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FIXED KNIFE DRAWER FOR PLANING MACHINES

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Fig. 1. Fig. 2. Fig. 5. Fig. 6.

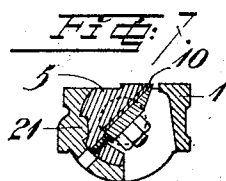
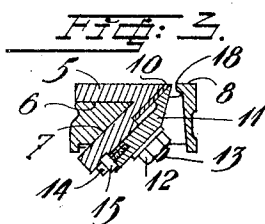
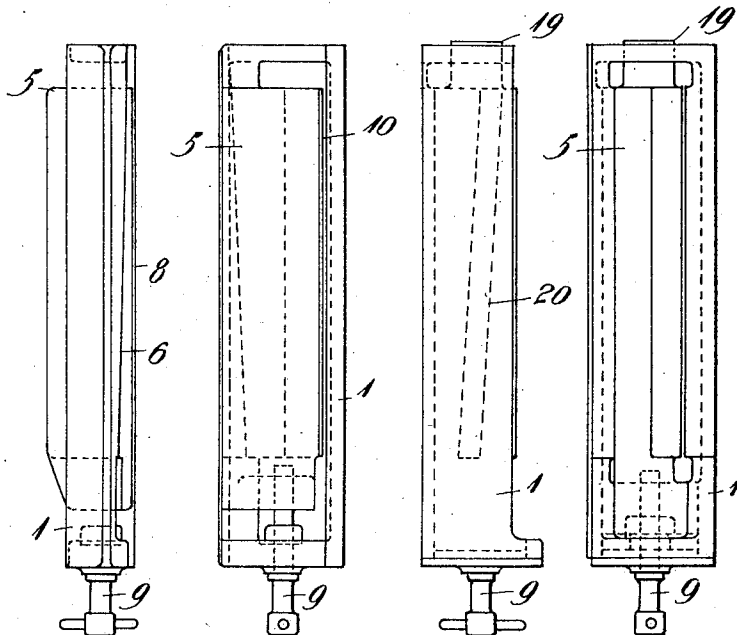
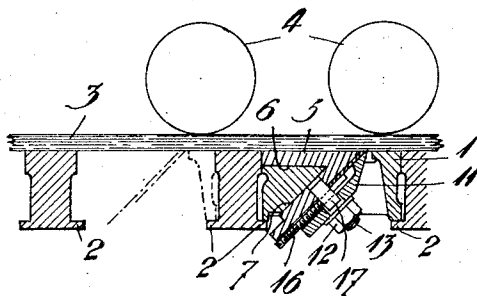


Fig. 4.



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UNITED STATES PATENT OFFICE.

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FIXED-KNIFE DRAWER FOR PLANING MACHINES.

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The present invention refers to an arrangement in such planing machines where the wood material fed forth is planed by fixed knives attached in so-called drawers. The main object of the invention is to remove the difficulties accompanying the adjustment of the knives for the purpose of effecting cuts more or less coarse, that is to say, chips or cuttings of a greater or smaller thickness. Hitherto, the adjustment generally has been effected by imparting blows to the knife at its rear edge, that is to say at the edge opposite to the cutting edge, so that the knife would be moved in its own plane and along its support. This method of procedure has required great skill and practice, particularly as the adjustments are for such small measures as 0.03 to 0.2 millimeters. Great importance is also to be attached to the cutting edge of the knife extending in parallel to the working plane after the adjustment. By reason of the small measures of adjustment it is not possible to control by measurement that an adjustment carried out in this manner will be accurate. Therefore, the control has been entirely dependent on the skill and the practice of the machinist in his determining by feeling whether the cuttings would be of the proper and uniform thickness.

In order to obviate this disadvantage, among other steps the arrangement of providing screws beside the rear edge of the knife has been resorted to, said screws being intended to bring about a more uniform displacement of the knife in its own plane than is possible to effect by mere blows. Endeavours have also been made to so arrange that part of the working plane of the drawer which is situated in front of the knife, that the same would permit of being raised and lowered. These arrangements, however, have not become satisfactory.

On the other hand, the arrangement aimed at with the present invention has been found to fulfill its purpose in all desired respects, and not only can the adjustment be effected with the greatest accuracy and with measurable exactness, but it can also be carried out without too great an amount of practice or skill.

