Feb. 14, 1939. C. F. DAHLBERG ET AL. 2,147,333

CANE CLEANING DEVICE

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Fig. 1.

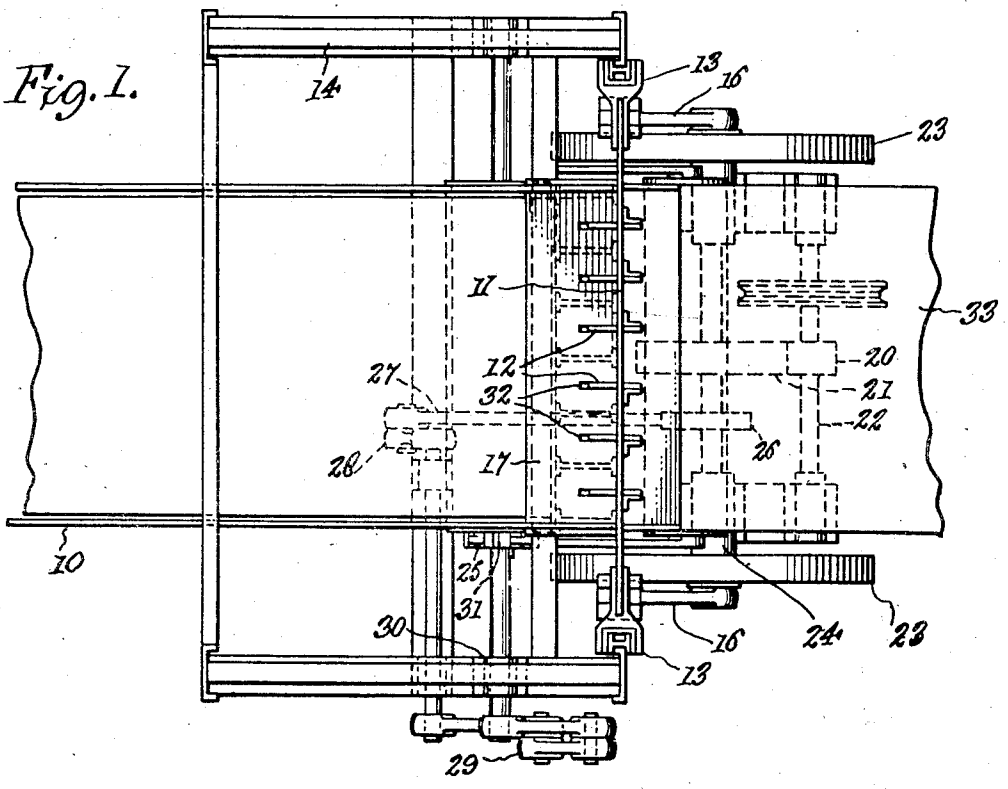
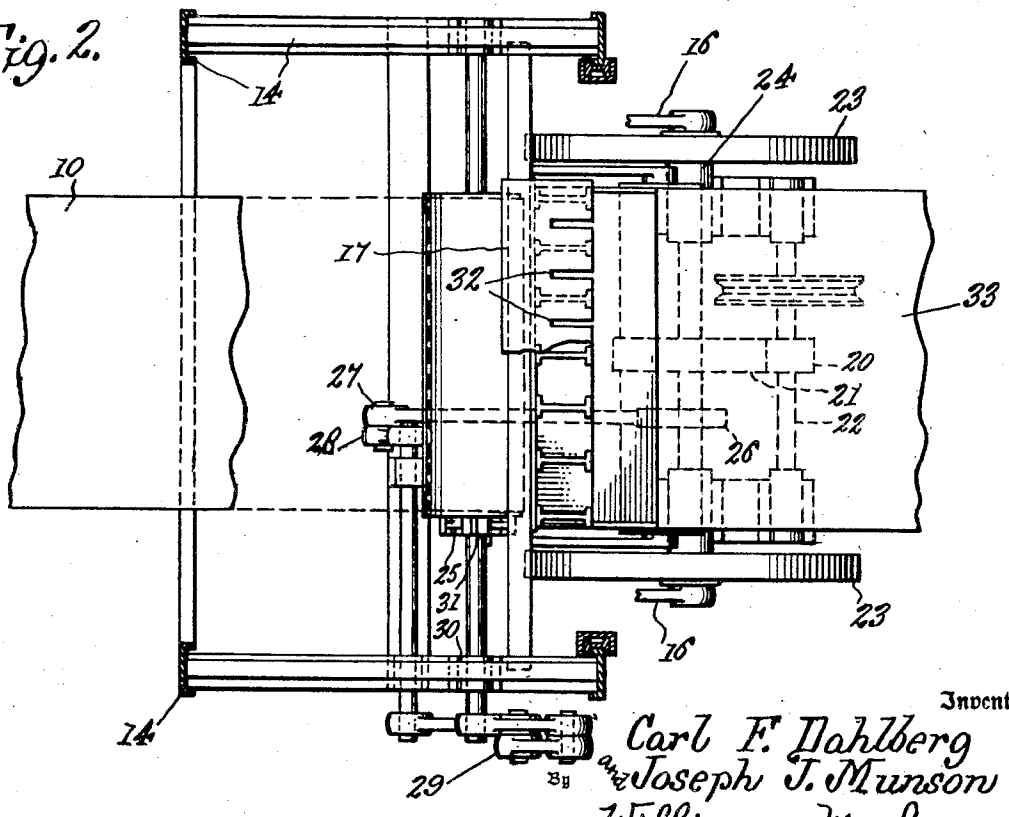


