

July 14, 1931.

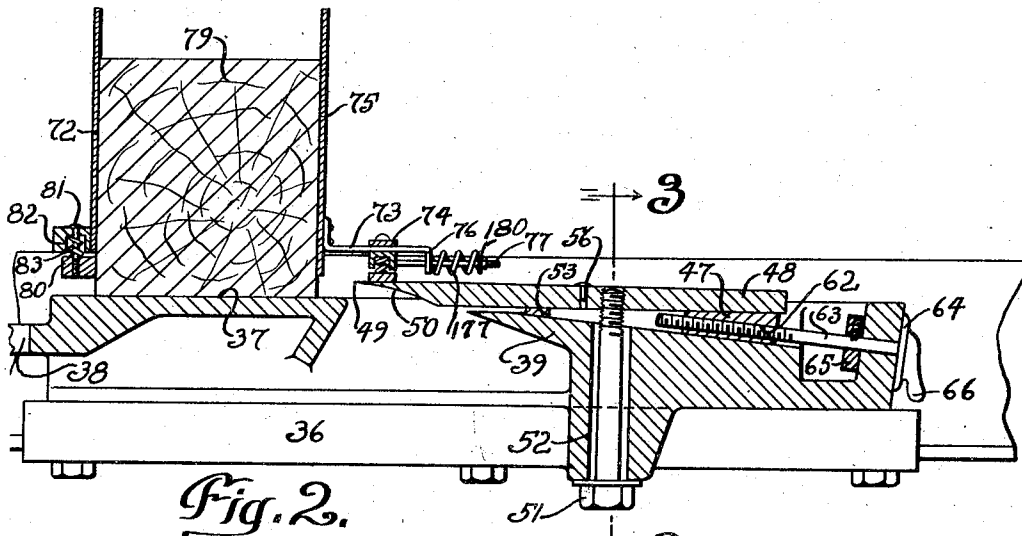
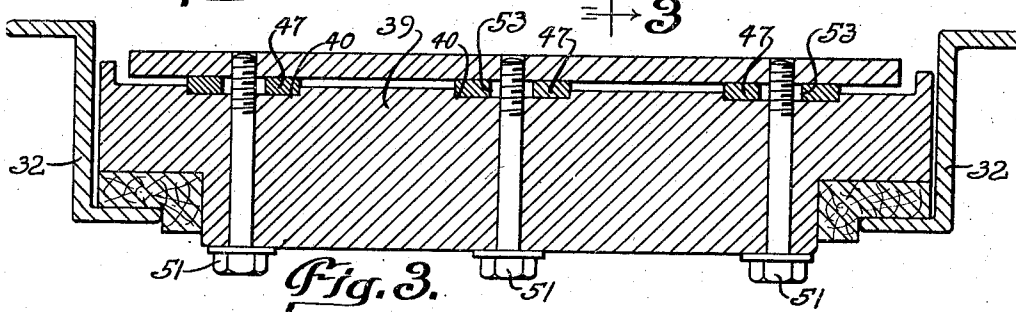
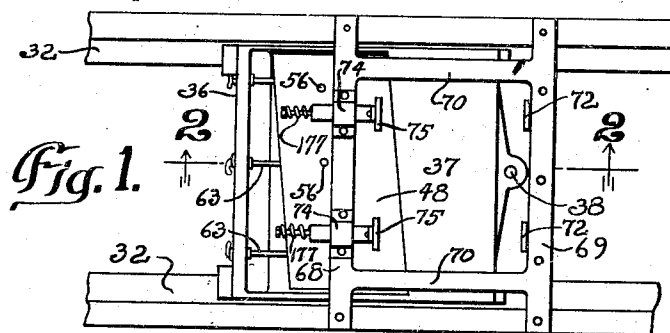
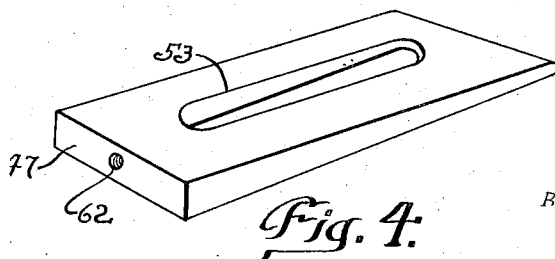
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1,814,726

