April 21, 1931. W. AULD 1,801,256

SHAPER GUARD

Filed Nov. 28, 1927

Fig. 1.

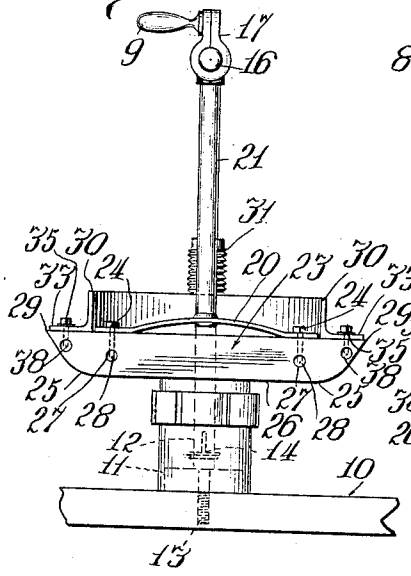


Fig. 2.

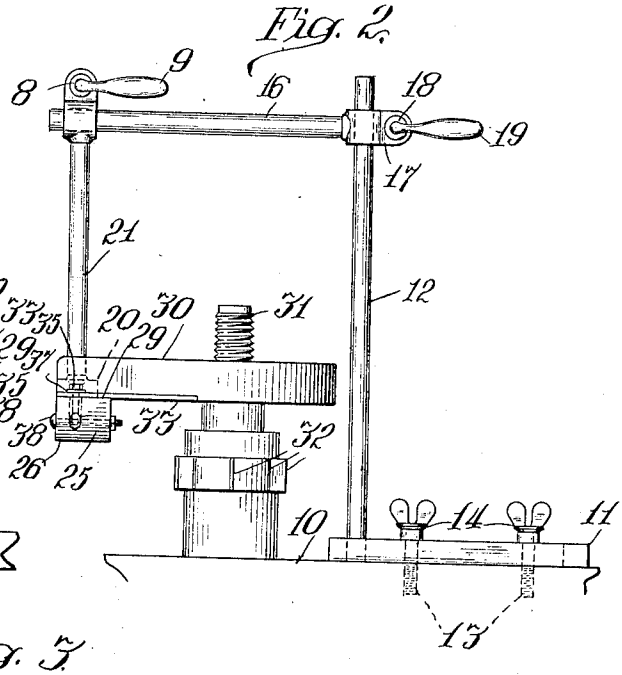


Fig. 3.

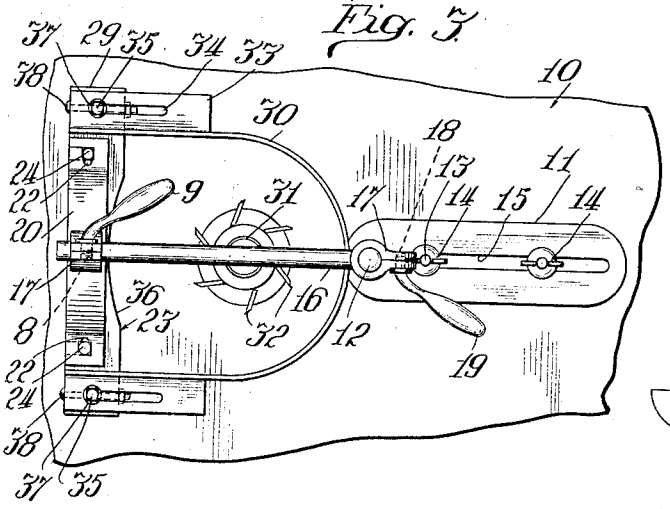


Fig. 4.

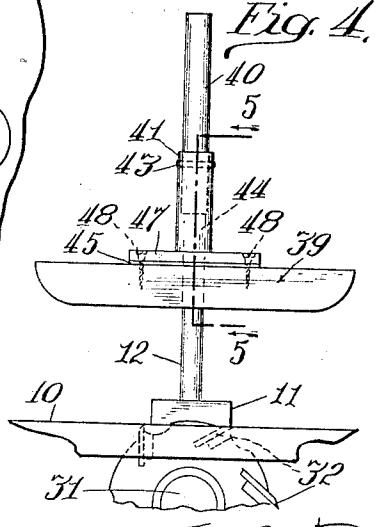
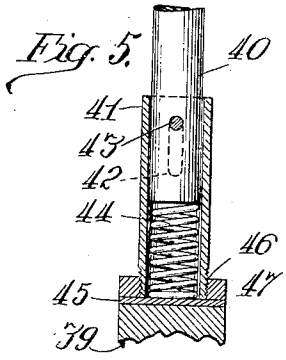


Fig. 5.



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his Attorney

Patented Apr. 21, 1931 1,801,256

UNITED STATES PATENT OFFICE

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SHAPER GUARD

Application filed November 28, 1927. Serial No. 236,189.

The invention relates to safety guards and work holding devices for shaper and universal machines having exposed cutter heads protruding above the surface of the work table.

