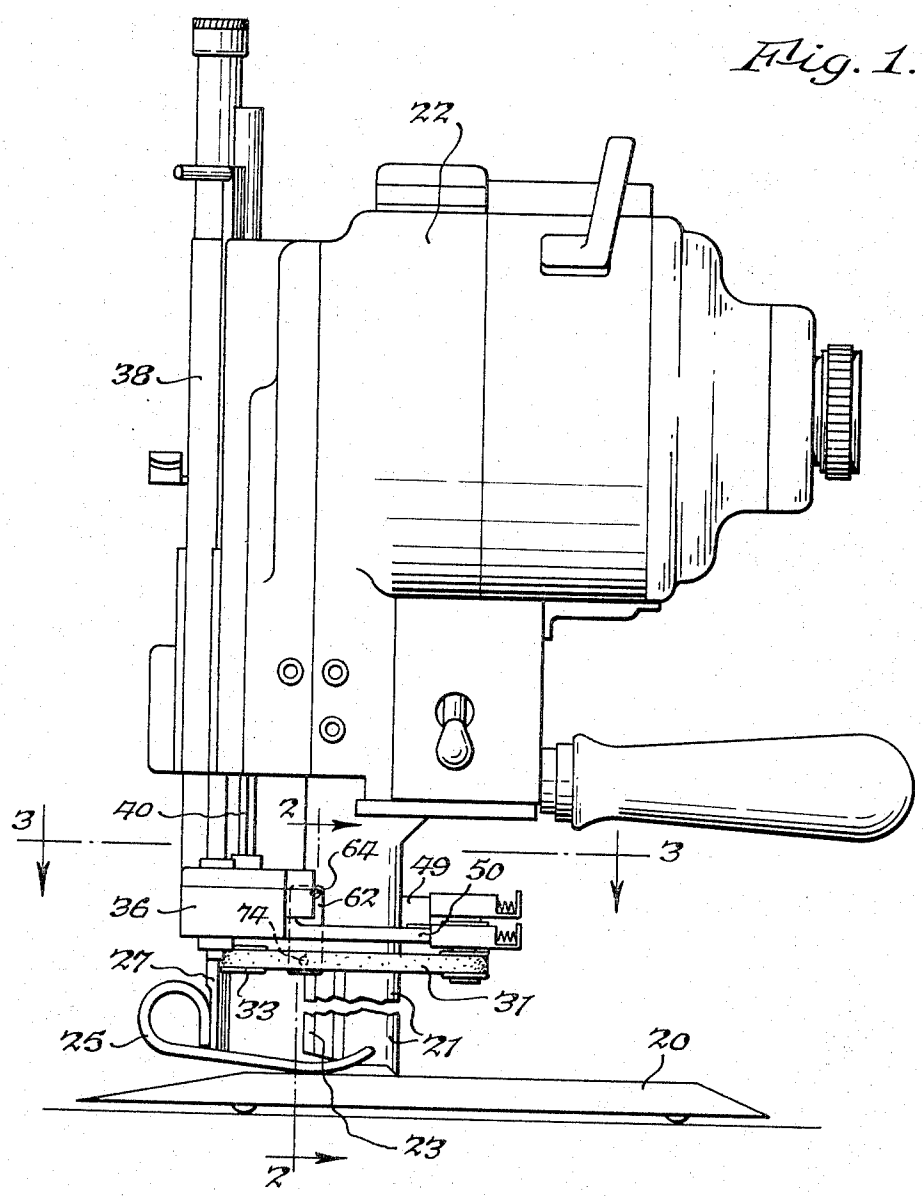
Nov. 7, 1967 F. G. CLARK 3,350,818

KNIFE SHARPENING MECHANISM

Filed July 6, 1964 2 Sheets-Sheet 1

Fig. 1.



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Fig. 5.

