

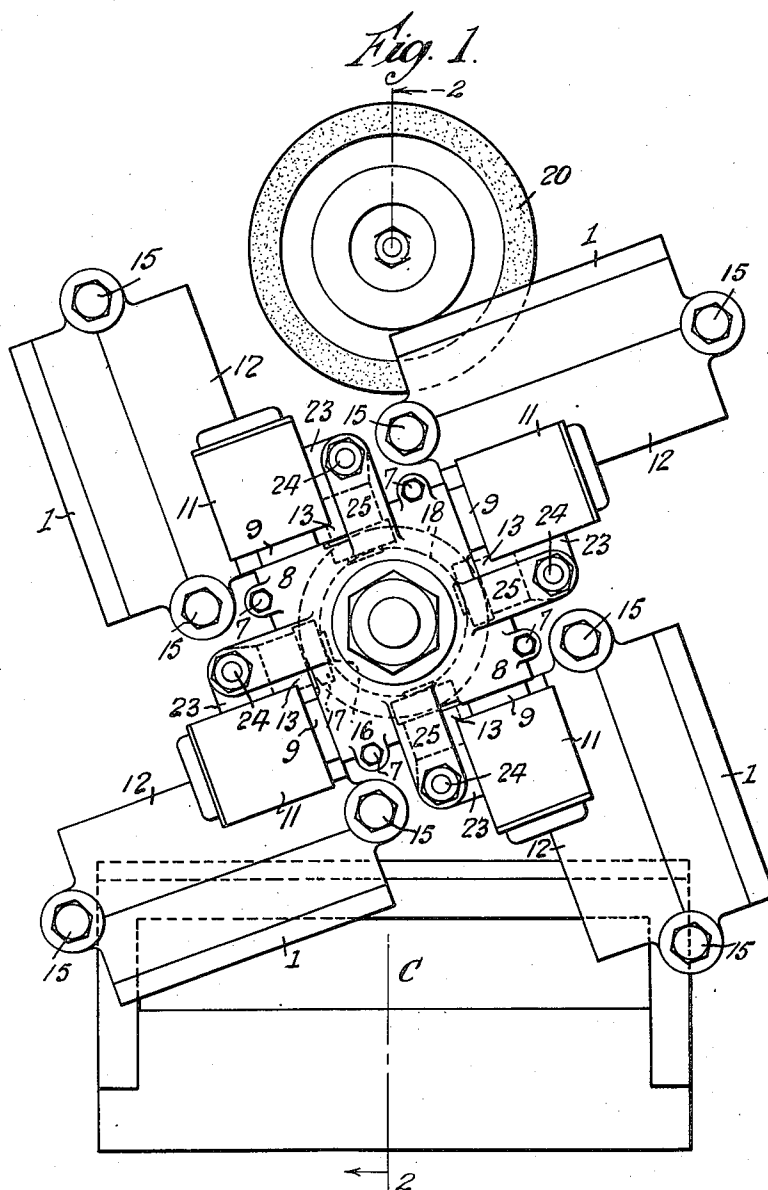
Oct. 26, 1937.

P. Q. R. SCHREIBER
ROTARY CUTTING MACHINE

2,097,223

Filed March 21, 1936

2 Sheets-Sheet 1



Inventor:
Patrick Quintin Robert Schreiber
By his attorneys,
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Fig. 2.

