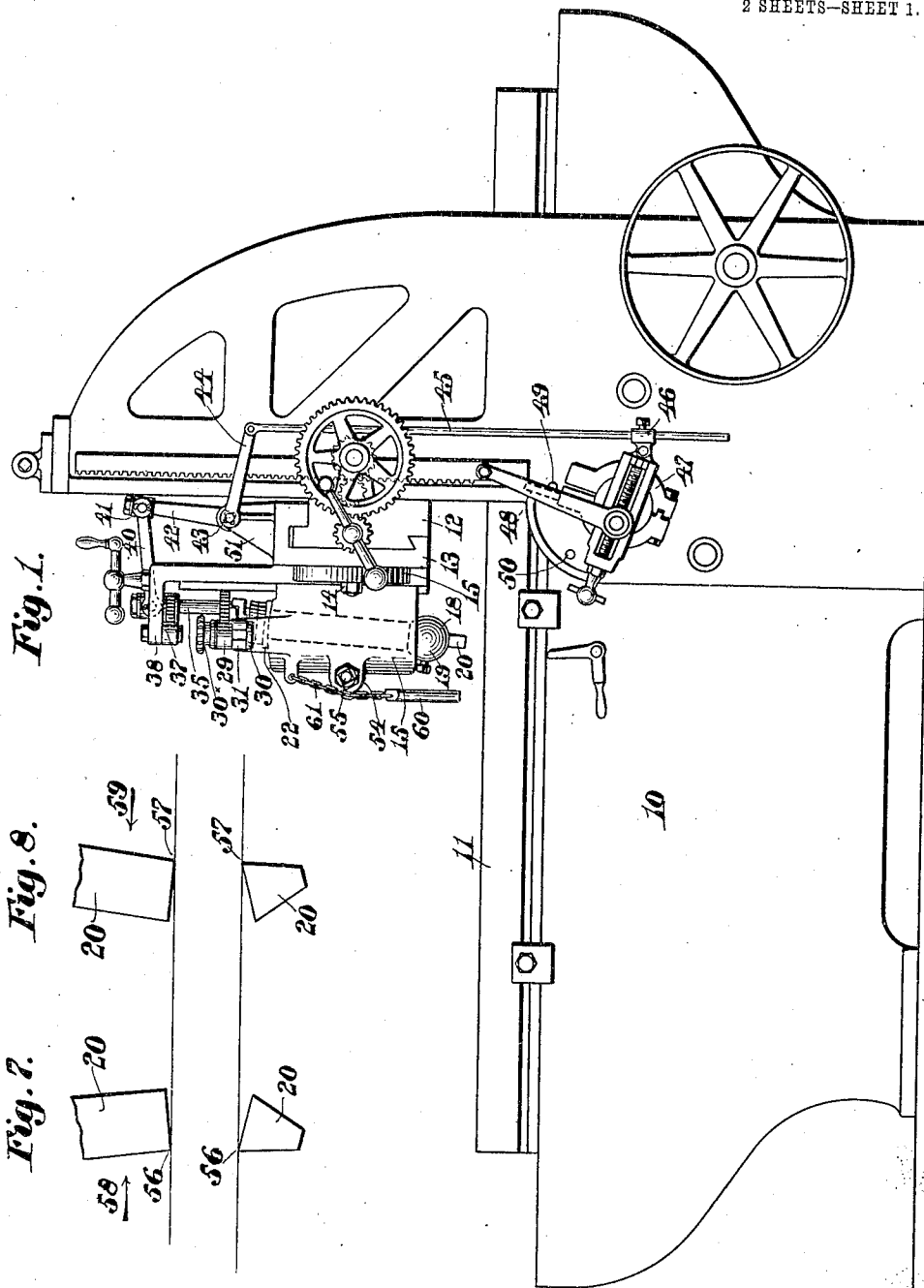


No. 843,244.

PATENTED FEB. 5, 1907.