RIVING MACHINE

Filed Aug. 27, 1928

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

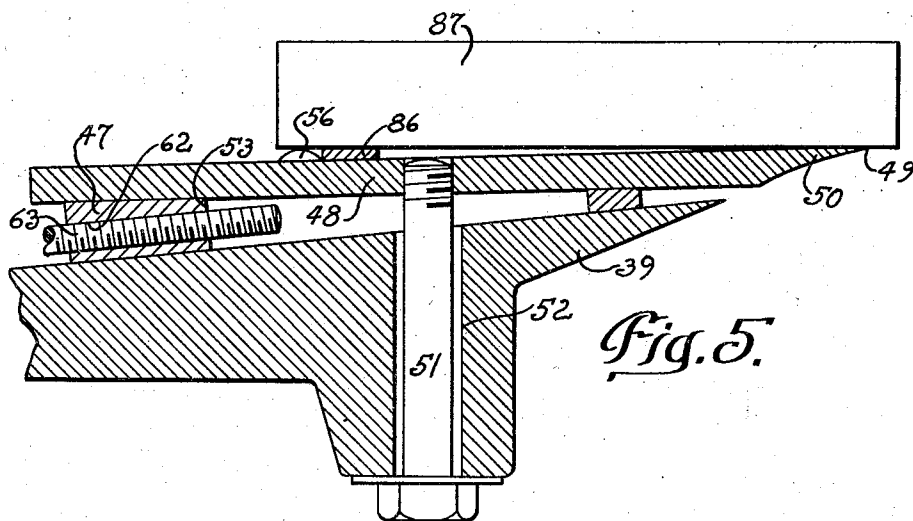
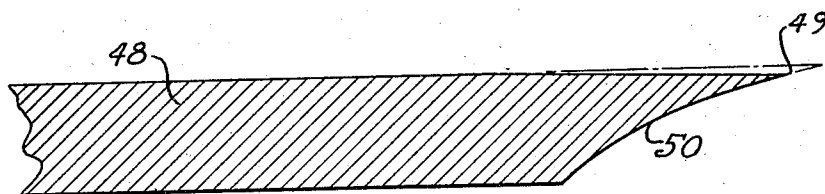


Fig. 6.

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RIVING MACHINE

Application filed August 27, 1928. Serial No. 302,209.

This invention relates to riving machines and particularly to that type thereof wherein a knife is moved against a relatively stationary block of wood in order to remove veneer-like strips from the same, the principal object being the provision of a new and novel construction permitting more accurate work to be accomplished and longer periods of time between removal of the knife from the machine for sharpening.

10 Another object is to provide a riving machine with a knife so constructed as to have a minimum of frictional contact with the block of wood being worked upon, thereby preventing distortion of the knife because
15 of rise in temperature due to friction between the same and the block.

Another object is to provide a riving machine in which the knife is positioned with the cutting edge above the body of the
20 knife, means having a minimum surface of contact being provided in connection with the body, whereby the block of wood being worked upon is maintained out of contact with the body of the knife during
25 passage of the knife under the same.

Another object is to provide a riving machine with a knife carriage and knife so constructed as to permit grinding of the knife without necessitating its removal
30 from the carriage.

Another object is to provide quickly adjustable and easily operated means for adjusting the position of the knife of a riving machine.

35 Another object is to provide a novel hopper construction for riving machines.

A further object is to provide a new and novel kick-out means for the hoppers of riving machines.

40 The above being among the objects of the present invention, the same consists in certain features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawings, and then claimed, having the above
45 and other objects in view.

In the accompanying drawings which show suitable embodiments of the present
50 invention and in which like numerals refer

to like parts throughout the several different views,—

Fig. 1 is a more or less diagrammatic fragmentary plan view of a riving machine.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a perspective view of one of the wedge members employed for adjusting the vertical position of the knife.