Heretofore the shaper heads holding the cutter bits and rotating at high speed in planes immediately above the surface of the work table have been responsible for the greater number of injuries to workers on woodworking machines because of the general lack of proper safeguards for the hands of the operator when feeding the work to the cutters. During the normal functioning of the machine the impact of the cutter bits against the work during the cutting operation required the sustained effort on the part of the operator to overcome the tendency of the shaper bits to kick-back the work against the pressure required to hold the work against the cutter head. It frequently happened that the cutter bits would encounter curly cross grained spots in the wood and tear out contiguous portions of the work; when this occurred during the taking of heavy cuts requiring considerable pressure to hold the work against the shaper head, the gouging action of the cutter bits tended to force the work towards the shaper head and out of the grasp of the operator, causing an involuntary movement of the operator's hands, following closely upon the work, against the shaper head.

The object of this invention is to avoid the hazards attending the operation of such machines by providing a combined work holding device and a hand shield adjustable to the work and detachable from the machine.

The foregoing and other objects are attained by the mechanism illustrated in the accompanying drawings, in which:—

Fig. 1 is a front elevational view of a preferred embodiment of the combined guard and work holding device of my invention;

Fig. 2 is a side elevational view of the same showing the method of clamping the assembled device to the work table;

Fig. 3 is a plan view of the apparatus showing its operative relation to the shaper head;

Fig. 4 is a view similar to Fig. 1 showing a modified arrangement of the work holding device; and

Fig. 5 is an enlarged fragmentary sectional view on line 5—5 of Fig. 4 looking in the direction indicated by the arrows, and showing the resilient holding down device mechanism.

In said drawings, 10 is the work table or bed plate of a standard type of shaper or universal woodworking machine equipped with the invention. Base 11 of standard 12 is clamped to the table by stud bolts 13 threaded into tapped openings in the table and provided with wing heads 14 for tightening the heads against the base which is slotted at 15 to permit adjustment longitudinally thereof for a purpose hereinafter referred to. The standard 12 is of substantial proportions and is held to the base 11 with a driving fit and sweated to insure rigidity of the standard to enable same to withstand the pressures normally exerted during the operation of the machine as will presently appear. The standard 12 is fitted with a projecting arm 16 adjustable vertically upon the standard and formed with resilient clamping jaws 17 adapted to embrace the standard; the jaws are brought together for clamping and separated to release them from the standard by means of bolts 18 threaded into one of the jaws and provided with a handle portion 19 for convenient manipulation.

The projecting arm 16, like the standard 12, is also of substantial proportions since it must resist the reactions to the work holding pressures exerted by the expansive force of spring 20 carried by a pendant thrust bar 21 adjustably mounted upon the projecting arm 16, and likewise of ample proportions to resist bending. The thrust bar 21 is also fitted with a pair of resilient clamping jaws 17 embracing the projecting arm 16 and operated by manipulating the handle 9 of an actuating bolt 8 mounted in said jaws. The spring 20 is preferably bowed as shown in Fig. 1 and formed with holes 22 slightly elongated in the direction of the length of the spring to provide a yielding connection

between the pressure shoe 23 and the spring and to prevent undue strain upon the cap screws 24 securing the shoe to the spring.

The pressure shoe 23 is preferably of wood and formed with curved ends 25 merging with the pressure face 26 to facilitate the introduction of the work between the shoe and the work table 10. To insure positive connection between the spring 20 and the shoe 23 and to prevent withdrawal of cap screws 24 under the stress of lateral thrusts upon the shoe during the passage of material between it and the table, the shoes are provided with lateral openings 27 in one of the side faces thereof and in the path of the cap screws 24 and closed by means of brass studs 28 having a driving fit in said openings and tapped to receive the cap screws 24, thereby further securing the shoe 23 against displacement. As indicated in Figs. 1 and 3, shoe 23 extends with its ends beyond the terminals of bow spring 20 to provide supporting seats 29 for a guard yoke 30 projecting rearwardly from the shoe to a point adjacent the standard 12 and surrounding the cutter head 31 in a plane above the cutter bits 32 to clear the work presented to the cutter.

The yoke may be of rolled aluminum or the like and functions to limit the approach of the shoe 23 to the cutter head to avoid possible encroachment of the shoe upon the cutter bits 32, and abnormal movement of the shoe towards the cutter will be checked by contact of the yoke with standard 12. The shoe pressure upon the work should be applied at a point as near to the cutter head as the character of the work will permit; for this purpose, the yoke securing flanges 33 are provided with slots 34 to permit adjustment of the yoke with respect to shoe 23 and the screws 35 holding the yoke to the shoe. By this means the desired clearance between the shoe and cutter head may be established to prevent destruction of the shoe and possible injury to the operator. The inner wall of the shoe intermediate its ends may be hollowed out to form a depressed surface 36 to permit further approach of the shoe to the cutter head to an extent approximating the depth of the cut and to afford greater operating visibility. To provide a positive fastening between shoe 23 and the yoke, brass bushings 37 are driven into openings in the yoke seat areas 29 of the shoe, tapped for the yoke screws 35, and bolts 38 or like devices passed horizontally through said bushings 37 and the shoe to prevent relative displacement of the parts.