T. A. WARNER.
PLANING MACHINE.
APPLICATION FILED DEC. 4, 1905.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

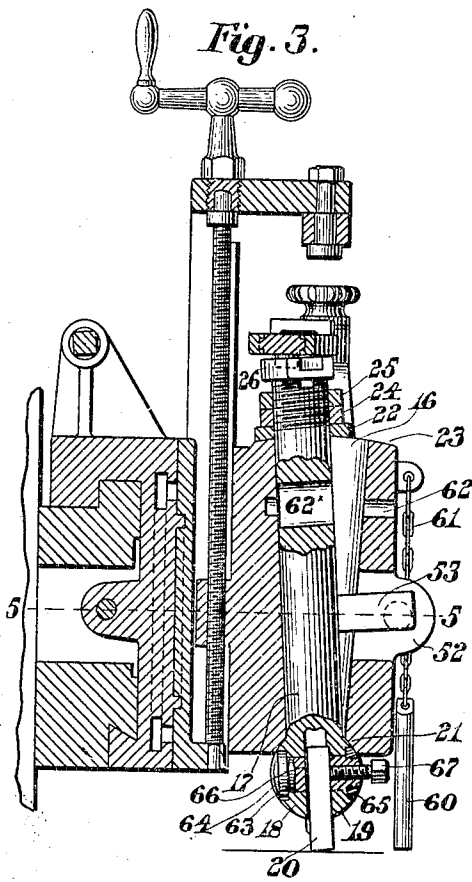


Fig. 3.

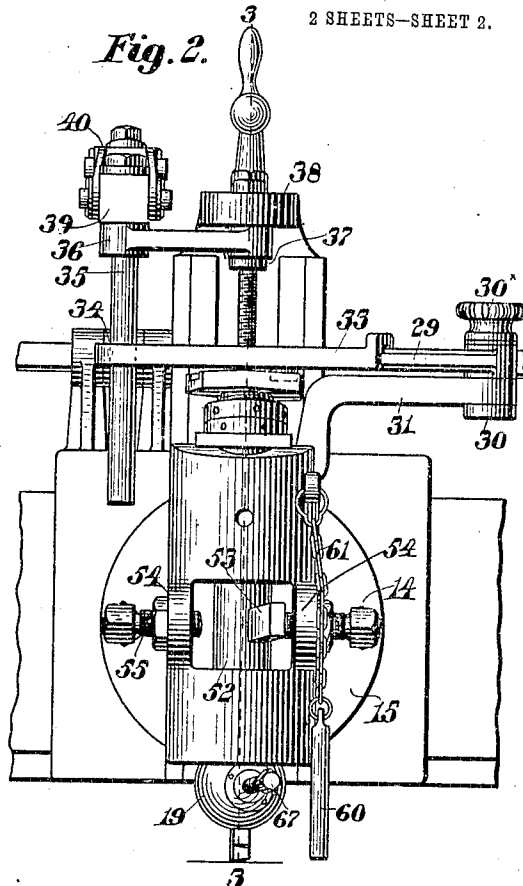


Fig. 2.

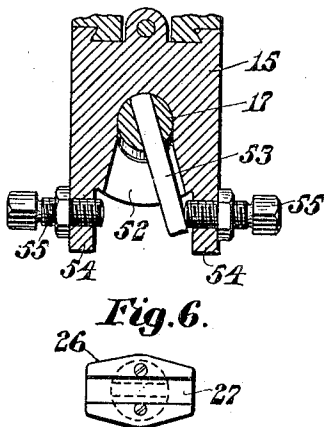


Fig. 5.

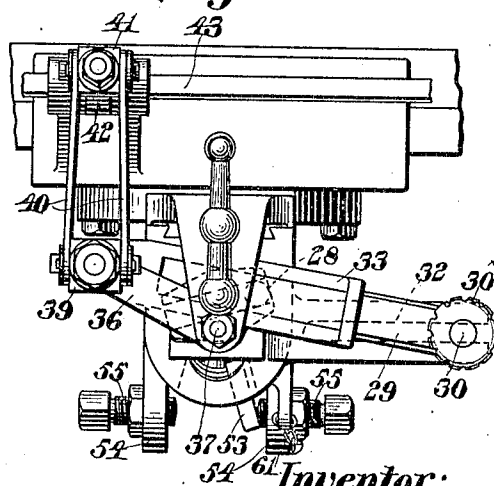


Fig. 4.

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UNITED STATES PATENT OFFICE.

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PLANING-MACHINE.

