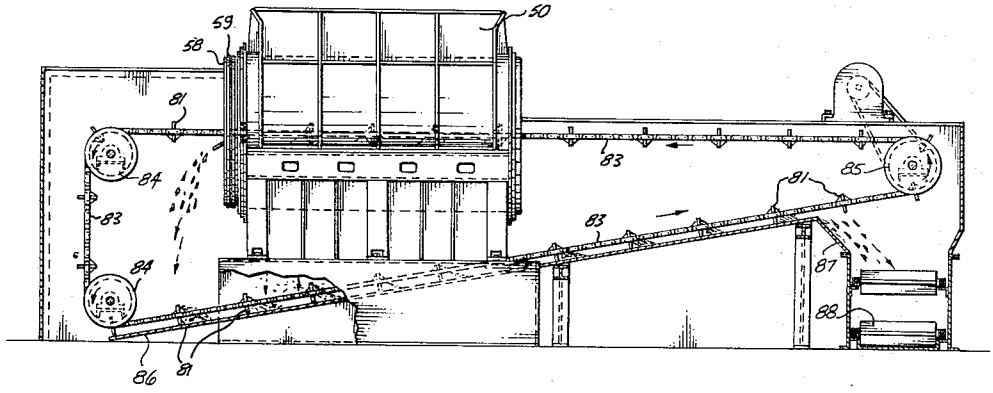
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Primary Examiner—Donald R. Schran
Attorney—Robert W. Beach

[57] **ABSTRACT**

A rotating chipping drum is mounted in a hollow body with a portion of its periphery exposed to a chipping chamber for holding log sections to be chipped. Cutting bits are mounted in apertures of the chipping drum so that chips cut from the log section enter the interior of the drum. The chips are removed from the interior of the drum by a conveyor of the screw type, of the belt type, or of the chain type, extending partially or entirely through the interior of the drum. The rotative axis of the chipping drum may be inclined to urge a log section toward one end of the chipping chamber.