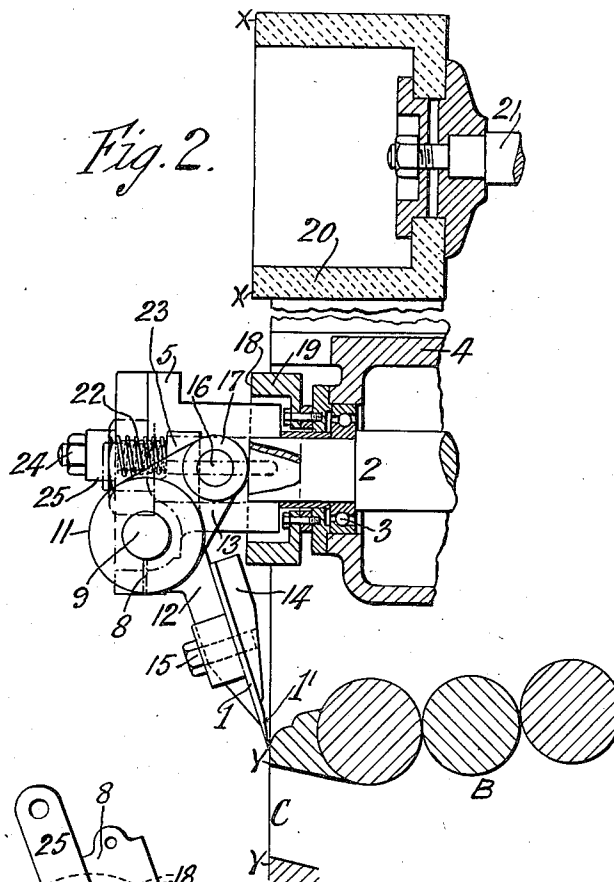
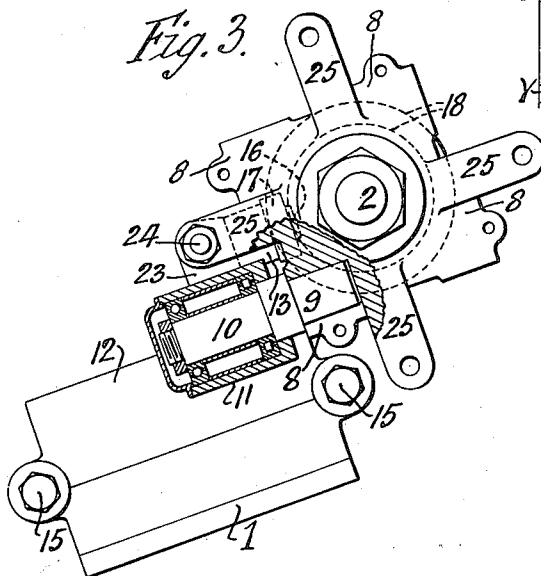


Fig. 3.



Inventor:
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Baldwin & Wright

UNITED STATES PATENT OFFICE

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ROTARY CUTTING MACHINE

Patrick Quintin Robert Schreiber, London, England, assignor to Robert Legg Limited, London, England

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8 Claims. (Cl. 146—109)

This invention relates to improvements in rotary cutting machines and more particularly to tobacco cutting machines of the type having one or more blades mounted on an arm or arms which revolve across the mouthpiece of the cutting machine. These knives may be ground by passing across the face of a grinding wheel mounted in the path of rotation of the knives, the face of the grinding wheel being in the same plane as the face of the mouthpiece of the cutting machine. It will be readily understood that it is impossible for knives mounted and ground in this manner to have any back clearance behind the ground cutting edge since the ground bevel of each knife is in the same plane as the face of the material cut. This makes it difficult to keep the knife from glancing away from the face of the material being cut, and therefore difficult to secure a perfectly regular even cut.

According to the present invention the blade or blades of the cutting knife or knives is or are ground during rotation to a plane which is at an angle to the plane of the face of the mouthpiece so that during cutting there will exist a small angular clearance between the ground surface of the blade and the surface of cut.

In one way of carrying out the invention the knife or knives is or are supported for angular movement to and away from the cutting face or mouthpiece of the machine and means are provided for effecting an angular displacement of the knife or each knife before it passes over the face of the grinding machine which is accordingly mounted to revolve in a different plane from that of the cutting face or mouthpiece.

