V. E. DOBBS.

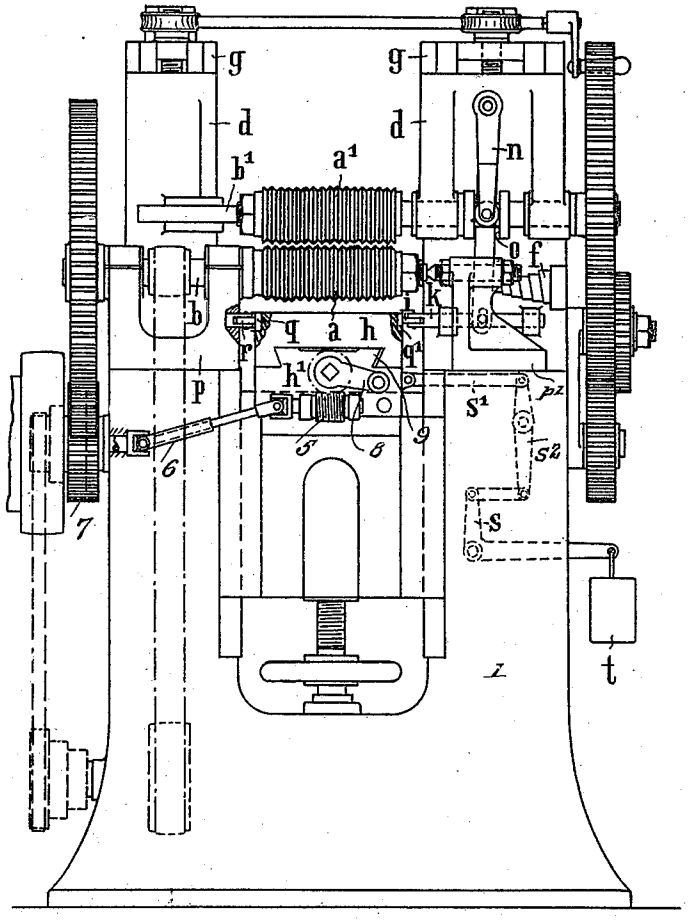
MACHINE FOR MILLING SLICING KNIVES.

APPLICATION FILED FEB. 8, 1910.

975,839. Patented Nov. 15, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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3 SHEETS—SHEET 2

Fig. 2.

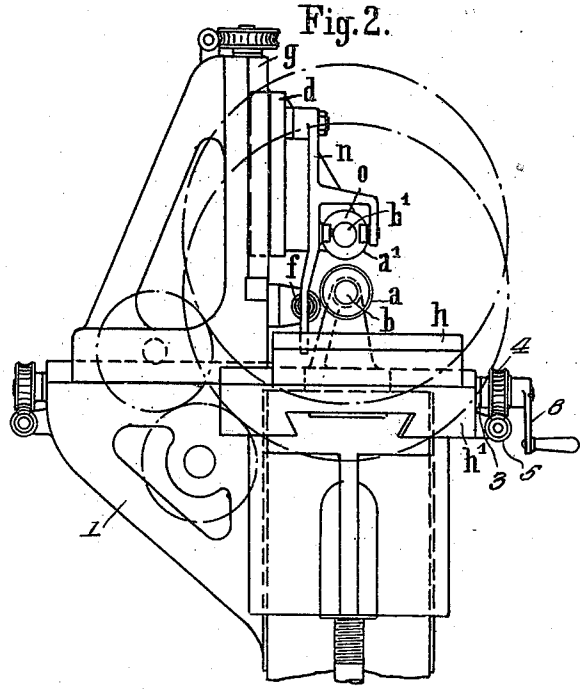


Fig. 6.

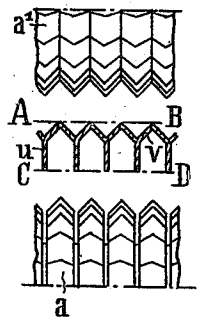


Fig. 4.

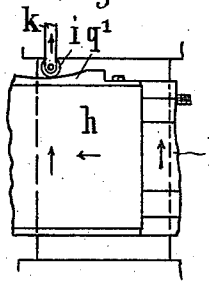


Fig. 3.

