

UNITED STATES PATENT OFFICE.

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MITER-BOX.

SPECIFICATION forming part of Letters Patent No. 525,215, dated August 28, 1894.

Application filed July 31, 1893. Serial No. 481,932. (No model.)

To all whom it may concern:

Be it known that I, KNUD L. HYLLER, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Miter-Boxes, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved miter box for carpenters', joiners', and cabinet-makers' use, which shall be so completely provided with devices for insuring cleanness in the cutting and accuracy in the matching of the mitered parts at whatever angles, as to dispense with the necessity for the use of the plane or chisel to complete or perfect the joint; and it consists in the details for the adjustment of the various guides and means of securing the same, as more particularly set out in the claims.

In the drawings,—Figure 1 is a plan of my improved miter box. Fig. 2 is a vertical section at the plane indicated by the line 2—2 on Fig. 1. Fig. 3 is a section at the line 3—3 on Fig. 2, designed to show details of the saw guide-bearing devices. Fig. 4 is a detail section at the line 4—4 on Fig. 1. Fig. 5 is a detail section at the line 5—5 on Fig. 1, showing a device for clamping the vertical gages to the margin of the horizontal bed.

A is a substantially semi-circular platform, which may have at its circumference a degree scale to assist the operator in adjusting the vertical gages when the angle of miter in the plane of the platform is known in degrees.

B B are vertical gages, pivoted at the center of the semi-circular platform A, and each adapted to swing over the platform so as to stand at any angle to the plane of the saw or line of intersection of the saw's plane with the platform. The platform has a marginal lip or flange A⁶, projecting horizontally flush with its upper surface about the semi-circular periphery which affords means for clamping the vertical gages B B to the platform in adjusted position, the lower bar *b* of the gage being extended in the portion *b'*, and bent down and back to clasp the flange A⁶, a bolt *b*² being inserted through both bars of the hook or loop thus formed, outside of the mar-

gin of the flange, and provided with a nut *b*³ at the lower end below the inturned end, and having an eccentric *b*⁴ pivoted to its upper end adapted by being rocked upon its pivot to clamp the hook formed by the projection *b* to cause it to bind the flange A⁶.

A' is a gage lip secured upon the straight edge *a* of the platform in slide-bearings A¹⁰ A¹⁰, so that it may be depressed so as to stand flush with the platform, or elevated to constitute a stop or gage for one side of the try-square, or other angle-measuring tool, in adjusting the vertical gages B B.

At the straight side of the platform A, but depressed below its upper surface, there are located the devices in which the saw guides are supported and adapted to be adjusted. These will now be described in detail.

The platform A is mounted upon transverse iron benches C C and *c*, which project beyond the straight edge and in such projecting portion are provided with the chairs C' C' and *c'*, in which the bed D is seated and secured. This bed, which is preferably an open or skeleton frame of metal, has in its upper surface the semi-circular concavity D', which forms the seat for the sliding beam E, which is also preferably a skeleton, both its convex outline, and the concave outline of the channel D' in the bed D in which it slides being preferably gridironed or composed of intersecting longitudinal and transverse bars, as illustrated.

In view of the fact hereinafter explained,—that the beam is to slide and rotate in the concave seat in the bed, it is preferable, in order to avoid possible collision of the edges of the bars or gridironed surfaces, in case of any slight inaccuracy or springing of them in use, that the longitudinal bars of one element and the transverse curved bars of the other element be slightly depressed from the surface. As illustrated, the longitudinal bars *d d* of the bed are flush with the concave surface, and the transverse or curved bars *d'* are slightly depressed, while, in case of the beam E, the longitudinal bars *e* are depressed and the transverse curved bars *e'* form the curved bearing surface. The purpose of this beam and bed is to carry vertical posts F F, on which saw guides may be afforded, and to provide for adjustment of such guides longi-