As applied to a tobacco cutting machine the face of the grinding wheel is set in a plane in front of the mouthpiece of the cutting machine and the knives may be carried by arms which are pivotally mounted on a boss or hub piece attached to the revolving knife spindle, cam or other controlling means being provided for controlling the movements of the arms during rotation, the arrangement being such that after passing over the grinding face, each knife arm, as it revolves towards the mouthpiece will be swung about its pivot by means of the cam until the edge of the knife is in the same plane as the face of the mouthpiece. Since the knife has passed through an angular movement it will be readily understood that the ground bevel of the knife has the same angular clearance with regard to the plane of the mouthpiece as the angular movement of the knife itself. In practice this movement is comparatively small, so that the movement of the knives takes place very smoothly. Also it may be arranged that the knife edge is positively held on to the face of the mouthpiece by the controlling cam, the return to the

grinding position being preferably brought about by a spring.

The invention is illustrated in the accompanying drawings, in which Figure 1 is an end view of a rotary cutting mechanism and associated sharpening means as applied to a precision tobacco cutting machine of which only the mouthpiece is shown.

Figure 2 is a partial longitudinal axial section on the line 2—2 of Figure 1 and showing one of the knives only just previous to its cutting pass across the mouthpiece, while Figure 3 is an end view of a knife with parts in section.

Referring to the drawings, the tobacco or other material to be cut is advanced by means of a conveyor A and feed rolls B to a mouth C from which it issues in a compressed condition, and which as applied to tobacco is termed the tobacco cheese. It will be understood that only such parts of the cutting machine as are necessary to explain the present invention have been illustrated in the drawings and for further details reference may be made to my United States Patent 2,048,473.

The cheese on issuing from the mouthpiece is subjected to the cutting action of a series of knives, of which there are conveniently four, indicated at 1 and mounted to revolve about an axis at right angles to the plane of cut.

It will be understood that as the blade of each knife passes across the grinder, an edge or surface indicated at 1' is ground on the back of the blade and it is desirable that in cutting the cheese the blade shall present its cutting edge thereto and so as to provide a small angular clearance between the ground surface and the surface of cut.

Each knife blade 1 is mounted in a holder carried by a driving shaft 2 with respect to which each holder is mounted for rocking movement in relation to the plane of rotation of the knives.

For this purpose, the knife shaft 2, which is mounted to revolve in bearings 3 provided in a bracket 4 forming part of the machine frame (not shown) carries a boss or bed plate 5 having four split sockets 6 each provided with clamping screws 7. In each of these four split sockets 8 is mounted a pin 9 the projecting portion of which constitutes a spindle 10 for mounting the knife holder.

Each knife holder comprises a hub 11 having a projecting knife arm 12 and a cam arm 13, the two arms in effect constituting a two armed lever capable of rocking movement about the axis of the spindle 10 upon which the hub is mounted by means of a ball bearing mounting. Associated with the knife arm 12 is a gripper plate 14 which is detachably secured thereto by screws 15 and between which two plates is held the knife blade 1. On the cam arm 13 is a stud 16 for

mounting a cam roller 17, this roller engaging a cam track 18 formed on a cup shaped piece 19 which is secured to the bracket 4 so that the track 18 is concentric with respect to the axis of the shaft 2.

On the upper side of the shaft 2, that is at a point opposite to the mouthpiece C, is a cup shaped grinding wheel 20 which is mounted to revolve on a shaft 21. Means (not shown) may be provided for truing up the face of the grinding wheel, and also advancing it to compensate for wear as, for example, described in my Patent 2,048,473 previously referred to.

It will be observed that the face of the grinding wheel 20 lies in a plane X—X slightly in advance of that of the plane Y—Y of the mouthpiece C and the object of the cam device is to cause a relative movement of each of the four knives as between the planes X—X and Y—Y. In effect, therefore, the plane X—X of the grinding wheel will grind the edge 1' on to the knives and as each knife holder, and thus the blade carried thereby, passes from the grinding wheel towards the mouthpiece the cam track will cause each holder in succession to rock about its pivot so that the set of the blade passing across the mouthpiece will be such as to produce the required angular clearance between the ground surface of the blade and the surface of cut, as can be seen from Figure 2.

Preferably the controlling cam 18 is so arranged that the knife edge is positively held on to the face of the mouthpiece thereby, and means such as a spring is provided to return the holder to the grinding position, or in other words to press the roller against the cam so that it will run down from the high to the low level portion when passing the grinder 20.