6 Claims, 7 Drawing Figures



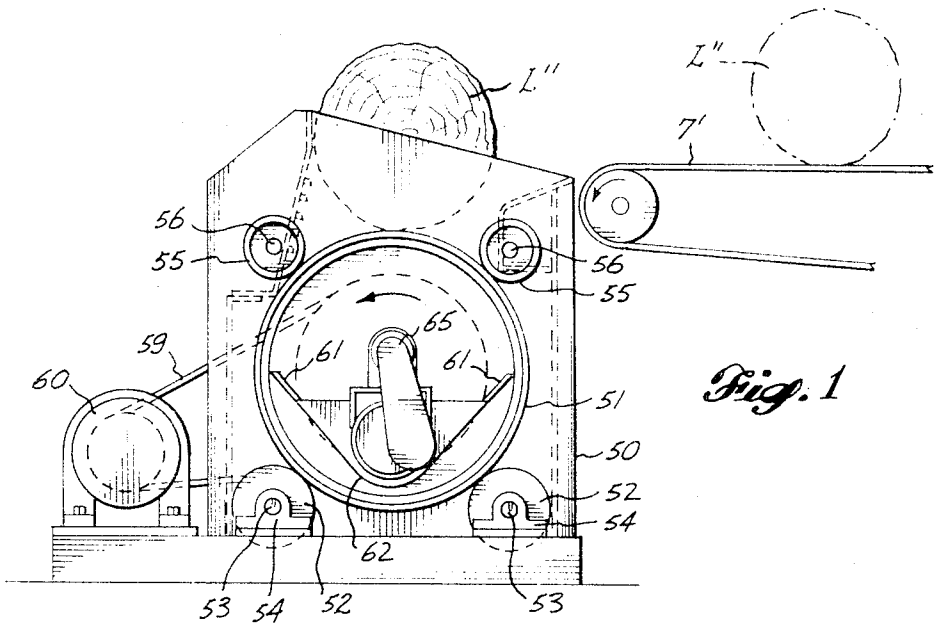

L"
L"
7'
56
55
56
55
59
60
61
65
61
51
50
52
54
62
53
54
52
53

Fig. 1