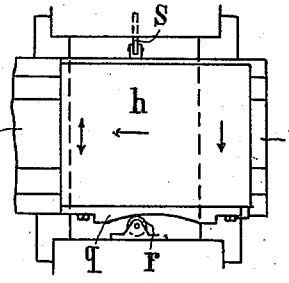
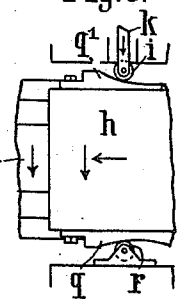


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 7.

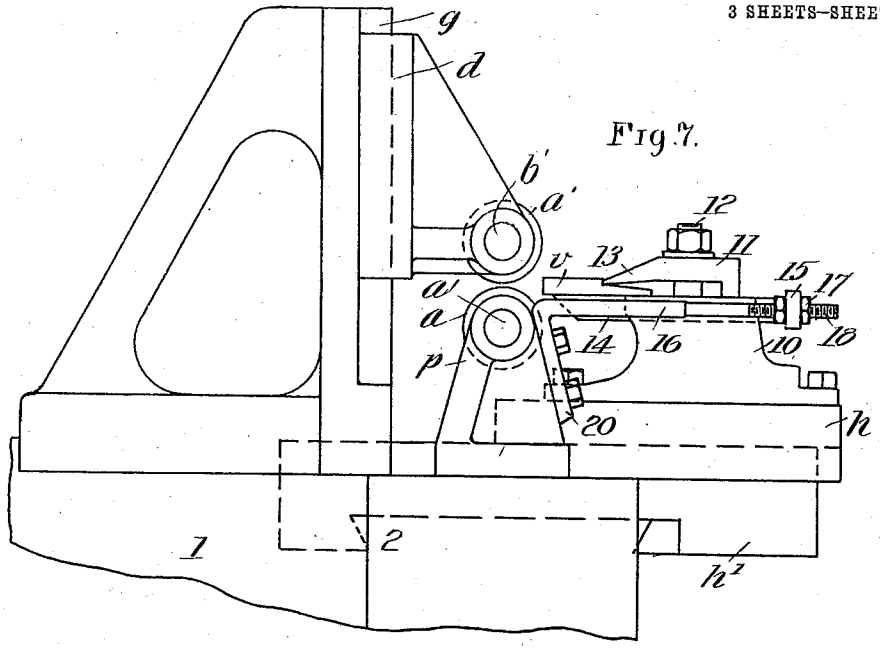
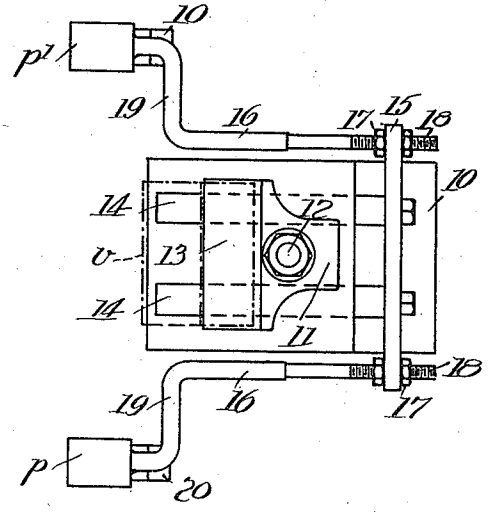


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

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MACHINE FOR MILLING SLICING-KNIVES.

975,839. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed February 8, 1910. Serial No. 542,799.

To all whom it may concern:

Be it known that I, VICTOR EUGEN DOBBS, a subject of the King of Great Britain and Ireland, residing at No. 12, Akazienstrasse, Köthen, Anhalt, Germany, have invented certain new and useful Improvements Relating to Machines for Milling Slicing-Knives, of which the following is a specification.

The present invention has reference to an improved machine for milling the grooves in slicing knives such as beet slicing knives and in particular in what are called roof ridge knives, that is to say knives in which thin continuous ribs are formed on the ridges separating the separate grooves one from the other. Heretofore knives of this kind have been manufactured by clamping them so that they were supported on their lower surface by a worktable, treating them on one side with cylindrical milling cutters and then reversing them or transferring them to a second machine in order to clamp and treat the other side in the same manner. This method has been found to be slow and inconvenient and to present difficulties in clamping the knives in such a manner that the teeth on one side of the knife present a given position as regards those on the other side, as is necessary. These defects and difficulties are obviated by the machine under the present invention owing to the fact that the work is so clamped that it is acted upon by a milling tool on its upper and lower sides simultaneously.

