Dec. 13, 1966 H. WARD 3,291,174

LEAF TOBACCO CUTTING MACHINE

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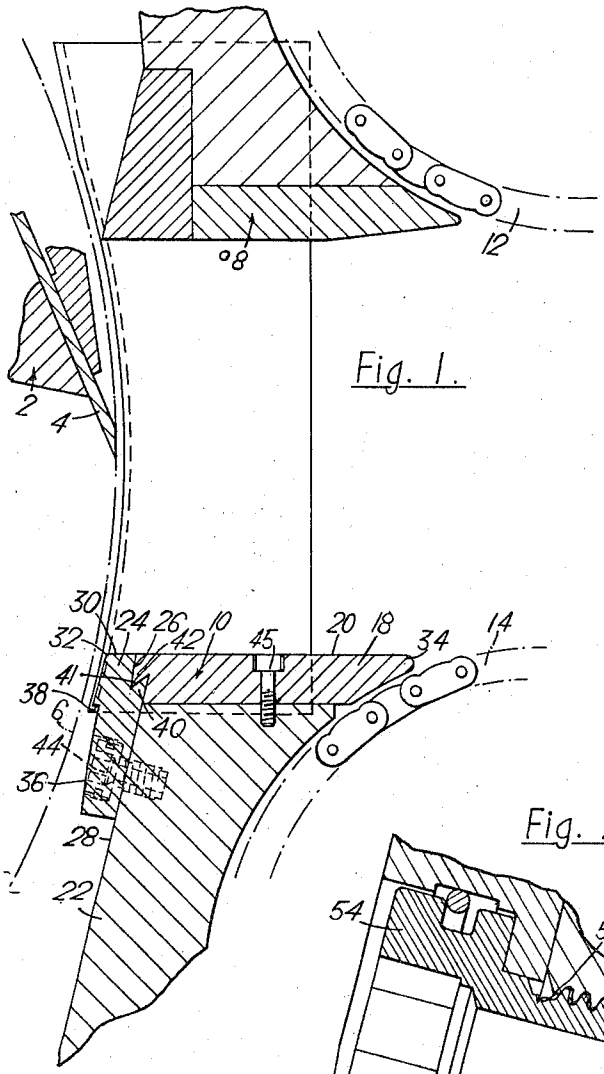


Fig. 1.

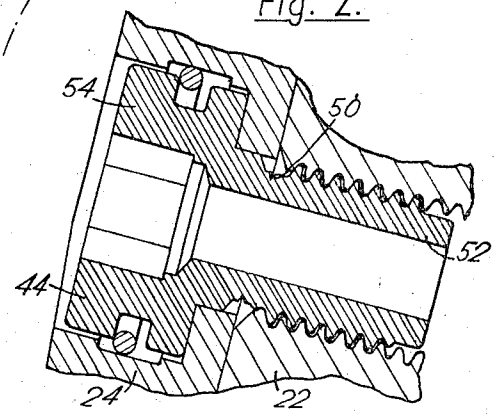


Fig. 2.

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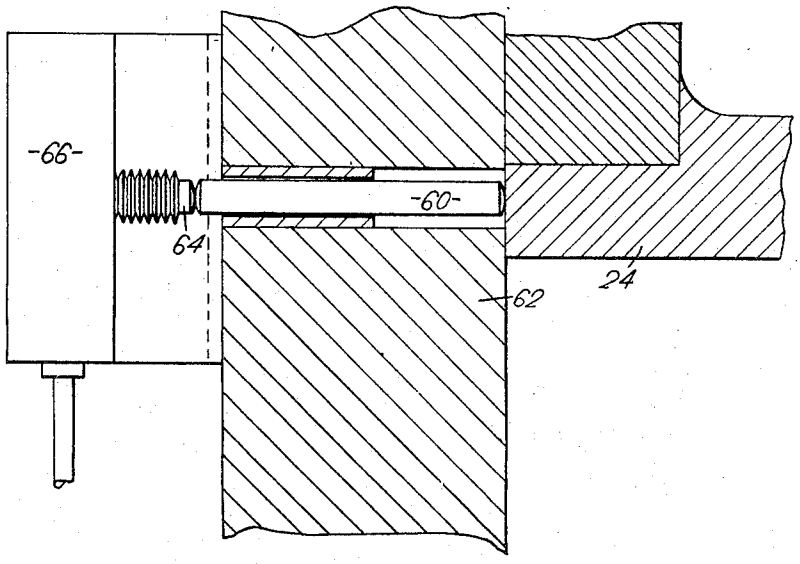
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Fig. 3.



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LEAF TOBACCO CUTTING MACHINE

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6 Claims. (Cl. 146—117)

This invention concerns machines in which tobacco is fed between conveyors to a mouthpiece through which it passes in order to be cut by knives mounted upon a rotating cutter, the knives having cutting edges moving in a cylindrical path which touches or nearly touches the front face of the mouthpiece. Such a machine is described in British Patent No. 751,093 for example. The invention is particularly concerned with the construction of the mouthpiece of such a machine.

