Sept. 4, 1928. 1,683,460

H. M. HARTWAY

MITER BOX

Filed April 28, 1924 3 Sheets-Sheet 1

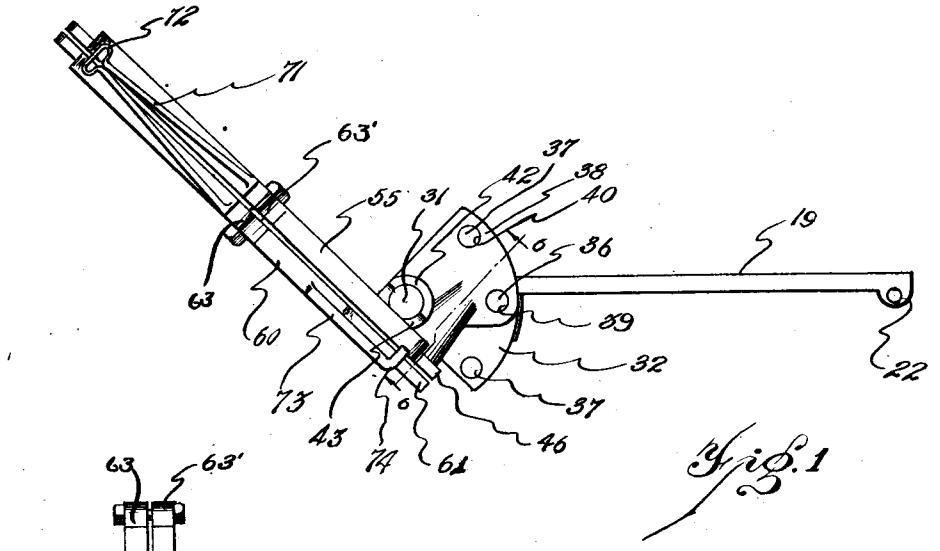

Fig. 1

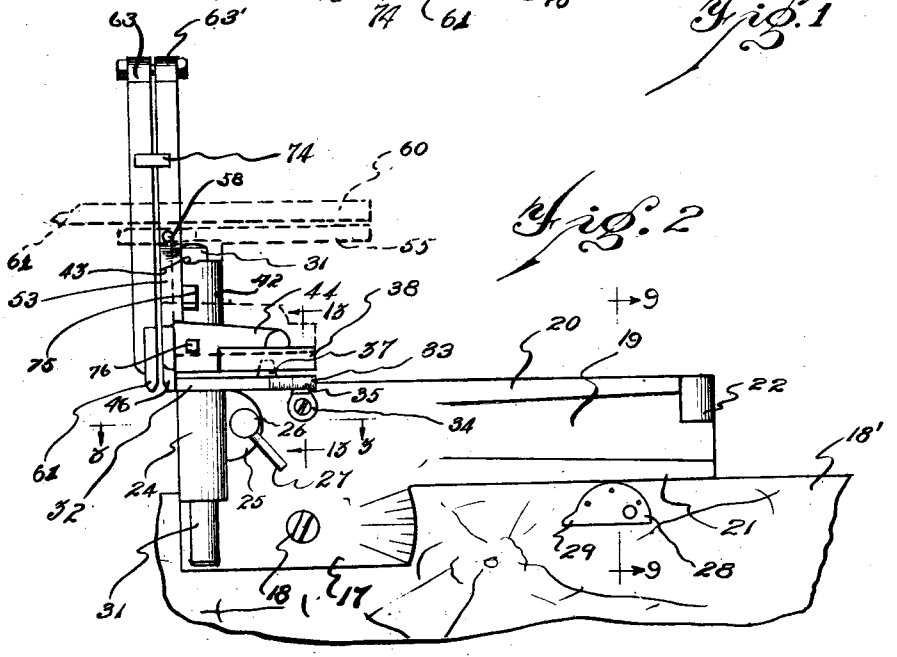

Fig. 2

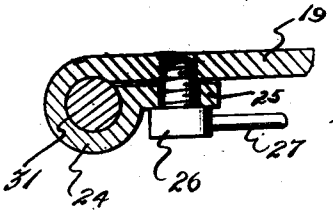

Fig. 3

INVENTOR.
HARVEY M. HART WAY

BY

ATTORNEY.