No. 843,244.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed December 4, 1905. Serial No. 290,112.

To all whom it may concern:

Be it known that I, THOMAS A. WARNER, a citizen of the United States of America, and a resident of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Planing-Machines, of which the following is a specification.

This invention relates to planing-machines, and has for its object the production of a machine in which a special tool is provided and mechanism supporting said tool which may be actuated at the end of movement of the tool in either direction to change its angle and cause a cutting in either direction of movement of the work upon which said tool is operating.

The invention consists in certain novel features of construction and arrangement of parts, which will be readily understood by reference to the description of the drawings and to the claims to be hereinafter given.

Of the drawings, Figure 1 represents a side elevation of a planing-machine embodying the features of this invention. Fig. 2 represents a front elevation of the tool-supporting head. Fig. 3 represents a vertical section on line 3 3 on Fig. 2. Fig. 4 represents a plan of the same. Fig. 5 represents a partial horizontal section on line 5 5 on Fig. 3. Fig. 6 represents a plan of the upper end of the tool-support in diagram. Fig. 7 represents an elevation and plan of the end of the working tool in position to operate upon the work when being fed in the direction indicated by the arrow, and Fig. 8 represents similar views of the same tool in position to operate upon the work when being fed in the opposite direction.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings, 10 represents the main frame of a planer of any well-known construction, while 11 is the work-supporting bed movable longitudinally of the frame 10 in any well-known manner. To the cross-rail 12 of said planer is secured the head 13, to the front of which is secured by suitable bolts 14 the tool-holder 15. The holder 15 has cut therethrough a vertical slot 16, the width of which is equal to the diameter of the shank 17 of the tool-support 18, the

lower end of which is spherical, as at 19, and provided with a recess for the insertion of the working tool 20. The lower end of the slot 16 is provided with a recessed socket 21, adapted to fit the spherical end 19 of the tool-support 18 and provide a universal joint therefor.

The upper end of the shank 17 has a bearing in a slide 22, the lower face of which is concentric with the center of the spherical end 19 and is slidable upon the outer concentric surface 23 of the tool-holder 15. The shank 17 has secured to its outer end the nut 24 and check-nut 25, by which the friction upon the slide 22 and end 19 may be adjusted.

The upper end of the slot 16 is elongated longitudinally of the planer and tapers gradually to the recess 21. To the face of the upper end of the shank 17 is secured a grooved plate 26, with the groove 27 of which a pin 28 engages. This pin is secured to the member 29, pivoted at 30 to a slotted support 31. The pivot 30 is provided with a nut 38*, by which said pivot may be adjusted longitudinally of the slot 32 of said support 31 to vary the movement of the tool, as will be hereinafter described.

Slidable upon the member 29 is a member 33, the outer end of which is provided with a hole 34, engaging a pin 35, supported by a lever 36, pivoted at 37 to the ear 38, extending from the head 15. The upper end of the pin 35 is provided with a block 39, to which is pivoted the links 40, the opposite ends of which are pivoted to a block 41, secured to or forming a part of the upwardly-extending lever 42, mounted upon an oscillating shaft 43. The shaft 43 is provided with a lever 44, to the outer end of which is secured a rod 45, upon which is adjustably secured a sleeve 46, said sleeve being pivoted to a friction member 47, provided with a pin 48, which limits the movement of the friction device 47 in either direction by coming in contact with the pins 49 50. This friction device is the same as will be found on any well-known planer and affords a ready means of operating the rod 45 to oscillate the shaft 43, which is mounted in suitable bearings 51 upon the tool-head 15. The slot 16 is provided with a lateral opening 52, communicating therewith and extending through the wall of the head 15, and the shank 17 is provided with a

lateral projection 53, which extends into this opening 52.