The invention is readily adapted to universal machines in which the cutter heads rotate in vertical planes for undercutting operations on the work by dispensing with yoke 30 and clamping jaws on thrust bar. A suitable adaptation is illustrated in Figs. 4 and 5 in which the vertical thrust bar 40 engages telescopically with casing 41 having vertically extending slots 42 on opposite sides thereof adapted to receive pin 43 on thrust bar 40 to limit upward movement thereof under pressure of coiled spring 44 within the casing. The spring is seated at its lower end upon wear plate 45 and extends through an opening 46 in a relatively thick supporting plate 47 and both plates secured to pressure shoe 39 by wood screws 48 or the like. As shown in Fig. 5, spring casing 41 is threaded into tapped opening 46 of the supporting plate 47 and finds a bearing seat upon wear plate 45 protecting upper face of shoe 39. As in the case of the first embodiment the coiled spring 44 is compressed by the upward movement of shoe 39 under pressure of the work introduced between the shoe and work table. In the normal position of the parts, with the spring 44 extended, the pin 43 on thrust bar 40 will occupy a position at top of slots 42 in the casing 41, but upon compression of the spring by the upward movement of the shoe 39 with its casing 41 the slots 42 will likewise be moved upwardly until their lower ends contact with stop pin 43 on the stationary thrust bar whereupon further movement upwardly will be checked.

Since the principal forces applied to the work in a universal machine are in the general direction of the length of the thrust bar 40, it will not be necessary to employ the yoke 30 for the reason that major lateral thrusts upon the shoe are not encountered in universal machine operations, the principal function of the shoe 39 and its thrust bar 40 being that of holding the work to the table against the upward thrust of the cutter bits, and only in a lesser degree is the shoe subjected to forces exerted in other directions because of the passage of the work between the table and pressure shoe 39. It should be noted however, that when shoe 39 is fitted with yoke 30 and the thrust bar 40 with clamping jaws 17 as illustrated in Figs. 1, 2, and 3, the coiled spring mechanism of the modified device may be substituted for the bowed leaf spring 20 shown in Figs. 1 and 3.

In operation of the invention, the work is introduced between the pressure shoe 23 and work table 10 under sufficient pressure to overcome the force of spring 20 until the work comes into contact with the shaper cutter knives or bits 32; the operator will continue to feed the work to the cutter until restrained by contact of his hands with the front face of the shoe whereupon he will be required to take a fresh grip elsewhere upon the work before the work can again be advanced towards the cutter, thereby shielding the hands of the operator from possible contact with the knives.

It will be noted that there has been provided complete protection for the hands of the operatives on shapers and universal woodworking machines. The guard is simple in

construction, easily applied, and inexpensive. The guard is adjustable vertically and horizontally to accommodate the size and character of the work by the manipulation of clamping jaw handles 9 and 19 and cap screws 35 running in yoke slots 34, and screws 13 in base slot 15. For undercutting operations involving the use of the modified work-holding attachment illustrated in Fig. 4, the operator is relieved of the necessity for bearing down upon the work in its passage over the protruding cutter bits 32, thereby preventing injury to his hands resulting from breaking up of the work during the cutting operation and the sudden exposure of the cutter bits.

What I claim is:—

1. In a guard and work holding assembly for woodworking machines, the combination including a supporting standard and a projecting arm vertically adjustable on said standard, of a pendent thrust bar supported on said arm and adjustable towards and away from said standard, a pressure shoe carried by and underlying said bar, and a guard yoke extending rearwardly toward said standard adjustably supported upon said shoe for movement horizontally with respect to said standard and shoe and adapted to engage said standard to prevent encroachment of the shoe upon the cutter.

2. In a guard and work holding assembly for woodworking machines, the combination including a supporting standard and a projecting arm vertically adjustable on said standard, of a yieldable pendent thrust bar supported on said arm and adjustable towards and away from said standard, a pressure shoe carried by and underlying said bar, a guard yoke extending rearwardly toward said standard supported upon said shoe for movement horizontally with respect to said standard and having its terminal portions of angular formation with laterally disposed attaching flanges, and means for adjustably securing said flanges to the shoe, said yoke being adapted to engage said standard to prevent encroachment of the shoe upon the cutter.

3. In a guard and work holding assembly for woodworking machines, the combination with the bed-plate of the machine, of a cutter projecting above said plate, a guard supporting standard secured to said plate at one side of said cutter, an arm vertically adjustable on said standard and projecting above said cutter, a thrust bar supported on said arm and depending therefrom upon the opposite side of said cutter and adjustable towards and away from said cutter and standard, a pressure shoe carried by and underlying said bar, a guard yoke about said cutter extending rearwardly toward said standard and supported upon said shoe for movement horizontally with respect to said standard and formed with laterally disposed attaching flanges at its ends, and means for adjustably securing said flanges to the shoe, said yoke being adapted to engage said standard to prevent encroachment of the shoe upon the cutter.

In witness whereof I have hereto set my hand this 16th day of November, 1927.

WILLIAM AULD.