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H. M. HARTWAY

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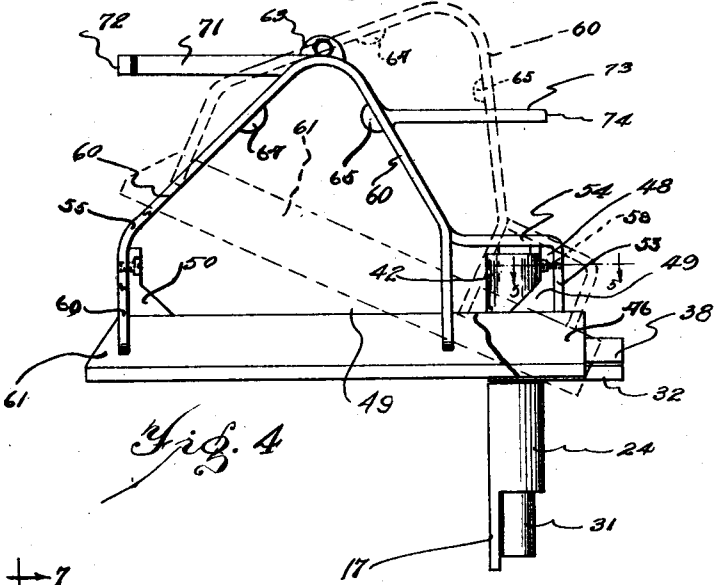


Fig. 4

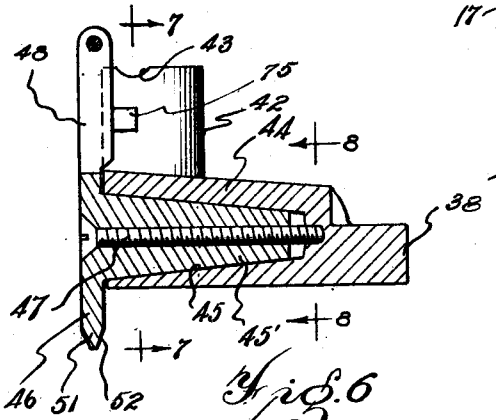
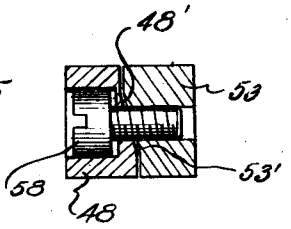


Fig. 6

Fig. 5



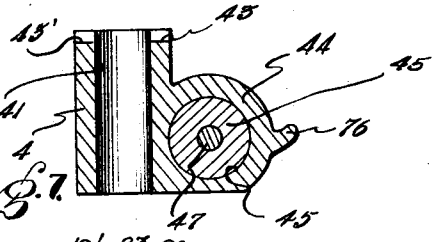


Fig. 7

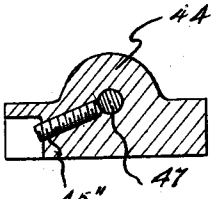


Fig. 8

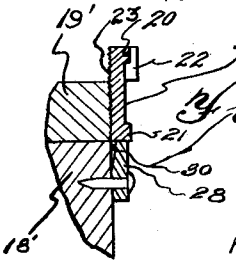


Fig. 9

INVENTOR.
HARVEY M. HARTWAY

BY

ATTORNEY.