The arrangement is principally characterized by the provision of a knife holder for the planing knife, which holder is movable and guided in the drawer in such a manner

that, when the knife holder is displaced in the drawer, the cutting edge of the knife is raised or lowered relatively to that portion of the drawer in front of the knife which coincides with the working plane.

The arrangement is preferably devised in such manner that the knife holder is adapted to be displaced to and fro in the longitudinal direction of the cutting edge of the knife along a guide which is not parallel to the working plane of the drawer, so that the holder is raised and lowered, together with the knife, with respect to the working plane, on displacement of the knife holder.

Instead, the knife holder may be rotatable in the drawer, the axis of rotation extending parallel to the cutting edge of the knife, which will thus be raised or lowered when the knife holder is turned. The rotary movement may be brought about by the provision of a thread or helical slot in the holder, said slot or thread having a great pitch, a stud or the like fixed in the drawer being adapted to engage said thread or slot. When the knife holder is displaced in the longitudinal direction, it is turned at the same time through the action of the stud in the helical slot.

The accompanying drawings illustrate two embodiments of the invention.

Fig. 1 is an elevation of a knife drawer devised according to the invention, the knife holder being displaceable to and fro in the drawer.

Fig. 2 shows the same knife drawer viewed from above.

Fig. 3 shows the same knife drawer in cross section.

Fig. 4 also shows a cross section of the knife drawer inserted in its place in the planing machine.

Fig. 5 is an elevation of a knife drawer where the knife holder is adapted to be displaced and turned in the drawer.

Fig. 6 shows the same knife drawer viewed from above.

Fig. 7 shows a cross section of the knife drawer according to Figs. 5 and 6.

1 designates the part forming the knife drawer, said part being adapted to be loosely inserted into a pocket shaped in a corresponding manner and provided in the frame of the machine, as shown in Fig. 4, said pocket being provided with guide rails 2 adapted to support the drawer. According to Fig. 4, a

plurality of drawers may be inserted in this manner adjacent one another. 3 denotes a work piece actuated by pressure rollers 4. 5 is the knife holder adapted to be displaced to and fro in the knife drawer 1, said knife holder having a V-shaped cross section, as shown in Figs. 3 and 4, enclosing a correspondingly shaped part of the drawer, said latter part with its sliding surfaces 6 and 7 forming an oblique angle with the working plane 8 of the drawer, as illustrated in Fig. 1. Mounted in the one head piece of the drawer is the screw 9, which is adapted with its inner threaded end to be screwed in the knife holder 5, said screw serving for displacement of the knife holder.

According to Fig. 3, the planer knife 10 proper consists of a thin lamina of a small width, said lamina bearing rigidly against a support in the knife holder 5 where it is retained by the break iron 11 adapted to be fixed by a nut 12 threaded onto a fixed screw 13 attached in the knife holder 5 and extending through the break iron 11. For the displacement of the break iron 11 relatively to the knife 10, there is provided according to Fig. 3 one or more screws 14 at the rear edge of the break iron, said screws being adapted to be screwed in the break iron and to be turned in the knife holder 5 by means of flanges 15 engaging the knife holder through a rotary movement. In adjusting the break iron, the nut 13 is loosened and the screws 14 are turned, whereupon the nut is tightened up. The knife 10 may be adjusted per se, that is to say independently of the break iron, in that it bears against special screws 16 adapted to be screwed in members 17 sunk into the knife holder 5.

Thus, raising and lowering of the cutting edge of the knife relatively to the working plane is effected simply by turning the screw 9.

As the knife 10 per se need never be directly actuated by blows or in a similar way, the knife need not, as is otherwise necessary, project outside its attachment. Therefore, it will be possible to make the knives proper in the simple manner disclosed in the drawing, that is to say so that each knife only forms a thin lamina of inconsiderable width. Thus the knife only requires a width of 12 millimeters, in distinction from previously used knives which have to be at least 100 millimeters wide. Therefore, the knives according to the invention may be manufactured very cheaply. Another advantage of great practical importance and connected with the nature of the knives is that planing knives of one and the same simple type may be used throughout the planing machine, i. e. not only in the knife drawers, but also in rotating cutters belonging to the machine. This involves a considerable saving.

By the fact that the planing knife need

never, as pointed out hereinbefore, be actuated per se, a further condition of the greatest importance will be available for obtaining an entirely plane and smooth surface on the wood material planed.