Fig. 5 is an enlarged fragmentary vertical sectional view taken through the knife in a direction at right angles to its cutting edge and illustrating the method employed for honing the cutting edge of the same without removing the knife from the machine.

Fig. 6 is an enlarged fragmentary view similar to Fig. 5 showing how the cutting edge is reinforced by the metal of the knife as the cutting edge is honed down.

In riving machines of the type herein disclosed, difficulties have arisen in connection with conventional constructions which have had the effect of increasing the cost of production of the article being manufactured and often caused an inferior article to be produced. These machines, as is commonly known, are employed for splitting from a block of wood thin sheets which are usually referred to as "veneer". It is usually essential that such sheets are absolutely smooth and of uniform thickness. By uniform thickness is meant not only an equal thickness over all parts of the same strip of veneer, but also that all strips of veneer which are cut from the same block are of the same thickness. Heretofore the constructions have been such that if the machine was driven at a speed to obtain a maximum production the knife blade became heated to such an extent as to warp, and such warping invariably results in a variation in the thickness of the veneer being cut. The result is that in conventional constructions the machine must be driven at a rate considerably lower than it would otherwise be possible to drive it if the product is to be kept uniformly accurate, and

frequent periods of rest to allow the knife to cool are also necessitated. Furthermore, in conventional constructions, as far as I am aware, it is not only impossible to sharpen the knife in the machine, but in event
 5 that the knife must be reground it is necessary to remove the knife from the cutter head or table, necessitating re-adjustment of the knife upon replacing it. In view of the
 10 fact that the stock from which the blocks of wood employed for forming the veneer often contains grains of sand which nick the cutting edge of the knife when they come in contact therewith, and in view of the fact
 15 that in the constructions as heretofore made the adjustment of the knife blade on the table is a relatively delicate operation necessitating the services of a skilled workman and waste of considerable time, the inability
 20 to readily sharpen the knife blade presents a serious difficulty that has not heretofore been avoided as far as I am aware.

By the employment of the present invention I provide a machine of the type described in which the cutter head or table
 25 may be caused to reciprocate at a maximum rate without endangering heating of the knife blade to such an extent as to cause warpage of the same, and furthermore, the knife blade may be dressed while in the
 30 machine to remove minor irregularities of the cutting edge such as may be caused by contact with the grain of sand or other foreign matter in the stock. Furthermore,
 35 the construction is such that for major damage to the cutting edge of the knife, the cutter head or table may be removed and the knife ground by suitable means without removing it from the head or table. In
 40 addition to this, in those cases where the knife becomes so worn or damaged as to necessitate complete regrinding, it may be removed from the cutter head or table and reground and then replaced and accurately
 45 re-adjusted in a minimum length of time by reason of special means provided for this purpose. By the employment of other features of the present invention as hereinafter pointed out, the production of veneering is
 50 further speeded up, thereby resulting in great economy in the manufacture of such veneering.

Referring to the accompanying drawings I show more or less diagrammatically in
 55 Fig. 1 a fragmentary view of a machine of a type particularly suited for the practice of the present invention. This machine includes a pair of ways 32 on which is supported and on which slides a cutter head
 60 comprising a frame portion 36 provided with a horizontal raised table portion 37 extending at a slight angle to a line perpendicular to the direction of movement of the cutter head, as in conventional constructions.
 65 The frame 36 is provided with an eye 38 for

connection to the usual driving rod (not shown).

The frame 36 is also provided with a raised supporting portion 39 which extends substantially perpendicularly to the adjacent edge of the table and which terminates
 70 in spaced but adjacent relationship with respect to such edge. The upper surface of the portion 39 extends angularly downwardly from the edge thereof nearest the table
 75 37 and is provided with two or more grooves 40, depending upon the length of the knife, in such surface. In each of the grooves 40 is slidably received a wedge member 47 positioned with its thickest end away from the
 80 table 37, and supported on the wedges 47 is the knife 48 positioned with its cutting edge substantially in vertical alignment with the adjacent edge of the table 37 and spaced upwardly therefrom.