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H. M. HARTWAY

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Fig. 10

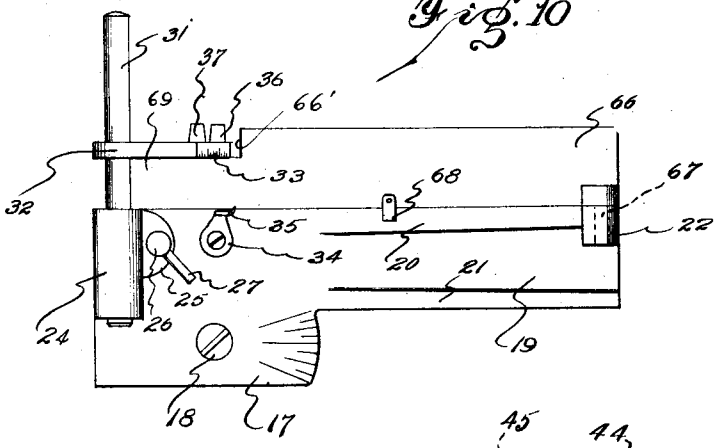
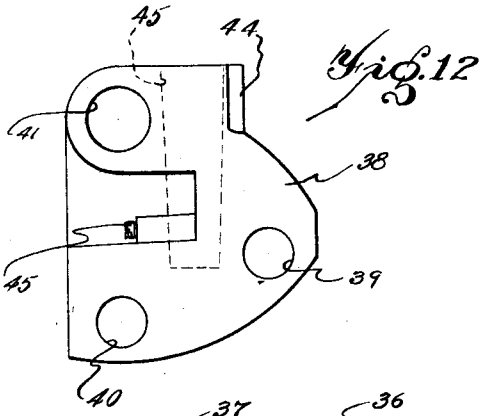


Fig. 12



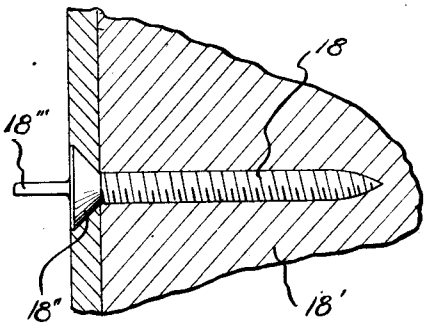


Fig. 11

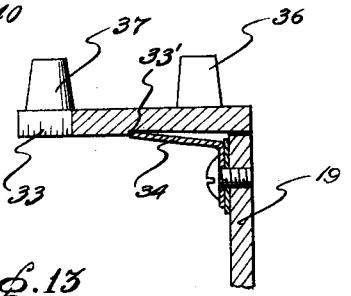


Fig. 13

INVENTOR.
HARVEY M. HARTWAY

BY Thos. J. Donnelly

ATTORNEY.

Patented Sept. 4, 1928. 1,683,460

UNITED STATES PATENT OFFICE.

HARVEY M. HARTWAY, OF HIGHLAND PARK, MICHIGAN.

MITER BOX.

Application filed April 28, 1924. Serial No. 709,456.

My invention relates to a new and useful improvement in a miter box, such as is commonly used by carpenters and similar artisans in making various angled cuts with a saw on a workpiece. In making cuts on different workpieces, it is sometimes desirable to change the angle of the cut and be able to return to the angled cut from which the change is made.

The present invention has as its object the provision of a miter box whereby the miter box may be quickly and easily adjusted for directing the saw for making various angled cuts.

Another object of the invention is the provision of a miter box whereby the saw, while contained between the guide members, may be quickly and easily tilted backwardly out of cutting position to permit the assembly of a workpiece on the cutting bench.

Another object of the invention is the provision of a miter box, so arranged as to present a guide member adjusted for determining cuts at forty five degrees to each other and arranged for quickly and easily passing from one adjustment to the other.

Another object of the invention is the provision of a miter box whereby a tilting of the saw to lie in a horizontal plane will release the guide members for adjustment movement.

Another object of the invention is the provision of a miter box having a face plate adapted for mounting on a supporting member and so arranged as to be capable of being tilted out of operative position so as to leave the work bench or work support free from all obstruction and arranged so that the miter box may be returned to operative position by movement of the same on its pivotal mounting to the work bench or work support.

Another object of the invention is the provision of a miter box having a guide adapted for adjustment to provide angular cuts carried by a supporting member, adapted for tilting in angular relation to the work bench or work support, so as to provide means for effecting a double angular cut with the saw operating in the guide.

Another object of the invention is the provision of a miter box whereby the saw may be very easily and quickly inserted and removed from the guide members.

Another object of the invention is the provision of a miter box having a saw guide so arranged as to prevent the injury of the teeth of the saw while held within the guide.

Another object of the invention is the provision in a miter box of saw guides having saw limiting means mounted thereon to prevent the undue raising of the saw relatively to the guides.