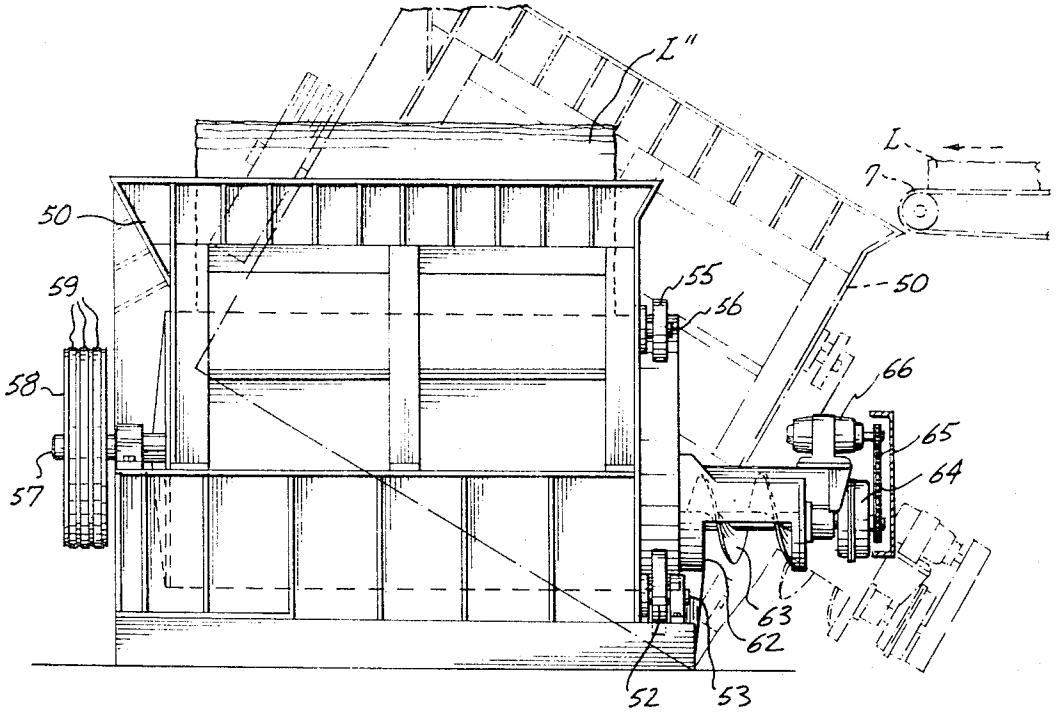

L"
L
7
50
50
59
55
56
58
66
65
64
57
63
62
52
53

Fig. 2

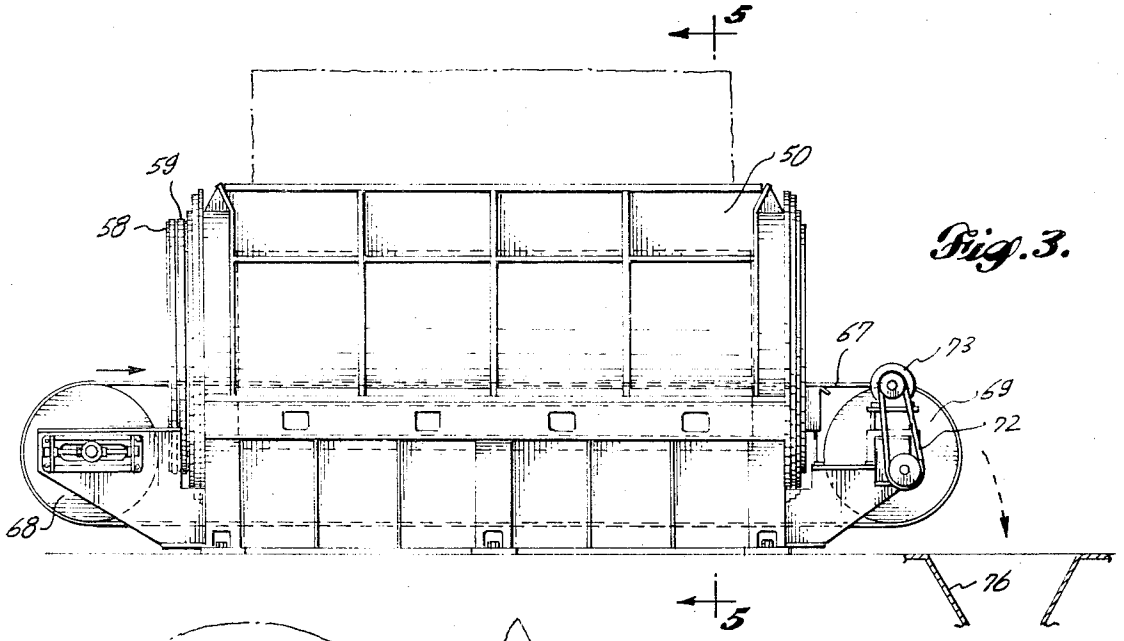

5
59
50
58
67
73
69
72
68
76
5

Fig. 3.