tudinally to bring them as near together and
 to the saw as the width or thickness of the
 material which is being cut will permit, and
 also angularly about the axis of the beam E
 and its seat in the bed D, to vary and fix the
 5 angle of the cut which the saw makes with
 respect to the plane of the platform. The
 beam E is therefore longitudinally open at
 the upper side, and extending longitudinally
 10 through it at the center is a cylindrical shaft
 E', which has bearings in the end plates E² E²
 of the beam, said bearings being concentric
 with the beam, but the journals of the shaft
 15 being cut slightly eccentric with respect to
 the shaft, so that the shaft rolling in said
 bearings operates as an eccentric for the pur-
 pose of binding the posts, as hereinafter ex-
 20 plained. The third bearing for the shaft may
 be provided at the middle of the length of
 the beam, where a similarly eccentric journal
 will be formed on the shaft. Conveniently,
 this middle bearing is made by a split eye-
 bolt or strap E³, which may be clasped around
 the shaft before it is inserted, the split ends
 25 protruding and being bound in any conven-
 ient manner as by a nut e³.

The posts F terminate at their lower ends
 in eyes F' F', which are entered by the shaft
 E' as the post is put into position in the beam,
 30 and the lower end of the post is provided at
 the side of the eyes with seats F² F², which,
 when the eyes are on the shaft, rest accurately
 upon the slide-bearings E⁴ E⁴, at the opposite
 margins of the longitudinal channel in which
 35 the shaft E' rests in the beam E. And rotat-
 ing the shaft E' in its bearings, causes it, en-
 gaging the eyes in the posts, to draw and
 firmly bind the post endwise onto said slide-
 bearings of the beam. The two posts being
 40 each set in position longitudinally in the beam,
 as desired, may be thus fixed in those posi-
 tions by the same clamping movement of the
 shaft. The two posts and the parts thereon
 are precisely alike, and the description will
 45 be made in terms applying to one of them.

Upon the side of the post toward the plat-
 form, it is provided with vertical sliding bear-
 ings for the saw frame G. This frame, in its
 details which will be explained, is adapted to
 50 receive the saw blade, being adjustable to
 blades of various thicknesses and widths, the
 intention being that in respect to thickness
 it shall be adjusted so that while the blade
 may move freely in it there shall be no appre-
 55 ciable lateral play. The frame is also de-
 signed to rest upon the back of the saw, and
 by its weight to hold the saw close into its
 cut, preventing jumping and consequent mar-
 60 ring of the cut surface which is otherwise lia-
 ble to occur. The device is thereby espe-
 cially adapted to produce finished work, even
 in the hands of persons comparatively inex-
 pert in such hand processes. In detail, the
 frame G comprises the slide rib G', which fits
 65 into the groove F³ in the post F, and the lat-
 eral flanges G² G², which engage behind the
 flanges F⁴ F⁴ of the post. This construction

is generically equivalent to a dove tail, but I
 prefer it to a dove-tail because of the less lia-
 bility to binding which I find in the construc- 70
 tion which I have adopted.

The frame G has a rectangular opening G³,
 from which a rift is cut through the lower end
 of the frame, and on one margin of the rift
 there is mounted the adjustable guard G⁴, 75
 which is dove-tailed to that margin, which is
 oblique with respect to the opposite margin,
 the latter being parallel with the slide rib G'.
 The edge of the guard G⁴, which faces the op-
 80 posite margin of the rift is parallel with said
 opposite margin, said guard being therefore
 tapering, its dove-tailed edge being oblique
 to its guard edge. To the upper end of this
 guard G⁴, there is loosely connected the link
 85 G⁵, which constitutes the stem of the guard
 and extends through the upper bar of the
 frame and is threaded at the protruding
 end. The frame is provided with the lug G⁶,
 overhanging the upper bar, and having an
 aperture in line with the aperture through 90
 said upper bar, through which the link ex-
 tends, so that the nut g⁵ on the threaded end
 of the link under the lug and fitting closely
 between said lug and the upper bar of the
 frame, being rotated, will force the link, and 95
 thereby the guard G⁴, in either direction,
 causing the guard to slide at its inclined dove-
 tailed joint on the margin of the rift, and
 thereby adjust it with nicety toward and from
 the opposite margin of the rift to vary the 100
 saw opening.