The wedges 47 are of slightly less angle between their upper and lower faces than the angle of the surfaces of the grooves 40 with respect to the horizontal, so that when
 85 the wedges 47 are received in their respective grooves 40, the upper surface of the wedges still extend downwardly towards the back edge of the cutter head. The knife 48 throughout its body portion is of equal
 90 thickness and its cutting edge 49 is formed by cutting away or bevelling the lower face of the knife as at 50. Thus it will be apparent that the upper face of the knife 48 is flat throughout its length and width
 95 and is disposed at an angle to the horizontal with the cutting edge at its highest point. The knife 48 is secured against movement to the frame by means of bolts 51 which extend upwardly through elongated openings
 100 52 in the portion 39, through elongated slots 53 in the corresponding wedges 47, and are threaded into the knife 48. It will be apparent that inasmuch as the body of the knife 48 is of equal thickness that its upper surface extends downwardly from the cutting
 105 edge 49 towards the rear edge of the cutter head, and although this amount may be varied for different sizes and widths of knives, I prefer that the edge of the knife opposite the cutting edge 49 be dropped approximately one-eighth of an inch for each
 110 eight inches in width of the knife, below the cutting edge of the knife. Between the cutting edge 49 and the opposite edge of the knife and preferably approximately midway therebetween I provide a plurality of
 115 button members such as 56 on the upper surface of the knife. These button members which are relatively widely spaced, as indicated in Figs. 1 and 5 project above the upper surface of the knife an amount sufficient to make their upper surfaces lie in the same horizontal plane as the cutting edge 49.

The knife blade 48 is adjusted laterally so

that the cutting edge 49 lies approximately in vertical alignment with the adjacent edge of the table 37. The relative height of the cutting edge 49 above the top of the table 37 is adjusted by means of the wedges 47 moving in the grooves 40. In order to readily move the wedges 47 and as a means for indicating the amount which the knife 48 is raised or lowered with respect to table 37 I provide each wedge with a threaded opening 62 in its outer face and provide for each opening a threaded rod 63. Each rod 63 projects out through the rear edge of the frame 36 and on the outer face thereof is provided with a dial 64. A collar 65 is secured to the rod 63 on the inner side of the bar 36 and co-operates with the dial 64 to prevent axial movement of the rod 63 but does not prevent rotation thereof. Suitable indicating marks (not shown) are provided on the outer face of the frame 36 in co-operating relationship with each dial 64, and each dial 64 is provided with a handle 66 for facilitating the turning of the same.

In operation, when it is desired to adjust the cutting edge 49 with respect to the table 37, the bolts 51 are loosened and the handles 66 turned, thereby causing rotation of the rod 63 and consequent movement of the corresponding wedges 47 to cause the knife 48 to be either raised or lowered. By suitably proportioning the indications on the dials 64 with respect to the lead of the threads on the rods 63, the adjustment of the distance between the cutting edge 49 and the upper surface of the table 37, which governs the thickness of the veneer being cut, may be read directly in thousandths of an inch on the dials 64, as will be obvious. When this distance has been adjusted to the proper dimension, the bolts 51 are again tightened to lock the knife 48 in position. It may be noted here that the openings 52 are enlarged to permit lateral shifting of the knife 48 so as to be able to maintain the cutting edge 49 over the edge of the table 37 when the width of the knife 48 has been decreased due to repeated grinding of the cutting edge thereof. It will also be noted that when the knives 48 are of a relatively great length, as illustrated, they are, to a certain extent, flexible in the direction of their length and that by proper movement of the various wedges 47, either singly or in combination with each other, the cutting edge 49 may be maintained in a perfect line.