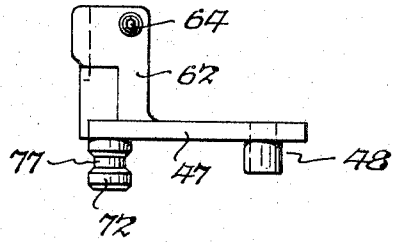


Fig. 6.

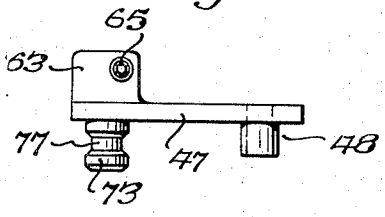


Fig. 4.

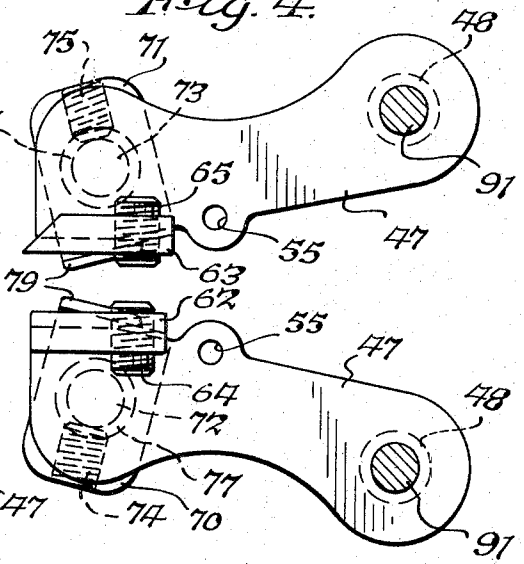


Fig. 2.

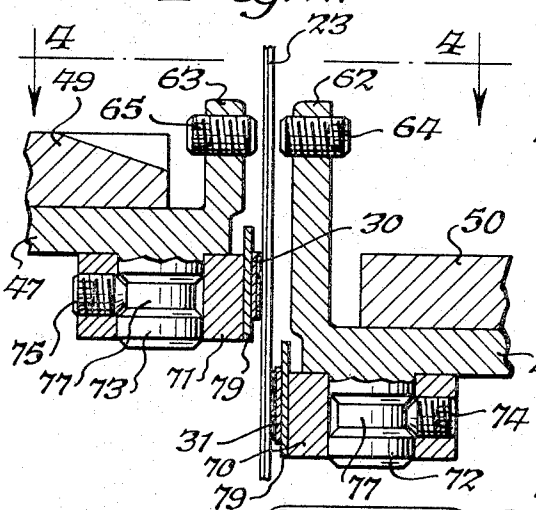


Fig. 3.

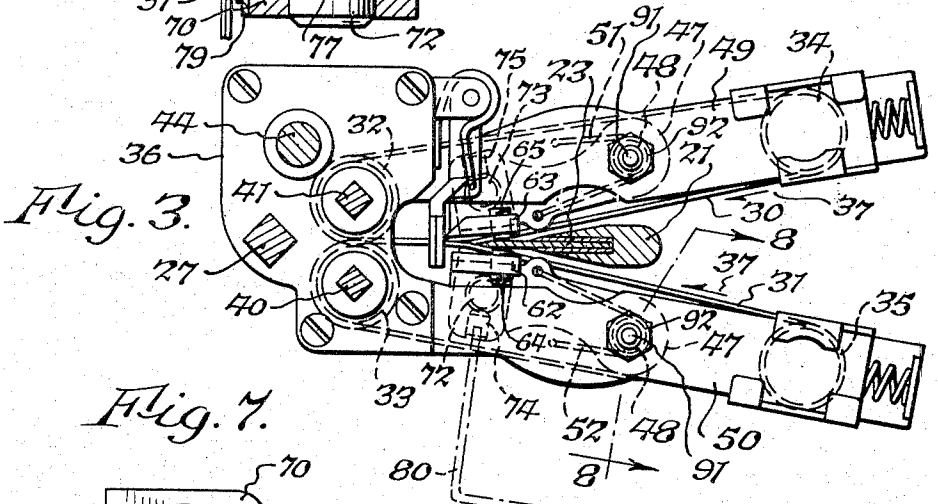


Fig. 7.