Another object of the invention is the provision of a miter box having saw guides adjustably connected to each other for permitting their arrangement relatively to each other for the reception of various sized saws therebetween.

Another object of the invention is the provision in a miter box of a detachable plate for elevating the saw to permit the positioning of workpieces of greater thickness thereunder than normally used therewith.

Another object of the invention is the provision of a miter box having saw guides arranged to guide the saw in its operation and to securely hold the same when elevated to inoperative position.

Another object of the invention is the provision of a miter box having adjustable saw guides, and provided with means for adjusting the angular relation of the saw guides to the workpiece and so constructed as to permit a ready change to forty-five degrees from any adjusted position.

Another object of the invention is the provision of a miter box having saw guides adjustable vertically relatively to the work bench with which used.

Another object of the invention is the provision with a miter box adapted for tilting relatively to the support on which mounted, of means for supporting the free end of said miter box when tilted to various degrees.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood from a reference to the accompanying drawings which form a part of this specification and in which.

Fig. 1 is a top plan view of the invention showing the guides at a forty five degree angle relatively to the workpiece,

Fig. 2 is a side elevational view of the invention showing the guides projected at right angles to the workpiece, and dotted in horizontal position.

Fig. 3 is a fragmentary sectional view of the invention, taken on substantially line 3—3 of Fig. 2,

Fig. 4 is a side elevational view of the invention showing it adjusted to a right angle cut,

Fig. 5 is a sectional view taken on substantially line 5—5 of Fig. 4,

Fig. 6 is a fragmentary sectional view taken on substantially line 6—6 of Fig. 1,

Fig. 7 is a sectional view taken on substantially line 7—7 of Fig. 6,

Fig. 8 is a sectional view taken on substantially line 8—8 of Fig. 6,

Fig. 9 is a sectional view taken on substantially line 9—9 of Fig. 2,

Fig. 10 is a side elevational view showing the detachable plate in operative position,

Fig. 11 is a fragmentary view illustrating the attaching screw used in the invention,

Fig. 12 is a bottom plan view of a plate used in the invention,

Fig. 13 is a sectional view taken on line 13—13 of Fig. 2.

The invention, in its preferred form, comprises a face plate having an attaching portion 17 which is attached to a work bench or other suitable work support 18′ by a suitable lag screw 18, having a conically shaped neck 18″ and a head 18‴ adapted for reception between the claws of a hammer, or in the huck of a carpenter's brace, or the like. Made integral with the portion 17 is an elongated bearing face plate 19 adapted to engage on one face the workpiece 19′ (see Fig. 9) which is mounted on the work bench or work support 18′. The plate 19 is provided, along its edges, with reinforcing ribs 20 and 21, so as to give to the plate sufficient strength and at the same time reduce, as much as possible, the body of the material forming it so as to reduce its weight. The plate 19 is provided, at one end, with an integrally formed knuckle 22, the purpose and function of which will appear hereinafter. The inner face 23 of the plate 19 is provided with sharp ribs or ridges, so as to engage and grip the workpiece and assist in preventing a longitudinal movement of it relatively to the plate 19 (see Fig. 9), when a cut is being made which is at nearly a straight angle to the longitudinal axis of the workpiece. Formed on the face plate, adjacent one end, is a split knuckle 24, having an outwardly projecting lug 25 through which is projected a bolt 26 threaded into the main body of the plate and provided with an operating handle 27 for effecting a screwing of the bolt 26 to bring about a clamping of the knuckle 24, upon a post 31 positioned therein. (See Fig. 3.) Mounted upon the work bench or work support 18′ is a cam supporting member 28 adapted for pivotal movement relatively to the work bench and for supporting the outer end of the plate 19 in various angles of vertical adjustment relatively to the work bench 18′. As shown in Fig. 2, the cam is provided with a plurality of circumferentially arranged holes so that, by driving a nail therethrough into the work bench 18′, the cam may be retained in any desired adjusted position. One end of the cam is provided with a tongue 29, which presents a means for moving the cam by means of a hammer on its pivot to bring about the various degrees of adjustment. In Fig. 9, the cam is shown as being chamfered at one side 30 to permit the entry of the claws of a hammer between the cam and the face of the work bench 18′ to facilitate the removal of the cam from the work bench.