In a particular arrangement two conveyors are used, an upper conveyor and a lower conveyor, between which the tobacco passes; and the mouthpiece also comprises a top member and a bottom member. The top member of the mouthpiece, together with the front of the upper conveyor, is arranged to rise and fall while under load, so that the tobacco is compressed, and emerges from the mouthpiece at a substantially uniform density, although the quantity fed by the conveyor may fluctuate.

The front of the lower conveyor is formed by a conveyor belt passing over a roller, for example. The bottom member of the mouthpiece includes a plate, called the "dead plate," which extends from the top of the front of the lower conveyor towards the front of the mouthpiece, and thus towards the rotating cutter. This dead plate is supported by a support member, which lies between the front of the lower conveyor and the rotating cutter, and is mounted on the main frame of the machine.

In such a machine, there is a danger of damage being caused to the rotating cutter, if a slight mis-positioning causes the cutting edges of the knives to strike against the bottom member of the mouthpiece.

According to the invention, a tobacco cutting machine comprises a rotating cutter having a number of knives mounted upon it, a mouthpiece, and means for feeding tobacoo between upper and lower conveyors to the mouthpiece through which it passes in order to be cut by the rotating cutter, the knives of the rotating cutter having cutting edges which move in a cylindrical part which nearly touches the front face of the mouthpiece, the mouthpiece comprising a bottom member including a dead plate extending from the top of the lower conveyor substantially horizontally towards the rotating cutter, a fixed support member situated underneath and supporting the dead plate, and lying between the front of the lower conveyor and the rotating cutter, and a knock-off member attached to the support member and forming the front of the bottom member, the rear face of the knock-off member having an upward pointing step with an upwardly inclined upper face formed in it, which step mates with a corresponding downwardly inclined step having a downwardly inclined lower surface formed in the front face of the dead plate, and the top surface of the knock-off member extending in the same plane as the top surface of the dead plate, the attachment of the knock-off member to the support member being capable of being broken by a downward blow from the rotating cutter if the cylindrical path of the cutting edges of the knives on the rotating cutter touches the front edge of the top surface of the knock-off member.

The knock-off member is so shaped that it can drop down through the space between the rotating cutter and the front face of the support member, in the event of its attachment being broken by a blow from the rotating cutter.

The presence of the mating steps between the knock-off member and the dead plate enables the knock-off member to be held firmly back against the front face of the support member.

A preferred arrangement according to the invention will now be described by way of example with reference to the accompanying drawings, of which:

FIGURE 1 shows in sectional side elevation part of a tobacco cutting machine; and

FIGURE 2 is a detailed sectional view of one of the screws holding the knock-off member to the support member;

FIGURE 3 shows an arrangement for automatically stopping the tobacco cutting machine, if the knock-off member is broken away from the rest of the bottom member.

FIGURE 1 shows part of a rotating cutter **2**, having a number of knives spaced out at intervals around its circumference. One of the knives is shown at **4**, and the cylindrical path of the cutting edges of the knives is indicated by the chain-dotted line **6**. A mouthpiece is formed by a top member **8** and a bottom member **10**, and tobacco is fed to the mouthpiece between an upper conveyor part of which is indicated by **12**, and a lower conveyor partly indicated at **14**. The bottom member **10** of the mouthpiece is fixed to the main frame of the machine, and the top member **8** is arranged to move up and down in order to compress the tobacco as it passes through the mouthpiece, so that the tobacco emerges from the mouthpiece at substantially uniform density although the quantity fed between the conveyors may fluctuate.

The bottom member **10** of the mouthpiece includes a dead plate **18** whose top surface **20** extends horizontally from the top front edge of the lower conveyor **14** towards the rotating cutter **2**. A support member **22** lying between the lower conveyor **14** and the rotating cutter **2** provides support for the dead plate **18**. A knock-off member **24** is mounted on the front faces **26** and **28** of the dead plate **18** and the support member **22** respectively. The top surface **30** of the knock-off member **24** lies in the same plane as the top surface **20** of the dead plate **18**, so that one continuous flat surface is formed for the top of the bottom member **10** of the mouthpiece.

It is desirable for the distance between the top of the front of the lower conveyor **14** and the front edge **32** of the knock-off member **24**, which front edge **32** forms the top front edge of the bottom member **10**, to be as short as possible, in order to avoid a jerky feeding action on the tobacco, and thus to improve the accuracy of the cutting of the tobacco. However, the support member **22** must have a minimum thickness in order to be sufficiently strong and rigid to provide support for the tobacco passing through the mouthpiece; and since the front fact of the lower conveyor **14** is formed by the cylindrical surface of the conveyor belt passing around the front of its roller, which roller projects underneath the rear end **34** of the dead plate **18**, it follows that the horizontal distance from the vertical plane containing the front edge **32** of the knock-off member to the top of the front of the lower conveyor **14** is greater than the horizontal distance from the same vertical plane to the middle of the front face of the lower conveyor. Thus, to have a minimum thickness throughout its height, the support member **22** has a front face **28** which is inclined outwards from the front face **26** of the dead plate **18**.