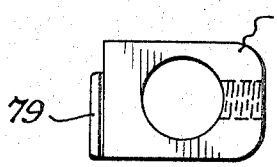
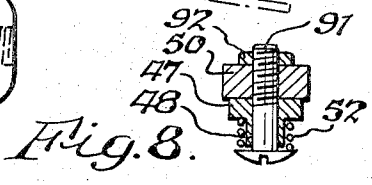


Fig. 8.



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3,350,818

KNIFE SHARPENING MECHANISM

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Filed July 6, 1964, Ser. No. 380,496
5 Claims. (Cl. 51—246)

This invention relates to improvements in knife sharpening mechanisms for cutting machines of the type commonly used for cutting cloth and other sheet materials and in which the cutting is effected by a reciprocatory knife such as disclosed in Patent No. 2,563,921, dated Aug. 14, 1951 and Patent No. 2,790,235, dated Apr. 30, 1957.

It is customary to provide knife sharpening mechanisms of this type with sharpening abrasive belts having various grain sizes to obtaining coarse or fine finishes on the cutting edge of the knife as may be required for cutting different types of materials. The thickness of these belts varies according to the grain size and consequently the spaces between the knife and the projections on the pressure shoes which hold the abrasive belts against the side bevels of the knife will vary in accordance with the belt thickness.

In order to maintain a uniform spacing or clearance, it has been necessary to have a variety of shoes with different projections for each belt thickness. It has also been necessary for users of the machines to change shoes, depending upon whether they use fine, medium or coarse belts.

It is an object of this invention to provide the pressure shoes with adjustable projections which can be readily set to maintain uniform spacing, regardless of the belt thickness.

Furthermore when adjusting the angularity of the part which presses the belt against the knife, an adjustment must be made in the projection described in the previous paragraph so as to maintain the same relative spacing between these two parts.

A further object is to provide a mechanism of this kind with means for readily adjusting the angularity of the face of the part which presses the belt against the knife so as to change the angle of the bevel leading to the cutting edge of the knife to provide a blunt or thin edge of the knife, without substituting different parts on the cutting mechanism.

In the accompanying drawings:

FIG. 1 is a side elevation of a cloth cutting machine provided with knife sharpening mechanism embodying this invention.

FIG. 2 is a fragmentary sectional elevation thereof on line 2—2, FIG. 1.

FIG. 3 is a plan view thereof on line 3—3, FIG. 1.

FIG. 4 is a horizontal, sectional plan view on an enlarged scale taken on the line 4—4, FIG. 2, showing the pivoted arms or pressure shoes detached from the mechanism for positioning the abrasive belts relatively to the knife.

FIGS. 5 and 6 are detached side elevations of the pivoted arms or pressure shoes.

FIG. 7 is a plan view of one of the adjustable blocks.

FIG. 8 is a vertical, cross sectional view showing the pivotal construction of a pressure shoe taken along the line 8—8, FIG. 3.

I have shown in the accompanying drawings my improvements as applied by way of example to a cutting machine similar to the one shown in said Patent No. 2,790,235. The machine comprises the usual base 20 adapted to rest on and to be moved about on a table which supports the lay of material to be cut. An upright, slender standard 21 is rigidly secured on the base and rises upwardly therefrom and supports the stationary frame 22 of an electric motor which reciprocates the knife 23 in a

vertical guide at the front of the standard 21 through suitable driving mechanism (not shown). 25 represents the usual presser foot arranged on the lower end of a guide bar 27 which extends vertically in front of the knife and is suitably mounted for vertical adjustment on the machine to set the presser foot at different levels according to the thickness of different lays or piles of material to be cut.