In order to feed the stock into the knife, what is commonly known as a hopper is employed. This may take the form of the construction illustrated in Figs. 1 and 2 and which comprises a frame having spaced transverse members 68 and 69 extending between the ways 32 in a direction substantially perpendicular to the cutting edge 49 and which are secured against movement to

the side bars or ways 32 by any suitable means. The members 68 and 69 are rigidly connected together by means of spaced cross members 70 extending perpendicularly thereto, and which thus forms between the members 68, 69 and 70 a rectangular frame which is adapted to receive the stock which will ordinarily be in the form of wooden blocks. Various sizes of hoppers may be provided for reception of various sizes of blocks of stock, as will be readily apparent. As in conventional constructions, the blocks are inserted in the rectangle formed by the members 68, 69 and 70 while the cutter head is reciprocating, and are fed down against the table 37 so that upon each movement of the cutter head towards right as viewed in Fig. 1, or to the left as viewed in Fig. 2, that portion of the block above the table 37, and below the cutter edge 49 is split from the block and is forced between the cutting edge 49 and table 37 into the space between them from which it drops beneath the cutter head and is removed in any suitable manner.

The hopper illustrated in the present case is of novel construction as will hereinafter be described. Secured to the member 69 by suitable angle brackets are a pair of spaced rigid vertically extending guide members 72. On the opposite member 68 and in opposite relationship to the members 72 are a pair of angle members 73 supported to slide thereon in the direction of the members 72 and held against the upper surface of the member 68 and guided in their sliding movement by straps 74 suitably secured to the upper face of the member 68. To the inner end of each of the members 73 is rigidly secured a vertically extending guide member 75 similar to the guide member 72. The outer end of each member 73 is bent downwardly as at 76, and bolt members 77 threaded into the member 68, extend outwardly therefrom and slidably project through the bent end portions 76. A coil spring 177 is held under compression between the outer face of each portion 76 and washers 180 secured on the outer end of each bolt 72. The spring 177 thus constantly urges the angle members 73 and guide members 75 towards the guide member 72.

In practice, the block of wood 79, constituting the stock from which the veneer is to be formed, is inserted between the guide members 72 and 75 and during reciprocation of the cutter head is manually or otherwise forced downwardly against the table 37 so as to be in a position to be acted upon by the knife 48 to split off veneer strips. The pressure of the springs 177 is so regulated that when downward pressure on the block 79 is relieved, the blocks 79 are maintained against further downward movement so that they will not inadvertently be presented to

the cutting knife, and thereby cause imperfect pieces of veneer, commonly known as "shims" to be removed from the blocks. It is to be noted that the members 73 are positioned on that side of the hopper opposite to which the pressure of the knife blade in cutting acts so that such pressure does not act against the springs 177 during the cutting operation.

In machines of this type as heretofore constructed, there has been one difficulty in connection with the hoppers as follows: The blocks 79 are not always of uniform thickness throughout their area and due to this fact, the slabs or unusable residue of each block are invariably of wedge shape, with the result that as soon as the narrow edge of the slab becomes of sufficiently small dimension to pass beneath the hopper frame, it is driven beneath it by the knife and often causes damage to the frame.

In the present invention I provide a construction which eliminates any possible damage from this cause. This is accomplished in the following manner: The lower faces of the members 68, 69 and 70 are provided with blocks or strips 80 which extend into nearly contacting relationship with respect to the cutting edge 49 of the knife 48. The blocks or strips 80 for the under side of the members 68 and 69 are secured in place by a plurality of vertical posts 81 which extend down through the corresponding member 68 or 69 and are threaded or otherwise suitably secured to the corresponding strips or blocks 80. The posts 81 are slidably received in the members 68 and 69. The lower faces of the members 68 and 69 are provided with a recess 82 about each post 81 and received about each post 81 in each recess 82 is a coil spring 83 held under tension between the bottom of the recess and the corresponding strip 80, and constantly urging the strips 80 downwardly away from its corresponding member 68 or 69. The post 81 is so adjusted that when its head contacts with the upper surface of the corresponding member 68 or 69, the corresponding strip 80 is downwardly spaced from the lower face of the corresponding member 68 or 69 a suitable amount such as a quarter of an inch or less. Any other suitable means of resiliently holding the blocks 80 in spaced relationship with respect to the lower face of the members 68 and 69 may be employed if desired, the construction shown being merely an illustration of one method. Although the corresponding strips on the under face of the members 70 may be supported similarly to the strips 80, in view of the fact that substantially no pressure will act on the slabs to force them under the same, I find it sufficient to rigidly secure such corresponding strips to the members 70 by any suitable