Fixedly mounted on the post 31 is a segment 32 having an arcuate face 33 graduated and scaled so as to indicate various angles of rotation of the post 31. Attached to the face plate 19 is an indicating finger 34 having a portion 35 of the end turned upwardly to engage the face 33′ and permit rotation of the segment 32, so as to indicate on the face 33 the various angles of rotation or adjustment which may be made by rotating the post 31. Mounted on the upper surface of the segment 32 and projecting upwardly therefrom, are bosses 36 and 37 (see Fig. 13) spaced apart so that a rotation of the sector through 45 degrees will bring the boss 37 into the position formerly occupied by the boss 36. The purpose of mounting these bosses this distance apart will appear herein when the description of the adjusting feature of the invention is set out.

A casting 38 is used with the invention having a flat surface provided with openings 39 and 40 (see Fig. 12) formed therein so positioned apart that one of the openings may receive one of the bosses already mentioned and the other opening receive the other boss at the same time. This casting is provided with an opening 41, which extends through an outwardly projecting sleeve 42 having notches 43 and 43′ formed in the sides thereof diametrically opposite each other. This casting is adapted for fitting over the post 31 in a free position, the openings 39 and 40 receiving the bosses 37 and 36. An enlargement 44 is formed on the casting and provided with an interiorly tapered opening 45 (see Fig. 6) in which is extended a hub 45′ through which passes a screw 47 for binding a guide blade 46 to the casting, the blade 46 being countersunk to permit the head of the screw 47 to lie flush with its surface. Projecting upwardly from the blade 46, at one side thereof, is an arm 48 having a hole formed therein adjacent the upper end thereof (see Fig. 6). Projecting longitudinally of the blade 46 and inclined downwardly from the arm 48 is a reinforcing portion 49 for the purpose

of strengthening the blade, as will be readily understood. Projecting upwardly from the opposite end of the blade 46 is another arm 50 having a hole provided in its upper end. (See Fig. 4.)

A yoke 55 is mounted in pivotal relation to the arm 48 by means of a screw 58 positioned in the opening formed in the arm 48 and threaded into a downwardly projecting portion 53 of a yoke 55 which has an angularly turned portion 54 connecting the downwardly turned portion 53. As shown in Fig. 5, the arm 48 is provided with a beveled face 48′ which engages a beveled face 53′ formed on the member 53. The opposite end of the yoke is pivotally connected to the upright arm 50 by means of a screw; such as shown in Fig. 5. The yoke portion 55 is made from a sufficiently resilient material to permit a slight springing of the same so that, as the arm 53 is moved over the arm 48, the beveled faces will be brought into closer relation, the member 53 being sprung slightly outwardly against the tension of the material of which the yoke is made, when pivotal movement of these parts is effected. The same tension is obtained at the arm 50 when the swinging of the yoke relatively to the arms 48 and 50 is brought about. The construction is such that when the yoke is brought close to the position shown in full lines in Fig. 2, the resiliency of the material will cause the yoke to snap quickly into the position shown in Fig. 2, the inward pressure of the yoke ends on the bevel faces effecting this movement. Consequently, the formation of the arms supporting the yoke and that portion of the yoke pivotally connected to the arms together with the resiliency of the material of the yoke serve to lock the yoke in the position shown in Fig. 2, to resist a movement of the yoke on the pivots supporting it. As shown in Fig. 4, the member 53 projects considerably below the point of pivotal connection. By extending this member 53 below the point of pivotal connection, more body is given to the coacting beveled faces, so that a more effective locking of the parts in their normal position shown in Fig. 1 is brought about.