The knife in the particular machine illustrated in the drawings is sharpened by grinding means comprising two narrow abrasive bands or belts 30 and 31 which are disposed at opposite sides of the knife to travel crosswise of the same in contact with the opposite sides of the knife edge, and these belts pass around two front drive pulleys 32 and 33 and rear spring-pressed belt tension pulleys 34 and 35 in the direction indicated by the arrows 37, FIG. 3. These belts are power-driven by the knife-operating motor and are mounted on the underside of a grinder carriage 36, arranged to move up and down lengthwise of the knife edge to enable the belts to sharpen the knife edge throughout its full length. This carriage 36 together with the various parts mounted thereon is movable vertically relatively to a housing or cover piece 38 which is removably secured in place on the motor frame 22 at the front of the machine and encloses parts of the knife-operating and sharpening mechanisms. The grinder carriage may be mounted and guided in its up and down movements in any suitable or desired manner, for example, as disclosed in said patent, No. 2,563,921, and an earlier patent, No. 2,183,786, issued Dec. 19, 1939 to Eastman Machine Company, assignee.

In the construction illustrated by way of example, the drive pulleys 32 and 33 are fixed on the lower ends of two vertical shafts 40 and 41 which are rotatable and held against axial movement relatively to the carriage 36 so that these shafts may move up and down with the carriage. These shafts are rotated by intermeshing pinions (not shown) arranged in the housing part 38 of the machine and suitably driven from the motor as has heretofore been customary.

The mechanism for producing the up and down travel of the grinder carriage 36 and the parts mounted thereon along the knife edge preferably includes a screw shaft 44 having crossing right and left hand threads and which is suitably rotated through gearing, not shown.

In order to support the means for adjusting the abrasive belts so they can operate on belts of varying thickness, due to different grain sizes, I have provided the adjusting means on arms or shoes 47 pivoted on their pivotal studs 48 on the lower face of the two rearwardly projecting extensions 49 and 50 of the grinder carriage 36. The pivotal studs are mounted on the extensions 49 and 50 as shown in FIG. 8 by screws 91 threaded into these extensions and having lock nuts 92. The outer ends of these arms 47 are urged by springs 51 and 52 toward the edge of the knife 23, one end of each spring engaging in a hole 55 of each arm and the other end being fixed on the extensions 49 and 50 of the carriage 36. Near the outer ends of the pivoted arms or shoes 47 I have provided extensions 62 and 63 preferably formed integral with the shoes and arranged at opposite sides of the knife and extending upwardly above the abrasive belts. Near the ends of these extensions, I have provided set screws 64 and 65 having their ends extending toward the opposite sides of the knife and engaging in threaded holes in the arms 62 and 63. These set screws are thus adjustable to be moved toward or away from the knife, as required by the thickness of the belt. These set screws are held frictionally to prevent them from moving out of their adjusted positions, due to vibration. The set screws, may for example, be of the kind readily available and having nylon plugs extending laterally and out of the

screws into engagement with the internal threads of the holes in which the set screws engage. Consequently, by adjustment of the set screws **64** and **65**, the distance of the set screws relatively to the knife can be controlled as required for the thickness of the belts employed. These set screws, when the grinder carriage is in its upper, inoperative position, are spaced from the knife, but when the carriage moves downwardly for sharpening the knife, the set screws can move into engagement with at least a portion of the knife to hold the abrasive belts in correct relation to the knife.