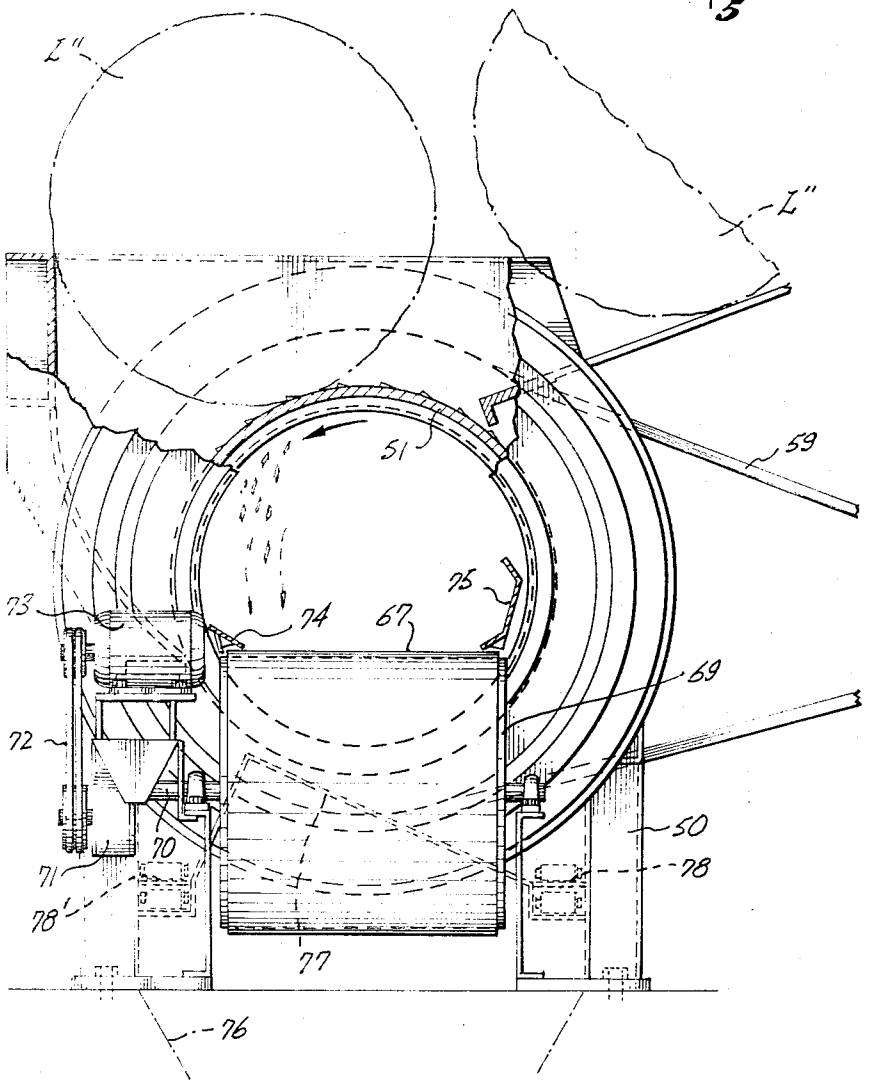

L"
L"
59
51
75
73
74
67
69
72
50
70
78
71
78
77
76

Fig. 4.

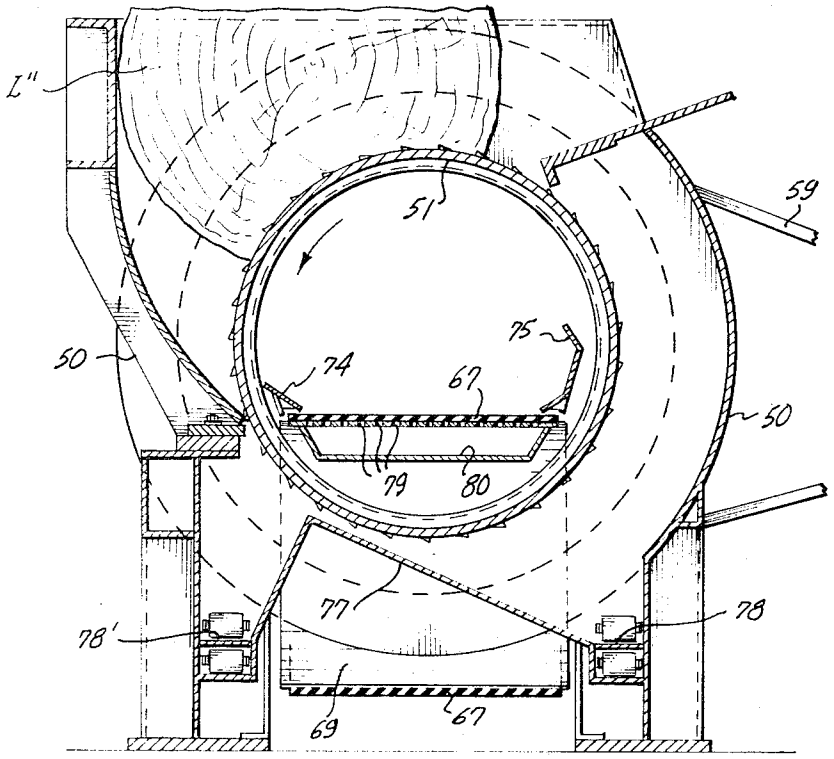

L"
51
59
75
50
74
67
79
80
77
78
78'
69
67

Fig. 5.