means. With this construction, as the blocks of stock are cut down until the last portion thereof, or slab, reaches the bottom of the hopper, the thinnest edge of the slab will be forced by the knife edge or other projection on the cutter head beneath one of the blocks 80, and the springs 83 which urge block downwardly will be compressed, thus allowing the block 80 to move up sufficiently to permit the slab to be ejected thereunder, and thus prevent wedging of the slab between the hopper and the table with consequent liability of damage.

As previously described, during operation of machine when the cutter head is reciprocating, blocks such as 79 are fed down into the hopper and the knife 48 in reciprocating with the cutter-head presents its cutting edge 49 to the block 79 so as to split that portion thereof below it off from the remainder of the block.

In positioning the knife 48 on the angle shown and described with the cutting edge 49 above the body of the knife, the lower surface of the block 79 in passing over the body of the knife will be held free of contact therewith so that there is no possible friction between the lower surface of the block and the upper surface of the knife. To further insure against such possible contact of the lower surface of the block with the upper surface of the knife and to prevent possible tipping of the block to the same angle as the knife so that it would come in contact with the upper surface thereof, the buttons 56 are provided and serve to support with their relatively small surface area the adjacent edge of the block during the cutting operation. As previously pointed out the friction between the lower face of the block of stock and the upper surface of the knife in conventional constructions generates sufficient heat to cause warping of the knife and consequent irregularities in the work being produced. It will be apparent from an examination of the drawings that a substantial portion of the lower surface area of the block of stock overlies the knife 48 during operation of the machine, and this is one of the reasons that such a great amount of heat is generated in conventional construction by contact of the block with the knife 48. I found that with the construction shown which enables me to keep the blocks 79 out of frictional contact with the knife body, no warping of the knife occurs and a uniform product results.

Furthermore, by positioning the knife 48 on the angle shown, should the cutting edge 49 become slightly nicked so as to present a groove or ridge in the surface of the veneer being cut, I am enabled to hone the upper face of the knife 48 at a the cutting edge 49 and remove the same while the cutter head is in the machine and without removing the

knife from the head. This may be easily done by placing a strip of brass 86 or other material on the upper surface of the knife 48 spaced sufficiently from the cutting edge 49 so that its upper surface lies in the same horizontal plane as the cutting edge 49 or slightly below the same as indicated in Fig. 5, and then by placing an abrasive block 87 between such strip and the cutting edge 49 and by moving the block, the nick may be honed out. If the nick is too large to readily be removed by such honing operation, the entire cutter head including the knife may be removed and placed on a surface grinder so that the upper surface of the knife including and immediately adjacent the cutting edge 49 may be ground horizontally to sharpen the knife. In this manner minor damage to the cutting edge 49 may be repaired without removing the knife from the head, and in view of the fact that the adjustment or re-adjustment of a knife with respect to the remainder of the cutter head to obtain the accurate work necessary is a relatively long and tedious job, necessitating the attention of a highly skilled workman, this feature is of major advantage.

This honing or grinding of the knife while still in the cutter head is, to a certain extent, beneficial rather than detrimental, the reason being that before the knife has been honed or ground at all, its cutting edge is extremely sharp as indicated by dotted lines in Fig. 6, and there is a relatively small amount of metal supporting such edge. On grinding or honing the cutting edge the angle between the opposite sides increases, due to the surface 50 being hollow ground, and thereby acts to reinforce the cutting edge and add to its strength. The flattened surface caused by such honing or grinding is so relatively small with respect to the entire surface area of the knife that the friction between it and the block of stock being cut is negligible. It will be apparent, of course, that when the knife is badly damaged or badly worn so as to require a complete re-grinding, the same may be removed from the cutter head and the bevelled surface 50 re-ground. In order to compensate for the decreasing in width of the knife due to the latter grinding operation, the openings 52 through which the bolts 51 extend are purposely enlarged to permit lateral adjustment of the knife. As previously explained, by the employment of the wedges 47 and dialed adjusting rods 63, the adjustment of the knife in the construction shown is greatly facilitated over the conventional constructions.