It is also desirable to adjust the angularity of the bevel of the cutting edge of the knife by adjusting the angularity of the faces of the guide blocks which press the belt against the knife. For this purpose I have provided guide blocks **70** and **71** which have faces which press the belts against the knife. These guide blocks are pivotally mounted on studs or pivot members **72** and **73** secured to or formed integral with the brackets **62** and **63**. These blocks are secured in adjusted positions on the studs by means of set screws **74** and **75** engaging the studs **72** and **73**. Preferably these set screws engage in annular grooves **77** in the studs so that when the set screws are loosened to adjust the angularity of the blocks **70** and **71**, these blocks will not drop down out of engagement with these studs. Consequently, by adjusting the angularity of the blocks, they can be readily set to change the angle of the bevel of the knife edges. The blocks may of course have the usual hardened wear blocks **79** cemented or otherwise applied thereto. The set screws **74** and **75** are normally located back to the abrasive belts, but these belts can be flexed so that a key or wrench **80** can be readily inserted into the heads of these screws. Preferably the two pairs of set screws **64**, **65** and **74**, **75** are provided with the same type of recesses, such as hexagon or spline type, so that one wrench or key can be used for all of the set screws. When adjusting the angularity of the blocks **70** and **71**, the wrench or key **80** also acts as a lever to aid in swinging each block into the desired position.

The construction described thus makes it possible to adjust the cutting mechanism for operating on belts of different thicknesses and also to adjust the guide blocks for different angularities of the bevel of the cutting edge of the knife without removing the arms or pressure shoes from the sharpener carriage and replacing them with others.

It will be understood that various changes in the details, materials and arrangements of parts which have been herein described and illustrated in order to explain the nature of the invention may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. In a knife sharpening mechanism for cutting machines having a knife with a cutting edge guided for reciprocal motion,

(a) a grinder carriage movable to and fro along the knife edge and having sharpening abrasive belts mounted thereon for movement into and out of engagement with the cutting edge,

(b) arms pivoted on said carriage at opposite sides of said knife and having their free ends spring-urged toward said knife, means on said arms for pressing said abrasive belts against the cutting edge,

(c) a bracket on each pivoted arm and having an extension projecting upwardly into close proximity to the knife, and

(d) a part on said extension adjustable toward and from said knife to compensate for variations in thickness of said belt.

2. A knife sharpening mechanism according to claim **1** in which said adjustable part on said extension is in the form of a set screw having one end thereof extending into close proximity to the knife and positioned to engage a side of said knife if the abrasive belt breaks.

3. In a knife sharpening mechanism for cutting machines having a knife with a cutting edge guided for reciprocal motion,

(a) a grinder carriage movable to and fro along the knife edge and having sharpening abrasive belts mounted thereon for movement into and out of engagement with the cutting edge,

(b) arms pivoted on said carriage at opposite sides of said knife and having their free ends spring-urged toward said knife,

(c) guide blocks positioned to engage said belts for positioning the knife-engaging portions of said belts in the desired angular relation to the cutting edge,

(d) pivot studs on said arms on which said guide blocks are supported,

(e) set screws securing said guide blocks in the desired angular relation to said studs, and

(f) said pivot studs having annular grooves in which the ends of set screws engage to hold said guide blocks from inadvertently becoming removed from said pivot studs.

4. In a knife sharpening mechanism for cutting machines having a knife with a cutting edge guided for reciprocal motion,

(a) a grinder carriage movable to and fro along the knife edge and having sharpening abrasive belts mounted thereon for movement into and out of engagement with the cutting edge,

(b) arms pivoted on said carriage at opposite sides of said knife and having their free ends spring-urged toward said knife, means on said arms for pressing said abrasive belts against the cutting edge,

(c) a bracket on each pivoted arm and having an extension projecting upwardly into close proximity to the knife, and

(d) a part on said extension adjustable toward and from said knife to compensate for variations in thickness of said belt,

(e) a downwardly extending pivot stud on each of said brackets,

(f) guide blocks pivotally mounted on said studs for engaging said belts at their contacts with said knife edge, and

(g) clamping means for securing said guide blocks on said pivot studs in desired angular relation to said knife blade.

5. A knife sharpening mechanism according to claim **4** in which said adjustable parts on said extension are set screws and in which said clamping means on said guide blocks are set screws,

(a) both of said sets of set screws having similarly formed heads, and

(b) a single key formed to cooperate with all of said set screws.

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LESTER M. SWINGLE, *Primary Examiner.*