It is already known to work beet slicing knives simultaneously from above and below with two cylindrical grinding tools. Machines of this kind as heretofore constructed are not, however, intended or suitable for forming slicing knives from solid material, but only serve to sharpen the front cutting edges on the known slicing knives pressed out of sheet metal.

An embodiment of the invention is illustrated diagrammatically by way of example in the accompanying drawing, in which:—

Figure 1 is a front elevation. Fig. 2 is a side view of the machine, parts being removed. Figs. 3, 4 and 5 show in plan the means for moving the support laterally when curved incisions are to be formed. Fig. 6 is a cross section drawn to a larger scale through a roof ridge knife and the two milling tools serving to mill it simultaneously on both sides, these latter being shown separated from the work for the sake of clearness. Fig. 7 is a side view of part of the machine, the view showing the clamping device for the work in position on the carriage. Fig. 8 is a detail view of the clamping device.

The milling tools a, a' are mounted on the spindles b, b' driven by suitable gearing as shown in the drawing. These tools or cutters are in the form of milling rollers, the milling edges of which each consists of a plurality of teeth separated by intervals, as is usual in milling tools. The two cutters are staggered relatively to each other by half the pitch so that the interval between them describes a zig-zag line. The slicing knife v which in its finished condition carries the roof ridges u on its under side, but which before treatment represents a solid steel plate of the thickness indicated by the two broken lines A—B and C—D (see Fig. 6) is caused to traverse this interval. The blank of steel to be worked is clamped only on the back end which is not to be milled, so that the whole forward end of the blank, which has to be provided with grooves on the upper and lower faces, is free on the upper, lower and front side for the milling action of the upper and lower tools simultaneously, and consequently there is no necessity for the work to be unclamped and reclamped.

The spindle b' is carried by carriages d displaceable upward and downward on the uprights g, these latter being themselves movable at right angles to the direction of displacement of the carriages d.

The frame 1 of the machine is provided with a dovetail guide 2 extending parallel with the cutters. On this guide is mounted a carriage or slide h' having a corresponding dovetail groove. The carriage h' can only move in a horizontal plane and in a direction parallel with the axes of the milling rollers. In the carriage h' is journaled in suitable bearings a screw spindle 3 driven by a screw wheel 4, worm 5, Cardan's shaft 6 and gear wheel 7. Instead of employing the gearing the spindle 3 may be turned by the crank arm 8.

A carriage h, which carries the work holder, is guided on a dovetail guide 9 secured to or made integral with the carriage h'. By means of the spindle 3 the carriage h may be displaced horizontally at right angles to the axes of the milling rollers

a a'. When the carriage h' is free to move on the guide 2, the carriage h is free to move with the carriage h' laterally, parallel with the axes of the rollers, and is also free to move independently on the guide 9, in a direction at right angles to the before mentioned movement. If, however, the carriage h' is secured by screws or other suitable means to the frame 1 or guide 2, so that it cannot move, then the carriage h can only move in a direction at right angles to the axes of the milling rollers.

The device for clamping the work is shown in Figs. 7 and 8, and consists of a frame 10 secured to the carriage h, and a bridge piece 11 secured to the frame 10 by a screw 12 the bridge piece having a tapered tongue 13. The work is clamped between the frame 10 and the bridge piece. Two supports 14 are provided, the supports being secured to a rail 15. Arms 16 extend through the rail 15 and are secured to the rail by means of nuts 17 engaging screw threads 18 formed on the ends of the arms 16. The arms 16 are bent outwardly as shown at 19, Fig. 8, and have on their ends flanges 20 extending downwardly. One of these flanges is secured to the headstock p of the machine and the other flange is secured to the cutter stock p'. By means of the arms 16, the rail 15 and supports 14 are held stationary during the movement of the carriage h and the frame 10, which carries the work v against the milling rollers a and a'. The supports 14 prevent the work from being bent or distorted at the beginning of the milling operation. As the work advances between the tools it is free on both faces as the supports 14 remain stationary.

If the milling is to be effected so that the ridges and grooves of the knife will be in straight lines on the upper and on the lower side, the carriage h' is secured to the frame 1 or guide 2, and the carriage h with the work clamped thereon is driven forward to carry the work against the milling rollers.

In addition to rectilinear cutting the machine is able to execute curved cuts on one or both sides. The machine is provided with special means to enable this to be effected.