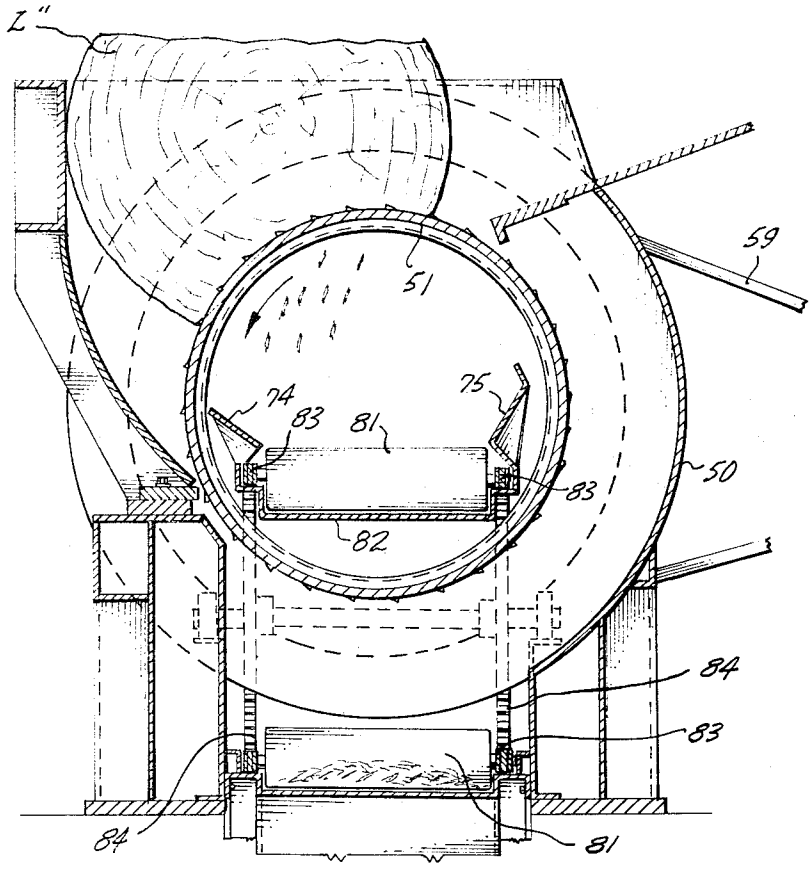

L"
59
51
75
74
83
81
83
50
82
84
83
84
81

Fig. 6.

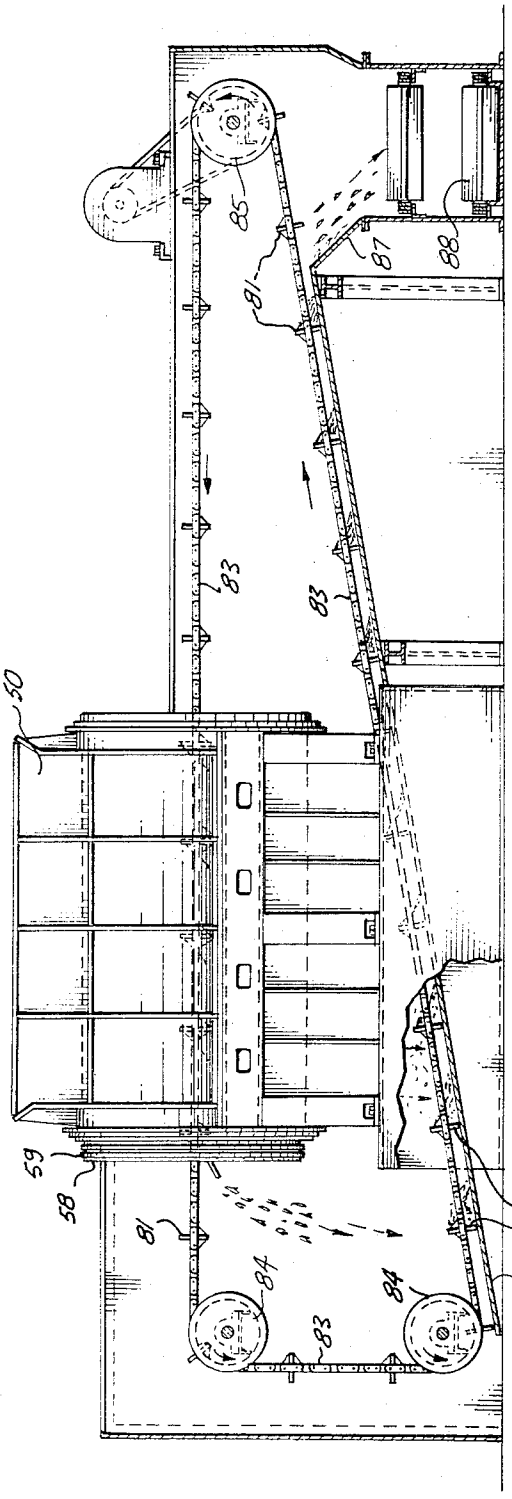


Fig. 7.