When the adjustment of the break iron is effected to correspond to a fine cut, that is to say to thin shavings, in such a manner that the outer edge of the break iron 11 is displaced outwards toward the cutting edge of the knife, the opening 18 between the break iron and the adjacent part of the knife drawer 1 is reduced. Reduction of the opening 18 will thus take place in the same degree as the shavings have to be thin. For coarser shavings, on the other hand, when the break iron 11 is removed with its edge from the cutting edge of the knife, the opening 18 will be larger, i. e. corresponding to the coarser shavings. In earlier arrangements where the knife and the break iron attached thereto are displaced in their own plane, the opening will again be larger for thin shavings and smaller for coarse shavings, which obviously is an incorrect state of things.

In the embodiment according to Figs. 5 to 7, the knife holder 5 is rotatable, as already pointed out hereinbefore, the axis of rotation extending in parallel to the cutting edge of the knife 10. The holder is steadily guided in that the cylindrical surface thereof is tightly enclosed by the drawer 1 which, correspondingly, is cylindrically shaped on its inside. Besides, the one end of the holder is formed into a pivot 19 mounted in the one head piece of the drawer. Mounted in the opposite head piece is the screw 9 adapted to be screwed in the holder. This holder is provided with a longitudinal slot 20 having a great pitch, an abutment 21 provided on the inside of the drawer engaging into said slot. When the screw 9 is turned, the knife holder 5 is displaced in its longitudinal direction, the abutment 21 sliding in the slot 20 and exerting a turning action on the holder, so that the cutting edge of the knife 10 is raised or lowered relatively to the working plane of the drawer.

As already set forth hereinbefore, each knife drawer is situated obliquely with respect to the feeding direction of the wood material, that is to say, in such a manner that the edges of the knife drawer and the corresponding edges of the pocket, into which the drawer is inserted, form an oblique angle with the feeding direction. On account of this oblique position, the advantageous condition is obtained, that the force which during work acts upon the drawer in the said direction will be divided in such a manner that one of its components will powerfully counteract displacement of the drawer out of the pocket. If the oblique position is suitably adapted, the said force will therefore, in connection with the friction between the

drawer and the wall of the pocket, keep the drawer in the pocket in any position without any special attaching means being required for this purpose. Therefore, it will be a very
5 simple matter to adjust the drawer in different ways only by displacing the same inwards or outwards in its corresponding pocket, in accordance with different widths of boards or, perhaps, in accordance with the
10 different positions that the boards may assume during the feeding thereof.

When the knife drawer is inserted in its pocket, it is displaceable in the longitudinal direction of the cutting edge of the knife.
15 This arrangement entails the very important advantage that the drawer may be displaced, without altering the distance between the cutting edge and the pressure rollers 4 shown in Fig. 4. Thus, cooperation between the
20 rollers and the drawer is maintained quite independently of the positions of displacement occupied by the drawer. Consequently, if only a portion of the length of the cutting edge of the knife is utilized on a certain occasion for the planing operation and is thus
25 worn, another portion of the edge, which is not worn, may come to use on some other occasion, simply by the drawer being displaced so that the unworn portion of the edge is
30 brought into working position.

What I claim is:—

1. In a planing machine, a frame having

a plane upper surface provided with an opening therein, guides on the underside of the frame below said opening, a drawer support- 35
ed on said guides below said opening having its upper surface in the plane of said frame surface, a knife holder supported by said drawer, a guide on said drawer engaging said knife holder and extending obliquely 40
to the cutting edge of said knife and to the upper surface of said drawer, and means secured to said drawer and engaging said knife holder to move the knife holder on said
45 guide, whereby the knife is moved upwardly and forwardly through the opening in the frame member.

2. In a planing machine as claimed in claim 1 in which the knife adjusting means comprises a screw mounted in an end of the 50
drawer and which engages an end of the knife holder to move the knife holder transversely of the drawer.

3. In a planing device as claimed in claim 1 in which the cutting edge of the cutting 55
knife and the side of the knife drawer which engages the guide and against which the force of the moving material forces the knife drawer are parallel to each other and at an oblique angle to the direction of the moving 60
material as and for the purpose set forth.

In testimony whereof I affix my signature.

CARL JOHAN AXEL JOHNSON.