As shown in Fig. 5, the openings in the arms to which the yoke is pivotally connected are sufficiently large to receive the head of the screw 58, which is threaded into the depending portions of the yoke. Associated with the yoke 55, is a cooperating yoke 60 carrying at its lower end a guide blade 61 adapted to co-operate with the blade 46 for guiding a saw while in use. As shown in Fig. 6, the edge of the blade 46 is beveled, as at 51 and 52, and as shown in Fig. 2, the edge of the blade 61 is also beveled on both sides, to permit a ready entry of the saw between the guides and to permit a more direct vision to the line of cut. The yoke 60 is provided with a lug 63 which is connected to a lug 63′ formed on the yoke 55 by means of a suitable bolt or screw. Formed on the inner surfaces of the yokes 60 and 55 are lugs 64 which also are connected by a bolt or screw. Formed on each of the yokes is a third lug 65 which lugs are connected together by means of a suitable bolt or screw. The yokes are mounted so as to present a slight space between the inner sides of the same, so that, a saw may be passed therebetween. Adjustment of this space between the yokes may be had by placing shims between the yokes at the upper end preliminary to tightening the bolts or screws, projecting through the lugs.

It is thus seen that the yoke is mounted on the casting 38 which is loosely positioned on the post 31 for free rotation thereabout. However, the openings 39 and 40, having received the bosses 37 and 36, a rotation of the yoke, bearing the guide blades, about the post 31 is prevented. Upon tilting the yoke on its pivots 58, so as to bring it into the position shown in dotted lines in Fig. 2, the portion 54 of the yoke, which is formed of greater width than its thickness, enters the notches 43, formed in the sleeve 42. The width of the portion 54 is such, however, that upon engaging the top of the post 31, which normally projects slightly above the upper end of the sleeve 42, it raises the casting 38 into the elevated position shown in dotted lines in Fig. 2, so that the bosses 36 and 37 are disengaged from the openings 39 and 40. Free rotation of the guide members may then be had about the post 31.

As shown in Fig. 1, the guide members are directed at an angle to the workpiece 19′, which is positioned on the work bench or work support 18′ at an angle of forty five degrees to provide a forty five degree cut with the saw positioned in the guides, the bosses 36 engaging in the opening 39. Upon tilting the device to horizontal position, as shown in dotted lines in Fig. 2, the yoke, together with the guides attached thereto, may be moved into the position shown in full lines in Fig. 2, so that each of the bosses 36 and 37 shall be received in one of the openings 39 or 40, and the guides will then be directed at right angles to the workpiece positioned on the work bench. It is thus seen that a quick shifting of the cuts from a right angle cut to a forty five degree cut may be had upon tilting the yoke to the position shown in dotted lines in Fig. 2 and rotating the same about the post 31 as an axis, so as to bring the openings 39 and 40 into alignment with their respective bosses 36 or 37. With a device of this class, this feature is an important one, as the majority of the cuts made by a carpenter or other

artisan are either forty five degree or ninety degree cuts; consequently, the permanent adjusting features are directed largely to the forty five and ninety degree cuts. It is to be noted, however, that an angular cut may be made on the workpiece and the device is so arranged that it may be adjusted for use in making another cut forty five degrees to the cut originally made.

When the device is assembled, the edge of the sector 32 is brought into alignment with the face of the plate 19. The clamp operated by the bolt 26 is then brought into tight engagement with the post 31, so as to prevent its rotation. The device is then in the adjusted position for making a right angle cut and a forty five degree cut with the adjustment already described. However, any angle of cut may be made within the limits of the specific device by adjusting the relative position of the segment 32 to the face of the plate 19. This adjustment may be made by rotating the post 31 until the proper angle is indicated by the gauge finger 35 on the graduated face 33. A clamping of the post 31 by the clamping member 24 is then had.