The front face **36** of the knock-off member **24** extends down from the front edge **32** close to the cylindrical path **6** of the cutting edges of the knives on the rotating cutter, and is then recessed backwards to form a step **38**. The rear face of the knock-off member **24** has an upward

pointing step **40** with an upwardly inclined upper surface **41**, the step **40** mating with a corresponding downward pointing step **42** formed in the front face **26** of the dead plate **18**. These co-operating steps hold the knock-off member **24** firmly back against the front face **28** of the support member **22**, and help to resist the thrust of the tobacco passing through the mouthpiece, which thrust tends to urge the knock-off member **24** away from the front face **26** of the dead plate **18**.

Three screws are used to attach the knock-off member **24** to the front face of the support member **22**; one of these screws is indicated at **44** in FIGURE 1, and FIGURE 2 shows a screw **44** in greater detail. Without the presence of the co-operating steps **40** and **42**, more screws **44** would be required to form a secure attachment. Although more than three screws could be used anyway, the resistance to shear stress is correspondingly greater.

During assembly of the bottom member **10** of the mouthpiece, the dead plate **18** is first screwed to the top of the support member **22** by vertical screws **45**; the screws are not tightened down, however. The knock-off member **24** is then screwed to the support member **22** by the screws **44**, with its step **40** mating with the step **42** in the front face **26** of the dead plate **18**, and these screws **44** are tightened down firmly. Finally, the dead plate **18** is screwed tightly down upon the top of the support member **22**, and this final tightening starts a slight shear strain in the screws **44** attaching the knock-off member **24** to the support member **22**. Each of the screws **44** has a groove **50** formed around the top of its threaded shank **52**, which groove lies in the junction plane containing the rear face of the knock-off member **24** and the front face **28** of the support member **22**. Thus, the screws **44** are easily sheared in half when a shear stress is placed upon their heads **54** which are contained within the knock-off member **24**. With this arrangement, a blow upon the front edge **32** of the knock-off member **24** will therefore cause the three shear screws **44** to be sheared in half, and the knock-off member will then be broken away from the rest of the bottom member **10**; as will be seen from FIGURE 1, it is shaped so that the downward path between the rotating cutter **2** and the support member **22** is not restricted.

FIGURE 3 shows an arrangement such that if the knock-off member **24** is broken away from the rest of the bottom member **10**, an electrical circuit is broken which causes the power to the tobacco cutting machine to be cut off. An actuating rod **60** is mounted in the main frame of the machine, which is indicated at **62**. A side of the knock-off member **24** bears against one end of the actuating rod **60**, which is thereby held so that it depresses a spring-loaded plunger **64** of a micro-switch **66** included in the electrical circuit supplying power to the tobacco cutting machine. If the knock-off member **24** is broken away from its position at which it is attached to the front of the support member **22** the spring-loaded plunger **64** is able to move the actuating rod **60** outwards from its mounting, and the electrical circuit supplying power to the machine is broken.

I claim:

1. A tobacco cutting machine comprising a rotating cutter having a number of knives mounted upon it, a mouthpiece, and means for feeding tobacco between upper and lower conveyors to the mouthpiece through which it passes in order to be cut by the rotating cutter, the knives of the rotating cutter having cutting edges which move in a cylindrical part which nearly touches the front face of the mouthpiece, the mouthpiece comprising a bottom member including a dead plate extending from the top of the lower conveyor substantially horizontally towards the rotating cutter, a fixed support member situated underneath and supporting the dead plate, and lying between the front of the lower conveyor and the rotating cutter, and a knock-off member attached to the support member and forming the front of the bottom member, the rear face of the knock-off member having an upward pointing step with an upwardly inclined upper face formed in it, which step mates with a corresponding downwardly inclined step having a downwardly inclined lower surface formed in the front face of the dead plate, and the top surface of the knock-off member extending in the same plane as the top surface of the dead plate, the attachment of the knock-off member to the support member being capable of being broken by a downward blow from the rotating cutter if the cylindrical path of the cutting edges of the knives on the rotating cutter touches the front edge of the top surface of the knock-off member.

2. A tobacco cutting machine according to claim **1**, in which the knock-off member is arranged to break an electrical circuit when it is broken away from the rest of the bottom member of the mouthpiece, so that power to the tobacco cutting machine is cut off.

3. A tobacco cutting machine according to claim **1** in which a number of screws are used to attach the knock-off member to the support member.

4. A tobacco cutting machine according to claim **3**, in which three screws are used to attach the knock-off member to the support member.

5. A tobacco cutting machine according to claim **4**, in which the three screws are arranged to have a slight shear strain across their shanks, in the plane containing the rear face of the knock-off member and the front face of the support member.

6. A tobacco cutting machine according to claim **4**, in which the screws have grooves formed around their shanks, which grooves lie in the plane containing the rear face of the knock-off member and the front face of the support member.

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