Fig. 2.



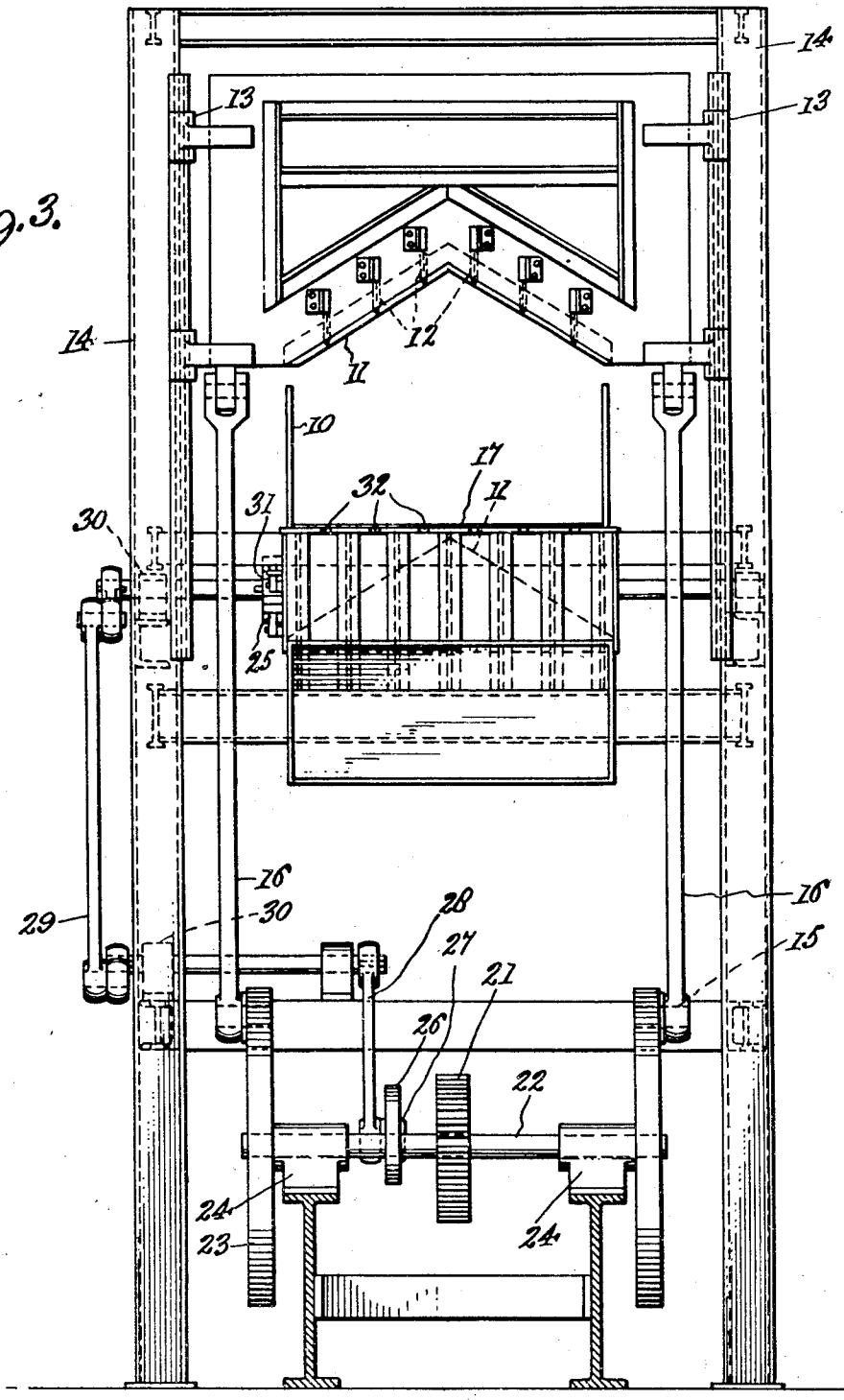
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CANE CLEANING DEVICE