In order that the frame may not only afford
 the guide for the saw blade, but may also oper-
 ate as a weight to hold the blade down in the
 cut which it makes, it must rest upon the 105
 back of the saw and be adapted thereby to
 follow the saw down as the latter cuts its way
 into the wood. And in order that it may not
 be prevented from so doing by coming into
 contact with the wood itself, and ceasing 110
 thereafter to rest its weight upon the saw, it
 is necessary that the stop which rests upon
 the back edge of the saw should not be far-
 115 ther from the lower edge of the frame at the
 margin of the saw aperture than the distance
 which the saw at any time protrudes into the
 cut. But inasmuch as this distance will vary
 as the work advances and with different
 pieces of work, and inasmuch as it is desir- 120
 able that the saw should be guarded as close
 to the cut which it is making as possible, al-
 lowing the least possible opportunity for in-
 accuracy, I provide the stop G⁷ for the back
 edge of the saw which is adjustable vertically
 125 in the frame, so that it may at all times rest
 upon the back edge of the saw and at the
 same time permit the saw to be guarded as
 near to its cut as possible.

G⁷ constitutes this stop, which is arranged
 to slide vertically on two guide rods, for one 130
 of which the link G⁵ is utilized, the other be-
 ing the rod G⁸, parallel with said link and
 suitably secured to the frame at the upper
 and lower ends. The stop G⁷ has the stem

G⁷⁰, which extends out through the upper bar of the frame in which the set screw G⁷¹ is provided to bind the stem and hold the stop at any point to which it may be adjusted. The distance between the guide rods for this stop below the latter will be sufficient to accommodate the back rib of the ribbed saws, such as are commonly employed for this class of work. But in view of the perfect guarding of the saw blade immediately adjacent to the cut, any kind of saw can be employed with this device without the usual danger of inaccuracy which is incurred in employing flexible saws.

In addition to the adjustment of the posts F F longitudinally in the beam E, this beam is adjustable both longitudinally and about its axis in the concave seat of the bed D, as will be understood from the structure of the two parts. To secure the beam in any position to which it may be adjusted, either longitudinally or by rotation, I provide the segmental clamp block E⁵, which, when placed upon the upper side of the beam, completes the cylindrical outline of the latter, having faces E⁵⁰ E⁵⁰, which match the slide-bearings E⁴, and a rib E⁵¹ which enters between said slide-bearings. I provide also the clamping strap E⁶ of metal, whose ends are received in the thin mortises d³, which extend vertically through the bed D at opposite sides of the concave seat therein, midway in its length and in line transversely with the pivot of the gages B B. This strap has the slot E⁶⁰, extending through its curved portion at the top, and the block E⁵ has a projection E⁵³ which enters said slot, whereby said strap retains the block in position notwithstanding any longitudinal movement of the beam E, while the slot permits the rotary movement of the block with the beam. The ends of the strap extend below the seat of the beam, and through the bed, below said seat, I insert the shaft D⁶, which passes through the two eyes E⁶¹ E⁶¹ in the ends of the strap, and has journals D⁶⁰ slightly eccentric with respect to the shaft, for which bearings are provided in the bed D, so that the rotation of the shaft in its eccentric bearings causes the shaft to act as an eccentric to draw the clamping strap tightly down upon the block E⁵, and thereby hold the beam in any position to which it may be adjusted,—either longitudinally or by rotation in the bed. One end of the shaft E' and one end of the shaft D⁶ are squared, and I provide for each of them a key by which they may be rotated, said keys being shown at E¹² and D⁶¹ respectively.