The means enabling curved grooves to be formed on both sides of the knives is as follows: As shown on the right hand side of Fig. 1, a thrust bar s' is pivotally connected with the carriage h' and with a lever s^2, the latter being connected by a link with a lever s to which a weight t is attached. Under the influence of the weight t and levers the thrust bar tends to press the carriage h' and the carriage h in the left hand direction. A curved sliding member (rail q) is detachably mounted on the carriage h and acts in opposition to this pressure. The member q rests against a roller r fixed to the headstock p, Figs. 1 and 3.

If knives are to be made having curved ridges and grooves on their upper and lower sides the carriage h' is free to move laterally, and the curved member q is fixed to the carriage h. The knife blank clamped on the carriage h is fed longitudinally against the milling roller, and at the same time the carriage is moved laterally to the right hand side according to the curvature of the curved member q.

If the knives are to be formed with curved grooves on their upper sides and straight grooves on their lower sides the lower carriage h' is fixed so that it is unable to move laterally and the curved member q is detached from the carriage h. The work clamped on the carriage h is cut in a straight line on its lower side when the carriage h moves forward. In order to produce a curved milling on the upper side a curved slide member (rail q') is arranged on the carriage h on the right hand side.

The curved member q', Figs. 1 and 4, acts upon a roller i journaled on a rod k which latter is engaged by a lever n having in its lower end a slot in which projects a pin fixed to the rod k. The lever n is pivoted at its upper end on a bolt screwed in the right hand carriage d and extends downwardly. The middle part of the lever n is provided with a forwardly projecting angular arm on which, as well as on the middle part of the lever n, are journaled rollers engaging the notch of a collar o secured rigidly to the spindle or shaft b' of the upper milling roller a', the spindle b' being adjustable laterally in its bearings. A spring f presses against the lever n and holds the roller i against the curved member q'. In forming the member q' regard must be had to the leverage of the lever n. Now if the carriage h is moved by the screw spindle 3 to carry the work against the cutters a a', the curved member q' fixed to the carriage h pushes the roller i and rod k outwardly to the right. The lever n is also swung outwardly to the right and the spindle b' and milling roller a' are moved laterally to the right hand side. The member q' being curved, ridges and grooves curved correspondingly are formed in the upper side of the work. The carriage h' being fixed in position, the carriage h can only move in a straight line at right angles to the axes of the milling rollers, and the knife blank clamped on the carriage h receives straight ridges and grooves on its under side.

If knives are to be formed in which the ridges and grooves, are curved, for instance, much greater on the lower side than on the upper side, the curved member q remains on the carriage h and a member q' curved correspondingly is secured to the right hand side

of the carriage h. If now the carriage h is advanced by the spindle 3, it is moved laterally by the curved member q, and the curved ridges and grooves formed on the lower side of the knife blank by the lower milling roller a correspond to the curvature of the curved member q. The curvature of the ridges and grooves in the upper side of the knife blank however corresponds only to the difference between the curvatures of the members q and q'.

When the above described mechanisms, for moving the carriage for the work laterally, and for moving the upper milling roller laterally, are both employed the slide members q and q', Fig. 5, are formed in correspondence with the form desired for the grooves.

It will be seen that a very great number of variations in the curvature of the ridges and grooves may be obtained by using and combining various differently curved members q and q'.

If knives are to be made the ridges and grooves of which are straight on the upper side and are curved corresponding to the curvature of the member q on the lower side, the curvature of the member q' is so calculated that the upper roller a' is moved thereby to the right synchronously and in the same degree as the carriage h and the blank are moved by the curved member q. Therefore the lateral movements of the blank and the upper roller a' are absolutely the same and the resulting action is the same as if neither the knife blank nor the milling roller a' had a lateral movement, and straight ridges and grooves are formed in the upper side of the knife blank. The lower roller not having lateral movement, cuts in the lower side of the knife blank curved grooves corresponding to the curvature of the member q.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A machine for milling beet slicing knives and other steel slicing knives, comprising two milling rollers arranged one above the other, and each consisting of a plurality of annular milling edges each of which is formed by a plurality of cutting teeth separated by intervals.

2. A machine for milling beet slicing knives and other steel slicing knives, comprising two milling rollers arranged one above the other, and each consisting of a plurality of annular milling edges, each of which is formed by a plurality of cutting teeth separated by intervals, the two milling rollers being staggered relatively to each other by half the pitch, so that the interval between them describes a zig zag line.

3. A machine for milling beet slicing knives and other steel slicing knives, comprising the combination of two milling rollers arranged one above the other, and each consisting of a plurality of annular milling edges, each consisting of a plurality of cutting teeth separated by intervals, and means for clamping the blank, so that the under side, front side and upper side of the part of the blank to be milled are free for the simultaneous milling action of the rollers.