To suitable ears 54 upon the head 15 are secured adjustable stops 55, which limit the horizontal movement of said projection 53 when moved about the axis of the shank 17. The end of the tool 20 is of the shape shown in the lower part of Figs. 7 and 8, and either corner 56 57 is adapted to cut upon the work passing beneath the same according to the vertical angle of said tool 20, as indicated clearly in Figs. 7 and 8—that is, when the bed 11 is traveling in the direction of the arrow 58 with work secured thereto and passing beneath the tool 20 the edge 56 will operate upon said work to cut the same. When, however, travel of the work is reversed and is moved in the direction indicated by the arrow 59 on Fig. 8, the cutting edge 57 will coact therewith and perform the same operation in the reverse movement. This reversal of the vertical and horizontal angles of the cutting-tool 20 is accomplished by means of the devices heretofore described through the medium of the oscillating friction member 47 acting upon the rod 45 to produce an oscillation of the shaft 43. The oscillation of this shaft 43 causes the pin 35 to be moved horizontally toward or away from the head 15, thereby causing the member 29 to be moved about its pivot 30. This movement of the member 29 will cause the pin 28 thereon to operate against the side walls of the groove 27. This action of the pin 35 against the wall of the groove 27 will tend to move the shank 17 from the position shown in Fig. 3 into its opposite position with its front side against the opposite wall of said recess 16. As soon as the shank 17 reaches the limit of its vertical movement about the socket 21 a continuation of the movement of the pin 28 against the wall of the groove 27 will cause the shank 17 to be rotated about its axis, moving the projection 53 from the position shown in Fig. 2 to the opposite side of said opening 52 to cause its opposite face to contact with the end of the adjusting-screw 55 at the left of said figure, this movement causing the working tools 20 to be moved into the position indicated in Fig. 7. A reversal of these movements will cause the tool 20 to be moved into the position indicated in Fig. 8 and shown throughout the figures of the drawings. By adjusting the member 29 in the support 31 so that the pin 28 will be on the opposite side of the axis of said tool-support 18 the movements of said members will be reversed. When it is desired that a channel should be cut into the work of the width of the working tool 20, it is obvious that the horizontal angle changing is not desirable and that the vertical angle change is all that is necessary. To prevent this horizontal angle change, a pin 60, sup-

ported by a chain 61, is provided, which may be inserted through the hole 62 in the head 15 and through the slot 62* in the shank 17, this slot 62* being of such a length as to permit the shank 15 to be freely moved in a vertical plane, but making it impossible to turn the same upon its axis when said pin 60 is inserted in said slot. The movement of the actuating parts in excess of the movement of the tool-support 17 when thus blocked is cared for by the friction device 47 in a well-known manner.

The lateral and vertical feeds to the head form no feature of the present invention, and may be constructed and operated as in any well-known planing-machine, and for this reason in order to simplify the understanding of the present invention many of the elements thereof are omitted from the drawings.

In order to strengthen the spherical end 19 of the tool-support 18, it is provided with a transverse member 63, having a head 64 on one end thereof, while the other end is threaded to receive a nut 65, by which said member may be secured in position to prevent the splitting under strain of said tool-support when the tool 20 is in operation. The member 63 is provided with a hole 66, through which the tool 20 is inserted, this tool 20 being held in position therein by means of the set-screw 67. This forms an important feature of this invention, as it strengthens the tool-support and prevents it from becoming injured and making the planer inoperative.

It is believed that from the foregoing the operation of the invention will be thoroughly understood without any further description.

I claim—

1. In a planing-machine, the combination with a tool-holder suitably mounted in the frame thereof, of a single working tool having two cutting edges oppositely inclined from a vertical face common to both and adapted to cut in either direction, and means for changing the angle of said tool-holder about its longitudinal axis at the end of the movement in either direction to change the angle of said common face to the work and alternately bring a different cutting edge into operative position.

2. In a planing-machine, the combination with a tool-holder suitably mounted in the frame thereof, of a working tool adapted to cut in either direction, and means for changing the vertical and horizontal angles thereof at the end of movement in either direction.

3. In a planing-machine, the combination with a tool-holder suitably mounted in the frame thereof, of a working tool supported thereby adapted to cut in either direction, mechanism coöperating with said working tool for moving it through a vertical angle, stops for limiting said vertical movement, and means coöperating with said mechanism

for causing said tool to be moved through a horizontal angle.

4. In a planing-machine, the combination with a tool-holder, of a working tool adapted to cut in either direction, a support therefor having a universal bearing in the bottom of said holder, a slide having a bearing for the upper end of said support, and means for moving said support in a vertical plane about said lower bearing.