When the device is moved from the position shown in dotted lines in Fig. 2, to the position shown in Fig. 1, or in full lines in Fig. 4, as the guide blades 61 and 46 are brought into close relation to each other, the beveled faces 48′ and 53′, cooperating with the tension of the material from which the yoke is made, cause these blades to snap quickly into the position shown in Fig. 1, so that the guide blades 61 and 46 will maintain a slight pressure on the saw to prevent the same from falling out of the guides. This feature is a desirable one inasmuch as the saw is held firmly between the guides when the device is tilted relatively to the face plate 19 on the hub 45′ as an axis, as seen in dotted lines in Fig. 4. As shown in Fig. 6, the guide blade 46 is mounted on the casting 38 by means of the screw 47 projected through the hub 45′ which is formed integral with the guide blade 46. The yoke, therefore, is adapted for tilting movement upwardly relatively to the casting 38 on the hub 45 as an axis. Upon moving the yoke upwardly so as to bring the blades 61 and 46 into vertical position the screw 47 tends to turn. This screw 47, however, is prevented from rotating by means of a suitable set screw 45″ threaded into the casting and adapted to engage the periphery of the screw 47. As shown in Fig. 6, the arm 48 is provided with a laterally projecting stop 75 adapted to engage an abutment member 76 (see Fig. 7) formed on the enlarged portion 44 of the casting 38. In this way, the tilting movement of the yoke on the hub 45 as an axis is limited so that when the blades 61 and 46 are brought into vertical position, the top 75 will be in engagement with the abutment member 76. When a saw is positioned between the guides 61 and 46, and it is desired to clear the work bench of all obstruction by the saw and guides, a swinging of the yoke to bring a saw into vertical position, as described, will serve to free the work bench of such obstructions quickly and easily, while, at the same time, in no way interfering with the adjustment of the angle of the guides and without necessitating the removal of the saw therefrom.

When the device is moved to the position shown in dotted lines in Fig. 2, the saw may be readily and quickly inserted between the yoke members 55 and 60, so that, when the device is brought to the position shown in Fig. 1 or in full lines in Fig. 4, the guide members will serve to engage the saw and retain it in position therebetween.

To prevent the saw from rising unduly while positioned between the guides, I have provided on the yokes an abutment member 71, having the engaging portion 72 formed at one end thereof; at the opposite sides of the yokes, I have mounted another abutment member 73 having the end 74 thereof angularly turned to project across the space 66 which separates the yokes 55 and 60. These members serve to prevent an undue rising of the saw either through the operation of the saw while making the cut, or while inserting the saw into the device.

In Fig. 10, I have shown an attachment face plate 66 mounted on the face plate 19. This plate 66 is provided with a bolt or finger 67 projecting outwardly from its edge and adapted to enter the openings formed in the portion 22 on the plate 19. Attached to the face of the plate 66 is a keeper 68 which is adapted to project beyond the edge thereof and engage the face of the plate 19 to prevent a swinging of the plate 66 on the bolt or finger 67, as a pivot, the free end of the plate 66 engaging against the periphery of the post 31. The plate 66 is provided with a cutaway portion 66′ to permit a riding of the segment 32 therein. The use of the plate 66 is desired when the workpiece is of greater thickness than ordinarily used, so that the saw guide may be elevated to the proper position and still afford a face plate for engaging the workpiece sufficiently to afford stability. As shown in the drawings, the portion 17 of the face plate is formed arcuate and graduated on its arcuate portion into various degrees. This graduation serves as a scale to indicate the various angles of elevation of the face plate or bolt 31 relatively to the work bench when the face plate is tilted on the bolt 18 as a pivot. If desired, a suitable indicating finger may be mounted on the work bench for co-operating with the graduations at the portion 70, although this is not necessary. In this way, the device

may be used for tilting, as suggested, to make an angular cut of the workpiece and while in a tilted position, adjustment of the guides may also be had for effecting another angular cut, thus providing an adjustable means for guiding a saw in making a double angular cut of a workpiece on which operated.

The device may be tilted to a full one hundred and eighty degrees on the bolt or lag screw 18, so that the device may be readily and quickly moved to this position to free the work bench from all obstructions. Where it is desired to return the device to operative position, the angle of cut, which was previously had, may be preserved, as it will not be necessary in tilting to such position, under ordinary circumstances, to alter the position of the segment 32 relatively to the face plate 19. The various positions of rocking are shown in the figures in dotted lines, it being apparent that the guide members may be rocked on the tapered shank 45′ irrespective as to whether or not the guide members are both lying in a vertical plane or raised to the position shown in Fig. 2.

It will be noted that by releasing the clamp which binds the plate 19 on the post 31, the vertical position of the casting relatively to the post may be adjusted for accommodating workpieces of various sizes, as already indicated.