It will be observed that this device is adapted to permit a very wide range of adjustment of the saw guards longitudinally with respect to the line of the cut, since the beam E may be adjusted in the bed and the posts F may be adjusted longitudinally with respect to the beam. Both posts being adapted to independent adjustment in the beam, their distance apart is limited only by

the length of the latter. By this means, it is possible, within a wide range, to bring the saw guards close to both ends of the cut, whatever the width of the board or molding, and this is one object which I consider important. It will be observed also as already pointed out, that the weight of the saw frames, sliding freely on the posts, bears at all times upon the saw, and tends to hold it in the cut which it makes, while the adjustability of the guard at the saw rift in said frame makes it possible to reduce to the minimum liability to lateral vibration while cutting. And also, that the adjustability of the stop in the saw frame, adapting the latter to be always brought down so that the saw guards shall be as close as possible to the upper surface of the material being cut, further diminishes the liability both to vibration and deflection by tilting the saw.

Any angle whatever may be obtained by the adjustment of the vertical gages B B, and the range of adjustment of the beam by rotation or rocking in the bed is designed to be fully forty-five degrees from the vertical position, and this practically permits the cutting of any angle in that direction, because the block or board may be placed either side up and upon either side of the pivot of the gages B B,—that is, against either one of said gages, and any angle may thus be secured with an adjustment of only forty-five degrees. Every conceivable miter cut may be made, therefore, with this device. Preferably, for greater convenience, it is desirable that the posts should have some range of adjustment from the vertical toward the platform as well as away from it, although it is not necessary, in order to adapt the device to cutting any angle. But to permit such adjustment toward the platform, the gages B B may be cut away at the upper inner corners such distance as the posts can tilt in that direction without bringing the plane of the saw beyond the edge of the platform or of the gage lip A' thereon; and this range might be made anything desired by varying the distance horizontally of the bed and beam from the said edge.

I claim—

1. In combination with the platform, the bed D rigid therewith, the beam E, seated in the bed and adapted to slide and rock in its seat; and means for clamping it fast thereto; and the posts extending up from said beam provided with guards for the saw blade: substantially as set forth.

2. In combination with the platform, the bed D, rigid therewith, the beam E seated in the bed and adapted to rock and slide in its seat, and means for clamping it fast thereto; the posts extending up from the beam and adjustable longitudinally with respect thereto, and means for securing them in adjusted position in the beam, said posts having guards for the saw blade: substantially as set forth.

3. In combination with the beam having

posts provided with saw guides the bed having a semi-cylindrical cavity which receives the beam, the clamping strap striding the beam, and the shaft journaled eccentrically in the bed below the beam and engaging the eyes of the strap to clamp the beam in the bed: substantially as set forth.

4. In combination with the bed the beam having saw guides, the shaft extending longitudinally through it and journaled eccentrically at the ends of the beam; the posts having eyes at their lower ends running on the shaft; and shoulders by which they are seated upon the upper side of the beam; whereby the rotation of the eccentrically journaled shaft clamps the post to the beam: substantially as set forth.

5. In combination with the bed, the posts F F, and the saw blade frames having slide-bearings on the posts; the guard G⁴ having slide bearings on the frame oblique to the guard edge, the stem of such guard pivotally connected thereto and longitudinally guided

in the same frame; and the adjusting nut checked against axial movement with respect to the frame; whereby its rotation moves the guard stem by virtue of its oblique bearings: substantially as set forth.

6. In combination with the bed having a semi-cylindrical cavity, saw-guide posts and the beam which carries them seated in such cavity and adapted to rock and slide therein, the cylindrical surfaces of the beam and bed being gridironed, as described, the longitudinal bars of the one and curved transverse bars of the other being depressed back of the cylindrical surfaces defined by the other bars: substantially as set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 21st day of July, 1893.

KNUD L. HYLLER.

Witnesses:

CHAS. S. BURTON,
JEAN ELLIOTT.