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Fig. 3.



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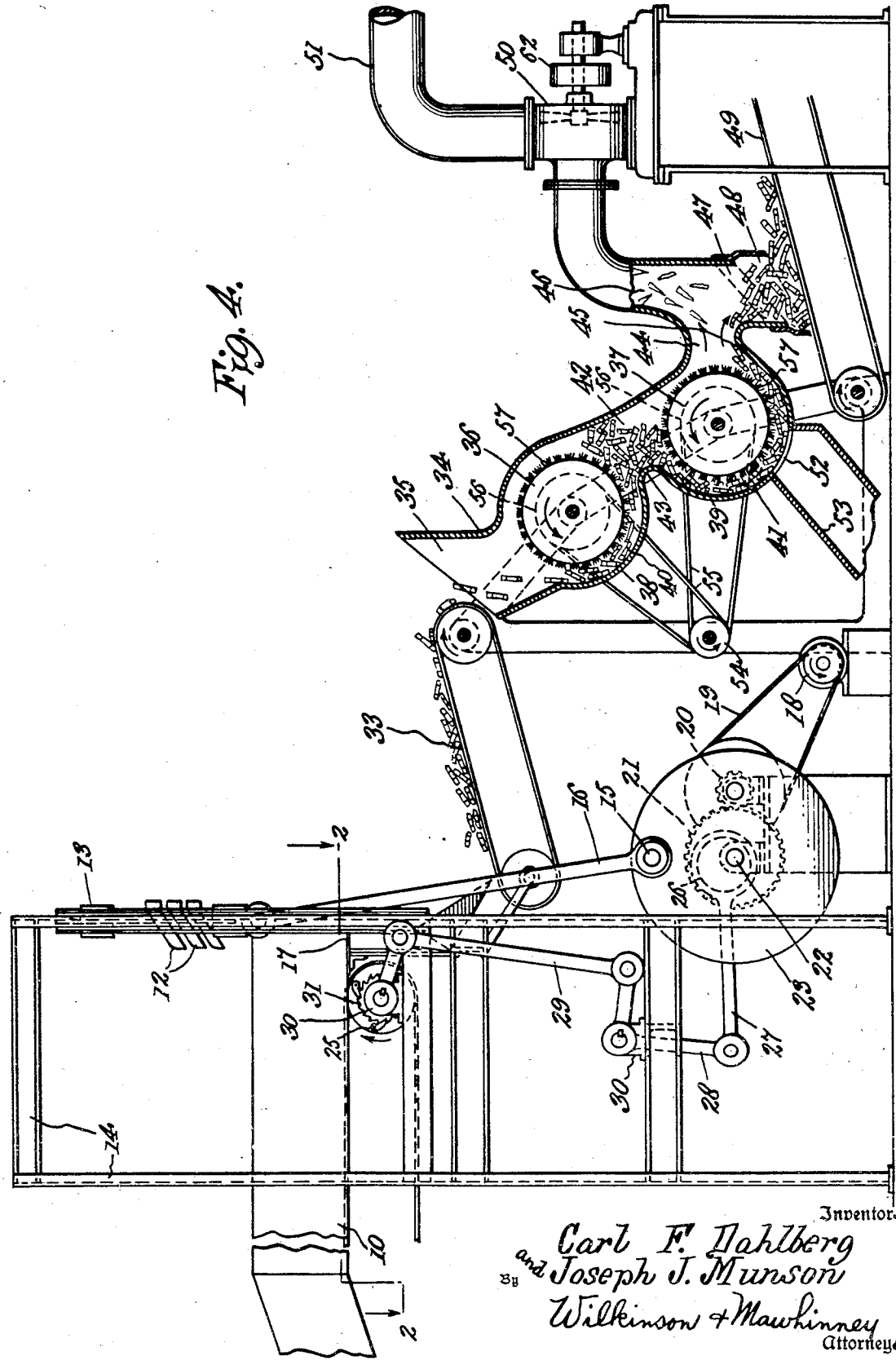
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CANE CLEANING DEVICE