For this purpose there is associated with each holder a spring 22, one end of which is in engagement with a third lever arm 23 on the hub 11, while its other end engages a stud 24 adjustably carried by screwing in a finger 25 integral with the bed plate 5, so that by adjusting the stud 24 the tension of the spring 22 may be varied.

What I claim is:—

1. A precision cutting machine suitable for cutting tobacco having a knife; means mounting the knife to revolve about a fixed axis and to traverse a cutting zone and cut in a predetermined cutting plane; and means for sharpening the knife as it revolves including a sharpening element disposed in a sharpening plane displaced relatively to the plane of cutting, and means for moving said knife during its revolving motion angularly with respect to its axis of rotation successively into positions with the ground edge of the knife in the cutting zone and then with said ground edge in the plane of sharpening, whereby to provide an angular clearance between the ground surface of the knife and the plane of cutting when the knife is traversing the cutting zone.

2. A precision cutting machine suitable for cutting tobacco comprising a mouthpiece, means for feeding the material to be cut through the mouthpiece, a plurality of knives mounted to revolve in a path across the face of the mouthpiece, means for sharpening the knives during rotation, including a sharpening element positioned to contact the knives during their revolution through such path and displaced from the plane of the mouthpiece, means mounting each knife

for angular displacement movements towards and away from the plane of the mouthpiece, and means for effecting a relative displacement of each knife when in contact with the sharpening means proportional to the angular clearance of the ground bevel on the knife from the plane of the mouthpiece.

3. A precision cutting machine suitable for cutting tobacco comprising a mouthpiece, means for feeding the material to be cut through the mouthpiece, a driving shaft, a knife for cutting the material as it issues from the mouthpiece, a holder for the knife, means mounting the holder on the shaft to rotate therewith and for angular displacement of the holder relative to the shaft, a grinding tool located in advance of the mouthpiece, and means for moving said holder and knife angularly with respect to the shaft and for moving the knife into engagement with the grinding tool during rotation of the knife.

4. A precision cutting machine suitable for cutting tobacco comprising a mouthpiece, a series of rotary knife holders which advance in succession across the mouthpiece, a grinding tool located in a plane in advance of the mouthpiece, means mounting the holders for angular displacement relative to the plane of the mouthpiece, and means for producing an angular displacement of the knife holders in passing across the grinding tool to move the knife into engagement with the grinding tool during rotation of the knife.

5. A precision cutting machine suitable for cutting tobacco comprising a mouthpiece through which the material to be cut is fed, a driving shaft, a plurality of knife holders, means mounting said knife holders on the shaft for rotation therewith and for angular displacement relative to the plane of the mouthpiece, a grinding tool for the knives which, in order to obtain an angular clearance between the ground surface on the blade of the knife and the plane of cut, is located in advance of the mouthpiece, and cam operated means for effecting displacement of the knife holders relative to the plane of the mouthpiece to move the knife into engagement with the grinding tool during rotation of the knife.

6. A precision cutting machine suitable for cutting tobacco comprising a mouthpiece through which the material to be cut is fed, a driving shaft having a boss, a plurality of knives, a plurality of two armed knife holders pivotally mounted on the boss so as to be capable of angular displacement relative to the plane of the mouthpiece, the holders and knives being so positioned that the knives revolve in a path across the face of the mouthpiece, a grinding tool positioned in advance of the mouthpiece to contact the knives during their revolution through said path, a cam track, and a plurality of cam rollers, one arm of each holder carrying a knife and the other arm of each carrying a cam roller, said rollers co-operating with said cam track to effect a relative displacement of the holders.

7. A precision cutting machine as claimed in claim 6 and in which the cam track is constructed positively to hold the knives in their plane of cut.

8. A precision cutting machine as claimed in claim 6 and comprising spring operated means for co-operation with the cam track to effect displacement of the knife.

PATRICK QUINTIN

ROBERT SCHREIBER.