4. A machine for milling beet slicing knives and other steel slicing knives, comprising the combination of two milling rollers arranged one above the other and each consisting of a plurality of annular milling edges each of which has a plurality of teeth separated by intervals, the two milling rollers being staggered relatively to each other by half the pitch, and means for clamping the blank, so that the under side, front side and upper side of the part of the blank to be milled are free for the simultaneous milling action of the rollers.

5. A machine for milling beet slicing knives and other steel slicing knives, comprising two milling rollers arranged one above the other and each consisting of a plurality of annular milling edges, each of which has a plurality of teeth separated by intervals, a blank carrying carriage, a lower carriage on which the blank-carrying carriage is moved horizontally at right angles to the axes of the rollers, the said lower carriage being movable on the main frame of the machine in a direction parallel with the axes of the rollers, and adapted to be rigidly fixed on the main frame, and two curved sliding members detachably mounted on the upper carriage, and adapted to move respectively the carriage and one of the milling rollers laterally in a direction parallel to the axes of the rollers.

6. A machine for milling beet slicing knives and other steel slicing knives, comprising two milling rollers arranged one above the other and each consisting of a plurality of annular milling edges each of which has a plurality of teeth separated by intervals, a blank-carrying carriage, a lower carriage on which the blank-carrying carriage is movable horizontally at right angles to the axes of the rollers, the said lower carriage being movable on the main frame of the machine in a direction parallel with the axes of the rollers, and adapted to be rigidly fixed to said main frame, two curved sliding members detachably mounted on said upper carriage and adapted to move respectively the carriage and one of said rollers laterally in a direction parallel with the axes of the rollers, the two curved sliding members being similar, and the lateral movements of the carriage and roller being synchronous and equal.

7. In a machine for milling slicing knives, the combination with the milling rollers for acting on both sides of the work simultane-

ously, of a carriage having lateral movement, a second carriage mounted to move on the first carriage toward and from the milling rollers and provided with means for clamping the work, a curved member detachably secured to one side of said second carriage, a roller secured to a fixed part of the machine and adapted to be engaged by said curved member, and means for holding the curved member in engagement with the said roller during the feeding of the work.

8. In a machine for milling slicing knives, the combination with the milling rollers for acting on both sides of the work somultaneously, of a carriage adapted to have lateral movement, a second carriage mounted to move on the first carriage toward and from the milling rollers and provided with means for holding the work, the said second carriage moving laterally with the first mentioned carriage, and having a curved member detachably secured to one side thereof, a roller secured to a fixed support and adapted to be engaged by the said curved member, a thrust bar connected with the first mentioned carriage, and means connected with the thrust bar and pressing on the same to hold the said curved member in contact with the said roller during the feeding of the work.

9. In a machine for milling slicing knives, the combination with the upper and lower milling rollers for acting on both sides of the work simultaneously, of a carriage for carrying the work to the milling rollers, one of said milling rollers being mounted to have lateral movement, a lever for moving the said roller laterally, a curved member detachably secured to one side of the carriage, a rod mounted to slide and connected with the lever, the said rod being provided with a roller engaging said curved member, a spring pressing said lever to maintain the roller in contact with said curved member, and means for moving the carriage to carry the work to the milling rollers, the said rod being moved laterally in correspondence with the curvature of said curved member thereby moving the lever to shift the said milling roller laterally.

10. In a machine for milling slicing knives, the combination with the work holder for clamping the work, and an upper and a lower milling roller for acting on both sides of the work simultaneously, of mechanism for moving the work holder transversely of the direction of feed of the work holder, and mechanism for moving one of the milling rollers transversely of the direction of feed of the work holder.

11. In a machine for milling slicing knives, the combination with the upper and lower milling rollers for acting on both sides of the work simultaneously, a carriage for moving the work forward to the rollers, the said carriage being mounted to have lateral movement, and the upper milling roller being mounted to have lateral movement at right angles to the feed of the work, of curved members detachably secured to opposite sides of said carriage, a device engaged by one of said curved members to move the carriage with the work laterally, when the work is fed forward to the rollers, and mechanism actuated by the other curved member to move the upper milling roller laterally.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

VICTOR EUGEN DOBBS.

Witnesses:
PAUL SCHULZE,
ALBIN CHRÏST.