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Fig. 4.



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CANE CLEANING DEVICE

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Fig. 9.

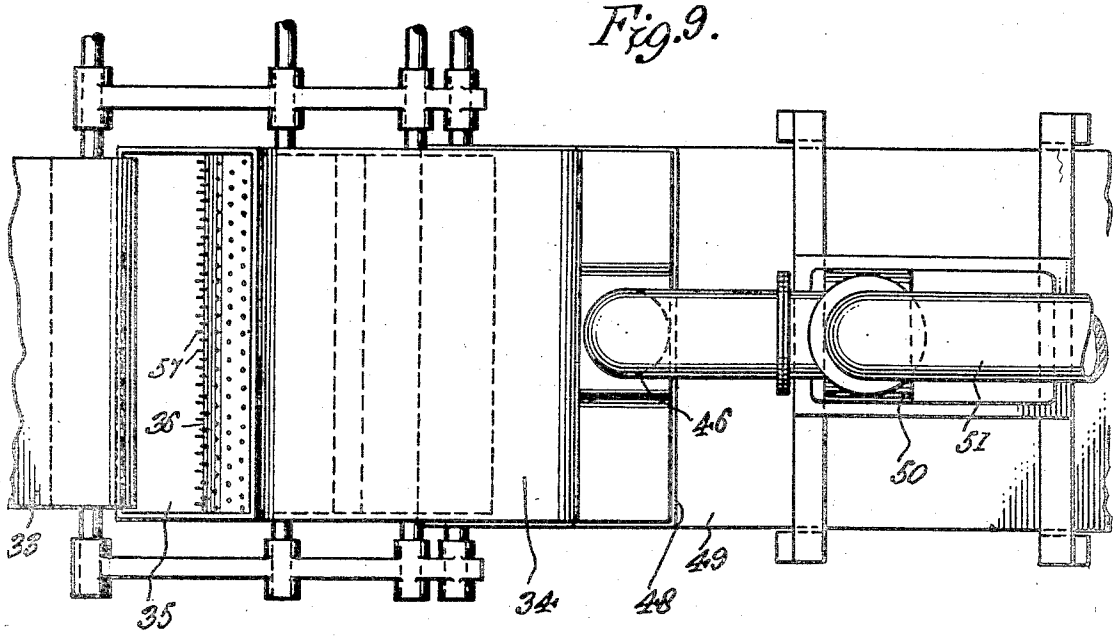


Fig. 5.