5. In a planing-machine, the combination with a tool-holder, of a working tool adapted to cut in either direction, a support therefor having a universal bearing in the bottom of said holder and a transverse groove in the opposite end thereof, and means cooperating with said groove to cause it to move in a vertical plane about said lower bearing.

6. In a planing-machine, the combination with a tool-holder, of a working tool adapted to cut in either direction, a support therefor having a universal bearing in the bottom of said holder, and a horizontally-movable pivoted member provided with a pin engaging a groove in the end of said support to cause it to move in a vertical plane about said lower bearing.

7. In a planing-machine, the combination with a tool-holder, of a working tool adapted to cut in either direction, a support therefor having a universal bearing in the bottom of said holder, a horizontally-movable pivoted member, a slide adjustable therein, and a pin on said slide adapted to engage a groove in the end of said support to cause it to move in a vertical plane about said lower bearing.

8. In a planing-machine, the combination with a tool-holder, of a working tool adapted to cut in either direction, a support therefor having a universal bearing in the bottom of said holder, a two-part horizontally-movable pivoted member one part being adjustable upon the other, a support therefor, means for adjusting the pivot relative to said support, and a pin on said pivoted member adapted to engage a groove in the end of said support to cause it to move in a vertical plane about said lower bearing.

9. In a planing-machine, the combination with a tool-holder, of a working tool adapted to cut in either direction, a support therefor having a universal bearing in the bottom of said holder, a two-part pivoted member horizontally movable one part of which is adjustable upon the other, a support therefor, means for adjusting the pivot relative to said support, an oscillating friction device, connectors interposed between said friction device and said pivoted member, and a pin on said pivoted member adapted to engage a groove in the end of said support to cause it to move in a vertical plane about said lower bearing.

10. In a planing-machine, the combination

with a tool-holder provided with a vertical slot therein wider at one end than the other and provided with a semispherical socket at the narrow end, a tool-support provided at one end with a spherical portion adapted to fit said socket, and means for moving said support about said socket in a vertical plane.

11. In a planing-machine, the combination with a tool-holder provided with a vertical slot therein wider at one end than the other and provided with a semispherical socket at the narrow end, a tool-support provided at one end with a spherical portion adapted to fit said socket, mechanism cooperating with said support to move it about said socket in a vertical plane, means for limiting the movement in a vertical plane, and means cooperating with said mechanism for moving said support about said socket in a horizontal plane.

12. In a planing-machine, the combination with a tool-holder provided with a vertical slot therein wider at one end than the other and provided with a semispherical socket at the narrow end, a tool-support provided at one end with a spherical portion adapted to fit said socket, mechanism cooperating with said support to move it about said socket in a vertical plane, means for limiting the movement in a vertical plane, means cooperating with said mechanism for moving said support about said socket in a horizontal plane, a radial member extending from said support, and shoulders to limit the horizontal movement of said member.

13. In a planing-machine, the combination with a tool-holder provided with a vertical slot therein wider at one end than the other and provided with a semispherical socket at the narrow end, a tool-support provided at one end with a spherical portion adapted to fit said socket, mechanism cooperating with said support to move it about said socket in a vertical plane, means for limiting the vertical movement, means cooperating with said mechanism for moving said support about said socket in a horizontal plane, a radial member extending from said support, and adjustable shoulders to limit the horizontal movement of said member.

14. In a planing-machine, the combination with a tool-holder suitably mounted in the frame thereof, of a working tool provided with two opposite cutting edges adapted to cut in either direction, and means for moving said tool-holder through a very acute angle about its vertical axis to cause one cutting edge to be withdrawn from its operative position and the other cutting edge moved into position to operate.

15. In a planing-machine, the combination with a tool-holder suitably mounted in the frame thereof, of a working tool provided with two parallel cutting edges oppositely in-

clined from a vertical face common to both
and adapted to cut in either direction, and
means for changing the angle of said tool-
holder about its longitudinal axis to bring a
5 different cutting edge of said tool into opera-
tive position at the end of movement in each
direction.

Signed by me at Boston, Massachusetts,
this 25th day of November, 1905.

THOMAS A. WARNER.

Witnesses:

WALTER E. LOMBARD,
EDNA C. CLEVELAND.