It will be apparent, of course, that the particular features of construction shown and described in the present application constitute but one embodiment of the present invention which may be varied to suit

the whims or necessities of the particular designer in order to accomplish the results disclosed, and formal changes may be made in the specific embodiment of the invention described without departing from the spirit or substance of the broad invention, the scope of which is commensurate with the appended claims.

What I claim is:

1. In a riving machine, in combination, a cutter head provided with a knife, means for directing stock into position to be operated upon by said knife, the cutting edge of said knife being positioned in advance of the body thereof in respect to the direction of feed of said stock, and spaced button members movable with said knife for preventing the body of said stock for contacting with the body of said knife.
2. In a riving machine, in combination, a cutter head provided with a knife, means for directing stock into position to be operated upon by said knife, the cutting edge of said knife being positioned in advance of the body thereof in respect to the direction of feed of said stock, and means having a limited surface area movable with said knife for preventing the body of said stock from contacting with the body of said knife, said means comprising a plurality of spaced button members on the body of said knife.
3. In a riving machine, in combination, a cutter head provided with a knife, means for directing stock into position to be operated upon by said knife, the cutting edge of said knife being positioned angularly upward, and in advance of the body thereof in respect to the direction of feed of said stock, and means having a limited surface area movable with said knife for preventing the body of said stock from contacting with the body of said knife, said means comprising a plurality of spaced projections on the body of said knife, the upper surfaces of which are disposed in substantially the same horizontal plane as said cutting edge.
4. In a riving machine, in combination, a cutter head comprising a frame, a table carried by said frame, three or more guiding surfaces carried by said frame and arranged transversely to an edge of said table, a wedge carried by each of said surfaces, an elongated knife supported on said wedges with its cutting edge in proximity to said edge of said table, means for clamping said wedges between said knife and said surfaces, and means for moving said wedges independently of each other whereby to enable said knife to be warped longitudinally of its cutting edge.
5. In a riving machine, in combination, a cutter head comprising a frame, a table carried by said frame, three or more spaced guiding surfaces carried by said frame and arranged transversely to an edge of said

table, a wedge carried by each of said surfaces, an elongated knife supported on said wedges with its cutting edge in proximity to said edge of said table, means for clamping
5 said wedges between said knife and said surfaces, and means for moving said wedges independently of each other whereby to enable said knife to be moved perpendicu-
10 larily with respect to the face of said table whereby to control the thickness of veneering to be cut by said machine.

6. In a riving machine, in combination, a cutter head comprising a frame, a table carried by said frame, three or more spaced
15 guiding surfaces carried by said frame and arranged transversely to an edge of said table, a wedge carried by each of said surfaces, an elongated knife supported on said wedges with its cutting edge in proximity
20 to said edge of said table, means for clamping said wedges between said knife and surfaces, and means for moving said wedges independently of each other whereby to enable said knife to be moved perpendicular-
25 ly with respect to the face of said table varying amounts over the length of said knife.

7. In a riving machine, in combination, a cutter head comprising a frame, a table carried by said frame, three or more spaced
30 guiding surfaces carried by said frame and arranged transversely to an edge of said table, a wedge carried by each of said surfaces, an elongated knife supported on said wedges with its cutting edge in proximity to
35 said edge of said table, means for clamping said wedges between said knife and said surfaces, and means for moving said wedges independently of each other whereby to enable said knife to be warped longitudinal-
40 ly of its cutting edge or to be moved bodily perpendicularly to the face of said table.

8. In a riving machine, in combination, a cutter head provided with a knife, means for directing stock into position to be operated
45 upon by said knife, the cutting edge of said knife being positioned in advance of the body thereof in respect to the direction of feed of said stock, and friction reducing means having a material but limited surface
50 bearing area both transversely and longitudinally of said cutting edge movable with said knife for preventing the body of said stock from contacting with the body of said knife.

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