CHIPPER CHIP-REMOVING STRUCTURE

This application is a continuation-in-part of prior application Ser. No. 883,038, filed Dec. 8, 1969, for Peripheral Chipper for Round Log Sections which resulted in United States Patent No. 3,661,192, issued May 9, 1972.

A principal object of the invention is to facilitate removal of chips from the interior of the chipping drum of a chipper intended primarily to chip short log sections.

A further object is to provide a chipper in which the rotative axis of the chipping drum can be inclined to urge log sections toward the lower end of the chipping chamber, or which can be horizontal.

FIG. 1 is an end elevation of a chipper according to the present invention, and

FIG. 2 is a side elevation of such chipper showing an alternative position of the chipper in broken lines.

FIG. 3 is a side elevation of a chipper showing an alternative type of chip-removal mechanism, FIG. 4 is an end elevation of such chipper, and FIG. 5 is a vertical section through such chipper taken on line 5—5 of FIG. 3.

FIG. 6 is a vertical section similar to FIG. 5, showing a chipper having a further modified chip-removal mechanism, and FIG. 7 is a side elevation of such chipper.

The chipper has a hollow body **50** in which the rotative chipping drum is located, having chipping bits mounted on its periphery as disclosed in copending application Ser. No. 883,038.

The chipper of FIGS. 1 and 2 has a chipping chamber that is considerably longer in the direction parallel to the rotative axis of the drum than its width transversely of such axis. Consequently, a log round chipped in such chamber may have a considerably greater axial length than its diameter. Such log rounds L'' can be fed to the chipping chamber by a supply conveyor **7'**.

The chipper body can be disposed in inclined position as shown in broken lines in FIG. 2, in order to urge log sections toward the lower end of the chipping chamber. Because such log sections being chipped will usually be longer than their diameter, however, the chipper body can be arranged so that the axis of the chipping drum is horizontal, as shown in solid lines in FIG. 2. In such case it is desirable to remove the chips from the interior of the drum **51** other than by gravity.

Particularly in FIG. 1 downwardly convergent chip-catching plates **61** are shown, which are joined by a trough **62**. A screw conveyor **63** located in such trough can be driven by reduction gearing **64** to move the chips out one end of the trough. Such reduction gearing is driven by a chain **65** powered by a motor **66**, as shown in FIG. 2.

While, as has been discussed above, the chipper shown in FIGS. 1 and 2 is particularly suitable for chipping log rounds of a length greater than wheels, the same chipper can be used satisfactorily for chipping log wheels L which can be fed to it by a supply conveyor **7**. In this instance, however, the chipper body **50** should be tilted into the broken line position shown in FIG. 2 so that the wheels will gravitate toward the lower end of the chipping chamber to prevent them from falling over.

In FIGS. 3, 4 and 5 the chipper body **50** and the chipper drum **51** are or may be essentially the same as the corresponding structure of the chipper shown in FIGS. 1 and 2. In this instance, however, the chips cut by the bits carried by the drum and passing into the interior of the drum fall onto an endless loop conveyor belt **67** that extends completely through the hollow of the chipper drum **51**. One end of the belt loop is carried by an idler pulley **68**, and the other end of the belt loop is carried by a powered pulley **69**.

The powered pulley **69** of the belt conveyor is carried by a shaft **20** which is driven by the reduction gearing **71**, in turn driven by the belt drive **72** driven by motor **73**. To direct the chips onto the conveyor belt **67** as far as possible an inclined strip apron **74** may be provided extending along the edge of the belt adjacent to which the anvil cooperating with the bits is located. A further strip apron **75** may be provided along the opposite edge of the belt. Apron **74** will scoop the chips onto the belt from the location at which they are cut. The opposite, wider apron **75** will deter the chips from being flung or pushed beyond the opposite edge of the belt.

