Oct. 26, 1926.

H. FINSTERWALD

1,604,158

APPARATUS FOR THE MANUFACTURE OF MATCH STICKS

Filed Oct. 13, 1925

Fig. 1.

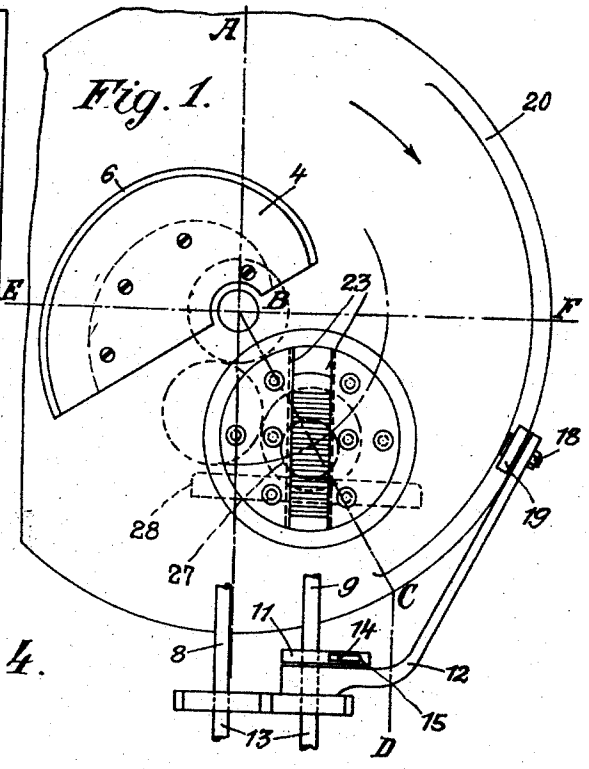


Fig. 2.

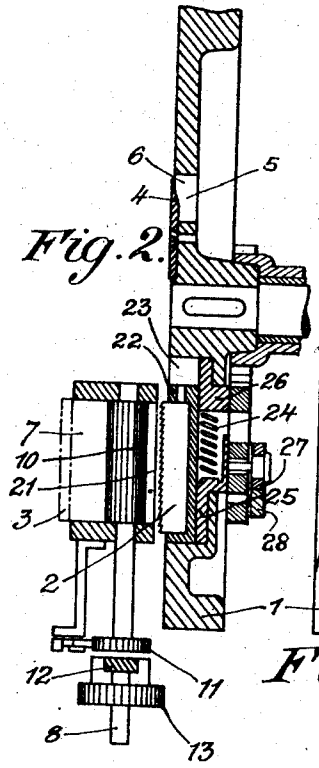


Fig. 4.

Fig. 3.

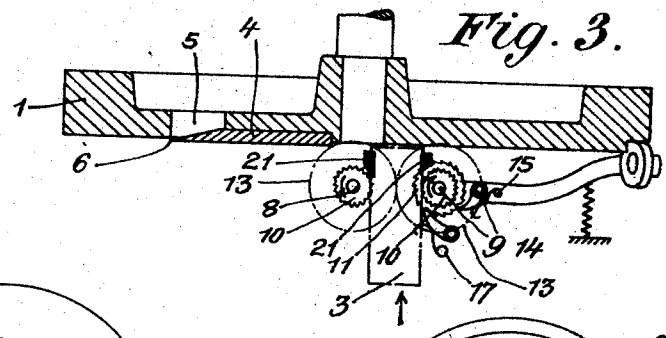


Fig. 5.

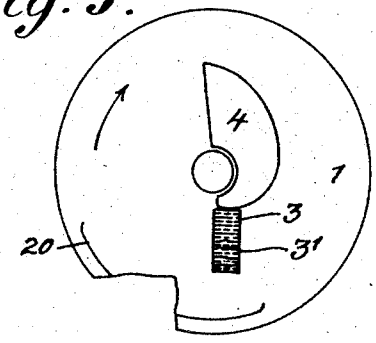
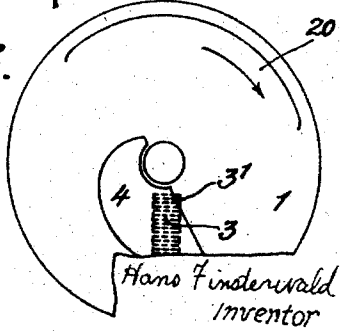


Fig. 6.



Hans Finsterwald
Inventor

By: Marks and Clerk
Attys.

Patented Oct. 26, 1926. 1,604,158

UNITED STATES PATENT OFFICE.

HANS FINSTERWALD, OF GEBENSTORF, SWITZERLAND.

APPARATUS FOR THE MANUFACTURE OF MATCH STICKS.

Application filed October 13, 1925, Serial No. 62,304, and in Germany June 7, 1924.

This invention relates to apparatus for the manufacture of small wooden sticks, more particularly match sticks, of square or rectangular cross-section. The material is first slit by slitting knives which are supported on a flywheel and which are guided in a straight line during the cutting. According to the invention an involute knife is employed for cutting off the wood previously slit.