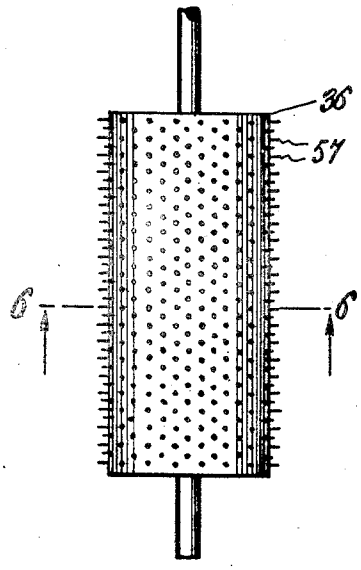


Fig. 7.

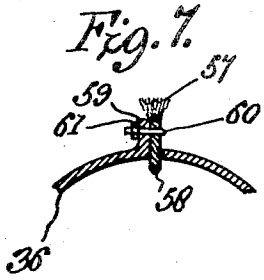


Fig. 8.

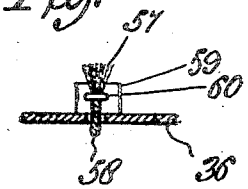
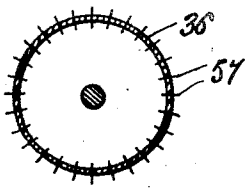


Fig. 6.



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UNITED STATES PATENT OFFICE

2,147,333

CANE CLEANING DEVICE

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Application June 3, 1937, Serial No. 146,304

2 Claims. (Cl. 146—193)

The present invention relates to improvements in cane cleaning devices and has for an object to provide, in conjunction with the cane cutting and delivery apparatus, a cleaning unit adapted to denude the cane of all foreign matter prior to its delivery to the expressing mills.

Sugar cane delivered to the mills from the fields in the various sugarhouse producing areas is not clean. It contains varying amounts of trash and dirt. The trash is usually made up mostly of the leaves of the sugar cane, some of which form the unremoved sheath of the cane. Other parts of the leaves, not grown to the cane, are usually mixed in with it, and this, together with grass of various kinds, also mixed with the cane, forms a greater part of the contamination

Dirty and trashy cane is very objectionable from a standpoint of milling, as the dirt and trash not only cause excessive wear and tear on machinery and prevent the proper feed of the cane to the various crushing units, but they also introduce additional solid matter which, on leaving the milling units, carry with them sugar which would otherwise go into juice and later be subject to recovery. There exists at the present time no adequate machinery for receiving the cane as it comes from the fields and ridding it of trash and dirt before it is sent to the milling unit for crushing to express the juice. The present invention aims to provide such a device.

A further object of the invention resides in providing a simple form of cleaning unit susceptible of being mounted in conjunction with the cane cutting apparatus and between such apparatus and the mill.

A still further object of the invention lies in providing a cleaning unit which will be efficient in operation, will not interfere with mill operations or retard the production thereof, and which itself may be constructed, operated and maintained economically.

With the foregoing and other objects in view, the invention will be more fully described hereinafter and particularly pointed out in the appended claims.

In the drawings, in which like reference characters denote like or corresponding parts throughout the several views,

Fig. 1 is a top plan view of a cane cutting apparatus with parts broken away.

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 4.

Fig. 3 is an end elevation of such cane cutting apparatus, with parts broken away and parts shown in section.

Fig. 4 is a side elevation of such cutting apparatus in conjunction with the improved cane cleaning unit, parts being broken away and parts shown in section.

Fig. 5 is a plan view of one of the clearing cylinders.

Fig. 6 is a cross section on the line 6—6 of Fig. 5.

Fig. 7 is an enlarged fragmentary section taken through the cleaning cylinder and showing one of the wire brushes and its method of mounting.

Fig. 8 is a similar view taken at substantially right-angles to Fig. 7, and

Fig. 9 is a top plan view of the housing of the improved cleaning unit.