It will be noted that the abutment members 71 and 73 mounted on the yoke terminate in a vertical plane substantially flush with the ends of the guide members. The purpose of extending these abutment members to this distance is to prevent any contact of the teeth of the saw with the guide members while positioned therebetween upon a tilting of the saw. Bringing the ends of the abutment members closer toward each other will permit a greater tilting of the saw, and it has been found from experience that it is desirable to have these abutment members terminate substantially in a vertical plane tangent to the ends of the guide members.

It will be noticed that the segment is provided with a notch 33′ on the under surface in which engage the upturned portion of the finger 34. In this way, the setting of the segment on the post 31 is very easily effected to give a right angle and a forty-five degree cut. The other adjustments are determined by the degrees indicated on the graduated face of the segment.

While I have illustrated and described the preferred form of structure, I do not wish to limit myself to the precise form of structure shown, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A miter box of the class described comprising a supporting member; a post mounted on said supporting member; a pair of saw guide members carried by said post and adapted for rotation thereon; a yoke mounted on said saw guide members and adapted for tilting to bring one of said guide members into horizontal position, the other of said guide members being in a vertical plane.

2. A miter box of the class described comprising a supporting member; a pair of saw guides rotatably carried on said supporting member; means co-operating with said saw guides for preventing their rotation on said supporting member; a yoke supporting said guides upon their rotatable mounting, so that they may be tilted to bring the saw to a horizontal plane and operating, when so tilted, to release said saw guides for rotation about said supporting member.

3. A miter box of the class described comprising a supporting member; a pair of saw guides carried by said supporting member and adapted for rotation thereon; means associated with said supporting member for preventing rotation of said saw guides on said supporting member; and means for mounting said saw guides upon their rotatable mounting so that they may be tilted to a horizontal plane and operating, when so tilted, to release said guides for free rotation about said supporting member.

4. In a miter box, a pair of saw guides; means for supporting said saw guides, one of said guides being retained in a vertical plane; a yoke associated with said guides and adapted for carrying one of the same and for pivotal attachment to the other; and means for locking said blades normally in close engagement with each other.

5. A miter box comprising a face plate; a post mounted on said face plate; a segment carried by said post; a plurality of abutment members mounted on said segment separated forty-five degrees; a pair of saw guide members mounted on said post and adapted for rotation thereon; means associated with said saw guide members for engaging said abutment members; means for moving said engaging means longitudinally of said post for releasing said abutment engaging means for permitting the rotation of said saw guide members about said post and adapted for permitting the engagement of said engaging means with one of said abutment members after the rotation of said guide members about said post through forty five degrees, subsequent to engagement of said engagement means with both of said abutment members.

6. In a miter box, a pair of saw guide members; means for carrying one of said saw guide members; a yoke attached to the

other of said saw guide members; arms projecting upwardly from said carried saw guide member and a portion on said yoke adapted for pivotal mounting on said arms for permitting the separation of said saw guides; the engaging faces of said arms and said portion of said yoke being oppositely beveled, said yoke being sufficiently resilient to permit the flexing of said portions when moving over the apex of the beveled surface of said arms.

7. In a miter box, a pair of saw guide members; means for carrying one of said saw guide members; means for carrying the other of said saw guide members, and pivotally mounted on said first named carrying means, adapted for rocking the other saw guide member relatively to said first named saw guide member, said carrying means having a saw receptive slot between them adapted for receiving a saw when rocked to a position placing said saw guides in inoperative relation.

8. A miter box of the class described, comprising a vertically extending supporting member; an abutment member carried by said supporting member having a pair of spaced bosses projecting from the upper surface thereof; an engaging member swingably mounted on said supporting member and having a pair of openings, spaced apart, each adapted for the reception of one of said spaced bosses; a saw guide mounted on said engaging member; a pair of parallel extending yokes, one of said yokes being pivotally mounted at its opposite ends to said saw guide; a saw guide fixedly mounted on the other of said yokes, the upper end of said post projecting beyond said engaging member, said pivotally mounted yoke being adapted for engaging, when swung to horizontal position, the upper end of said supporting member for raising said engaging member out of engagement with said spaced bosses, for permitting the free rotation of said yokes about said post as an axis.

In testimony whereof I have signed the foregoing specification.

HARVEY M. HARTWAY.