Involute knives are already known in disintegrating machines. It is, however, new to employ involute knives for cutting sticks from previously slit wood. Hitherto in chopping machines working by the pealing process, the knives have been provided with rectilinear edges. Such knives have the disadvantage that in the case of previously slit wood they break away the edges of the sticks. With involute knives on the contrary the cut is tangential to the fibre of the wood throughout the cut, exerts thereon a drawing cut and has no tendency at all to break off the edges. Owing to the involute form of the knife an absolutely accurate cutting off of the previously slit sticks is ensured, the natural porosity of the wood remains protected and the sticks acquire the utmost possible strength because the cut follows the direction of the fibre. The stick has smooth surfaces which are accurately parallel to one another and is therefore excellently adapted for further working up in automatic machines.

In the accompanying drawing one constructional example of the invention is illustrated.

Figure 1 is a side elevation of the flywheel of the apparatus;

Figure 2 is a section on the line A—B—C—D in Figure 1;

Figure 3 is a section on the line E—F in Figure 1;

Figure 4 is an end view of the flywheel, and

Figures 5 and 6 show diagrammatically the position of the involute knife relative to the wood at the beginning and end of the cut.

The slitting knives 2 are gripped in a channel-shaped clamp 22 which is displaceable in a guide 23 parallel to the disc. A spring 24 presses upon a block 25 which is secured to the clamp 22. The other end of the spring bears against a support 26 on the flywheel 1. To the block 25 is secured a roller 27, which is guided in a straight line during the traversing of the slitting knives on a piece of wood 3 by a stationary track 28 so that the knives 2, during the cutting, do not move along a circular arc but along a straight line and slit the piece of wood in corresponding parallel straight lines. An involute knife 4 is secured approximately diametrically opposite to the slitting knives over a gap 5 in the flywheel 1 in such a way that it leaves a narrow slot 6 along the edge. In front of the flywheel 1 are located in a casing 7 of rectangular cross-section, and rigidly mounted on shafts 8 and 9 respectively, two perpendicularly grooved cylinders 10. Moreover to the shaft 9 is keyed a ratchet wheel 11 and, on the same shaft is oscillatably arranged a lever 12 which is pressed by a spring 12^1 (Figure 3) against the flywheel 1. Furthermore there is mounted upon each of the two shafts 8 and 9 a spur wheel 13. These two spur wheels are in mesh with one another. On the lever 12 there is a pawl 14 which engages in the ratchet wheel 11 under the pressure of a spring 15. Another pawl 16, the bolt of which is screwed firmly to the casing 7 and which is subject to the pressure of a spring 17, likewise engages in the ratchet wheel 11. At the upper end of the lever 12 upon a screw-threaded bolt 18 there is an anti-friction roller 19 which is adapted to run over a curved track 20 on the flywheel 1. Beside each of the two grooved cylinders 10 and rigidly connected with the casing 7 there is a guiding piece 21 which is provided with a plurality of horizontal knife-edged ribs. These are intended for protecting the piece of wood that is to be cut against lateral and vertical displacement.

The method of working of the apparatus described is as follows:

The piece of wood to be worked up is pushed into the casing 7 and pressed against the cylinders 10. This may be effected either by hand or by suitable apparatus. With each revolution of the flywheel in the direction of the arrow the cylinders 10 rotate owing to their being influenced by the rockable lever 12, the pawl 14, the ratchet wheel 11 and the spur wheels 13, and push the piece of wood 3 against the knives.

The relative positions of the flywheel and of the cutting knife shown in Figure 1 correspond to the commencement of a work-

ing stroke. During the further rotation of the flywheel in the direction of the arrow the slitting knives 2 slit the piece of wood 3 in straight lines in a known manner. The cutting distance of the slitting knives corresponds exactly to the desired width of stick. According to this method of slitting, the piece of wood 3 to be worked up is pushed forward against the flywheel 1 by a feeding device through a distance exactly equal to the depth of the slit, whereupon the curved cutting knife 4 comes into the position shown in Figure 5 which corresponds to the commencement of the cutting process. From the relative positions of the piece of wood 3 and the cutting knife 4 (Figure 5) it will be seen that the horizontally running wood fibres 3^1 run almost exactly tangentially to the curved knife edge and that the knife edge cuts up the wood approximately from the centre outwards towards both sides. Figure 6 shows the flywheel and the cutting knife at the end of the cutting process and it will be immediately obvious that the aforementioned conditions, namely the tangential position of the wood fibres relative to the knife edge, and the commencement of cutting approximately at the centre of the wood supplied, are also fulfilled in this position. The same thing may be shown for any intermediate position.

What I claim is:—

In a match stick cutting apparatus, in combination with work-holding and feeding means, a fly-wheel, slitting knives supported on the fly-wheel, means for guiding the slitting knives in a straight line during cutting action to form a series of straight parallel incisions in the work, and an involute knife carried by the fly-wheel, the form of the knife bearing such relation to the work holding and feeding means that, during its cutting action, the knife edge and incisions are maintained in substantially tangential relation.

In testimony whereof I have affixed my signature.

HANS FINSTERWALD.