Referring more particularly to the drawings, the cane, as it comes from the fields, usually in long stalks, is conducted by means of an intermittent slow-speed conveyor 10 to a guillotine-type knife 11 with knives 12 attached to it and projecting in a direction at substantially right-angles to its cutting edge. The knife 11 is held in position, preferably vertically, by means of guides 13 attached to suitable framing 14. The knife 11 is given a reciprocating motion by means of cranks 15 through connecting rods 16. This reciprocating motion carries the cutting edge of the knife from its extreme upward position, shown in full llines in Fig. 3, past the dead plate 17 to its lowest position shown in dotted lines in Fig. 3. The cranks 15 are given uniform circular motion by means of a motor 18. Through suitable transmission 19 this circular motion is imparted to the pinion 20 and to spur gear 21. The spur gear 21 is carried on a shaft 22 as are likewise the crank discs 23. The shaft 22 is journaled in bearings 24 supported by appropriate foundations. The intermittent motion is imparted to the cane carrier 10 by means of a ratchet 25, Fig. 4, which is given an oscillatory motion by means of an eccentric 26 through connecting rod 27, bell-crank 28 and reach rod 29. The bell-crank 28 is pivoted on a stationary bracket 30.

The knife 11 is operated through the shaft 22 on which the eccentric 26 is mounted. Therefore as the knife 11 approaches the extreme upward position, and before it travels an appreciable distance downward, the reach rod 29 is pulled down, causing the ratchet 25 to engage and revolve the sprocket 31 in the direction shown by the arrow in Fig. 4. This ratchet motion is sufficient to move the cane on the carrier out over the dead plate 17, under the knife 11 a distance slightly less than the amount the knives 12 project back from the cutting edge of knife 11. The result is, as knife 11 travels downward past the

dead plate 17, carrying with it the knives 12 through the slots 32 in the dead plate, the cane is cut off by knife 11, and, at the same time, slit backward by the knives 12; thus blocking out the cane in squares or rectangles of widths equal to the distance between knives 12 and lengths equal to the travel of carrier 10 for each stroke of knife 11. This method of cutting insures against long pieces of cane getting past the knife 11 should some of the stalks be crosswise in the carrier 10. In other words, the longest piece of cane which could possibly exist after cutting would be that corresponding to the dimension of the diagonal of rectangles or squares mentioned above.

This cane, after being thus chopped, drops down on a high-speed conveyer 33, the purpose of which is to spread it out in a thin layer whereby it is fed in a more uniform manner than would otherwise be possible to the cleaning unit.

The conveyer 33 ordinarily transfers this chopped cane is accommodated prior to its deliv- the present invention a cleaning unit is interposed between the mill and this conveyer 33, whereby the conveyer 33 discharges the cane into the cleaning unit. For this purpose the housing 34 of the cleaning unit is formed at its upper or receiving end into a hopper 35 disposed relatively to the discharge end of the conveyer 33 so that the chopped cane will be delivered by such conveyer 33 into the hopper 35 by which the chopped cane is directed into the housing and past the cleaning brushes 36 and 37 therein. These brushes may be in any suitable number. The two brushes 36 and 37 will ordinarily suffice for the purpose. Such brushes are contained within bulged portions 38 and 39 of the housing. The bulged portions will be substantially cylindrical to accord with the generally cylindrical character of the brushes 36 and 37, except that outwardly and beyond the brushes the bulged portions are of sufficient radius to provide annular channels between the outermost portions of the bristles of the brushes and the bulged wall of the housing. The cane is adapted to move through these annular channels 40 and 41. The housing is also so formed between the bulged portion 38 and the bulged portion 39 that an internal chamber 42 is created in which the chopped cane is received from the first cleaning brush, and where the chopped cane is accommodated prior to its delivery into the annular channel 41 of the second bulged portion 39. The housing is formed with a crimped wall portion 43 between the two brushes. This crimped portion 43 causes the two bulged portions 38 and 39 to partake of the general cylindrical character throughout a great portion of the circumference of the same and it also guides the cane from the first brush into the internal chamber 42, while providing an initial passage from the chamber 42 into the annular channel 41 of the next brush 37.

At the delivery end of the second brush the housing is crimped together as to its upper and lower walls to produce a throat. The lower wall 45 of this throat is disposed on an inclination or tangent to the circle of the bulged portion 39 whereby it will direct the chopped cane from the second annular chamber 41 diagonally and upwardly into the lower portion of a suction pipe 46 which communicates with the throat 44 angularly and which is disposed vertically above an outlet 47. The outlet end is shown as provided with flaps or belt strips 48. This outlet 47 discharges onto a slow-speed continuous conveyer 49 whereby the cleaned cane is transferred to the mill.

The suction pipe 46 connects with an exhaust fan 50 or other exhausting device. The outlet pipe 51 from the fan 50 may lead to a discharge disposal point, for instance to a trash burner.

In the bottom of the housing below the annular chamber 41 is a grate 52 communicating with a chute or outlet pipe 53.

The cylindrical brushes may be driven from a motor 54 by belts 55 running over pulleys 56 attached to the shafts of the brush cylinders or to the cylinders themselves.

Referring more particularly to Figs. 5 and 6, one of the brush cylinders is shown in plan and cross-sectional views. Such cylinder 36 may be made from sheet metal or other appropriate material possessing the necessary strength and lightness so as to be rotated with a minimum of mechanical effort and at the expenditure of small maintainance cost. From the cylindrical surface project bristles of suitable material and in suitable numbers. Preferably these bristles are made from wire as shown in Figs. 7 and 8. The bristles themselves are shown at 57, the same being made from the frayed or splayed ends of twisted wire which compose the shanks of the brushes. These twisted shanks 58 form relatively strong and rigid brush supports, the same being welded or otherwise secured to outturned lugs or flanges 59 on the cylinders 36 of the brush members. The shanks 58 may also be anchored to the lugs 59 by means of staples or U-bolts 60 having the nuts 61 threaded thereon. These staples or bolts which are near the bristle ends of the brushes further impart rigidity thereto and hold the bristles in a stiff and outwardly extending condition projecting into the annular channels 40 and 41 to have a maximum cleaning effect upon the chopped cane.

In the use of the device, the brushes are rotated at proper speeds about their journal bearings through the housing. The cane, as it drops through the hopper 35, is engaged by the first brush 36 and carried in the direction shown by the curved arrow. From brush 36, the cane is delivered to the internal chamber 42. From this point it drops down through the housing and is engaged by the second brush 37. This latter brush carries the cane around in the annular channel 41 below the brush, both brushes rotating in a counter-clockwise direction as viewed in Fig. 4. Leaving the brush 37, the cane is thrown in an upward direction by means of the wall 45 into and through the throat 44 and upwardly into the lower part of the suction pipe or hood 46. The light trash, which has been loosened from the cane by means of the brushes, is picked up at this point by a regulated current of air induced by the exhaust fan 50 which is driven by any suitable means, for instance by a pulley 62, or by direct connection to a motor or engine. The regulation of the draft in the hood 46 is controlled either by means of dampers or by varying the speed of the exhaust fan 50. The cleaned cane, after leaving the last brush, and after being subjected to the suction cleaning in the hood, falls down on the slow-speed conveyer 49 which carries it to the milling unit. The light trash picked up in the hood or suction pipe is carried through exhaust fan 50 and blown to a suitable trash burner. The grate 52 is provided in the housing under the brush 37 to permit the separation and elimination of high specific gravity material, such as soil, sand, etc., which high-speed specific gravity material may be conducted away by suitable carriers. The brushes are preferably driven at se-

lective variable speeds in order to regulate the degree of cleaning without undue wear and tear.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:

1. In a cane cleaning device, a housing for receiving the chopped cane, a plurality of cylindrical portions in the housing, rotary cylindrical brushes in the cylindrical portions of the housing, said brushes being spaced from the cylindrical walls of the housing to provide annular channels for the passage of the chopped cane whereby the chopped cane will be separated from the trash by the action of the brushes in said channels, and means in connection with said housing for removing the trash from the cane.

2. In an improved cane cleaning device, a housing having an upper hopper end for receiving chopped cane and a plurality of bulged portions below said hopper with a crimped lower housing wall between the bulged portions producing an internal chamber between two substantially cylindrical portions, rotary brushes within the bulged portions, means for rotating said brushes, said housing having an outlet end below the lower brush and separating means for separating the light trash which has been removed from the cane during the brushing action in said housing.

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