Movement of the upper stretch of belt **67** will carry the chips deposited on it out of the chipper drum, over the pulley **69** and dump such chips into the hopper **76** for storage or other disposition. In order to prevent any excess chips from falling onto the upper side of the lower belt stretch, a shield **77** extends lengthwise of the chipper beneath the chipping drum and above the lower belt stretch. The major portion of the width of this shield slopes transversely of the direction of movement of the belt to a trough **78** from which excess chips are scraped by a chain conveyor. Slivers will slide down the opposite, narrow, steep portion of the shield into a trough **78'** from which the slivers are scraped by another chain conveyor.

To reduce the effort required to move the belt **67** while enabling it to carry a heavy load of chips, air may be discharged beneath the upper stretch of the belt through apertures **79** in the top of a manifold **80** to which air is supplied under pressure. The upper stretch of the belt will thus be floated on a dynamic cushion of air, which will greatly reduce the friction between the belt stretch and its support. Preferably such manifold extends substantially throughout the length of the upper stretch of the belt.

In FIG. 6 a further type of endless loop chip-removal mechanism extending throughout the full length of the chipper drum is illustrated. Such mechanism is shown as a chain conveyor including flights **81** running in a trough **82** and having their opposite ends connected to chains **83**. Such chains are carried by idler sprockets **84** and a drive sprocket **85** which move the flights **81** through the chipper to the left, as shown in FIG. 7. Preferably the chains **83** are located below and protected by aprons **74** and **75** of the type described in connection with FIG. 5.

As shown in FIG. 7, the chains **83** include a substantially horizontal upper stretch extending through the chipper drum and a lower stretch inclined upwardly from the chip discharge end of the chipper drum and passing beneath the chipper drum. Chips are raked by the flights **81** to the end of trough **82** from which the chips drop onto the lower portion of the upwardly inclined stretch of the chain conveyor in a trough **86**. Such trough extends upwardly beneath the drum so that any excess chips that fall from the drum are deposited in such conveyor trough.

Near the upper end of the lower inclined conveyor stretch is a discharge chute into which the conveyor flights **81** rake the chips to slide down the chute into a flight conveyor **88**, which carries the chips to a storage

bin, or to a transport vehicle, or to some other disposal device.

We claim:

1. A peripheral chipper comprising a hollow body having therein a chipping chamber, a rotary chipping drum including a plurality of bits having cutting edges projecting from its periphery, means mounting said chipping drum for rotation with a portion of its periphery exposed to said chipping chamber for engagement by a log section in said chamber, and endless-loop conveyor means including a first linear-moving stretch exteinding axially through said chipping drum throughout its length and traveling in one direction for moving chips axially of said chipping drum for discharge of chips from one end of said chipping drum and a second linear-moving stretch outside said drum and moving in the opposite direction.

2. The chipper defined in claim **1,** in which the conveyor having one stretch means includes a belt conveyor extending axially through the chipping drum.

3. The chipper defined in claim **2,** in which the belt conveyor includes a belt, belt-supporting plate means closely underlying said belt, and means for supplying a dynamic cushion of air between said belt-supporting plate means and said belt.

4. The chipper defined in claim **1,** in which the conveyor means includes a trough extending axially of the chipping drum and a flight conveyor having flights moving along said trough.

5. The chipper defined in claim **1,** in which the second stretch of the conveyor means moves beneath the rotary chipping drum for receiving chips from the first stretch and from the lower portion of the chipping drum.

6. The chipper defined in claim **5,** in which the second stretch of the conveyor means beneath the rotary chipping drum is inclined upwardly from the chip discharge end of the chipping drum.

* * * * *

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,783,916 Dated January 8, 1974

Inventor(s) Thomas W. Nicholson, Ray B. Jorgensen, Stanley D. Vanek

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 12, cancel "teinding" and insert --tending--; line 19, cancel "having one stretch"; line 20, after "veyor" insert --having one stretch--.

Signed and sealed this 18th day of June 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents