

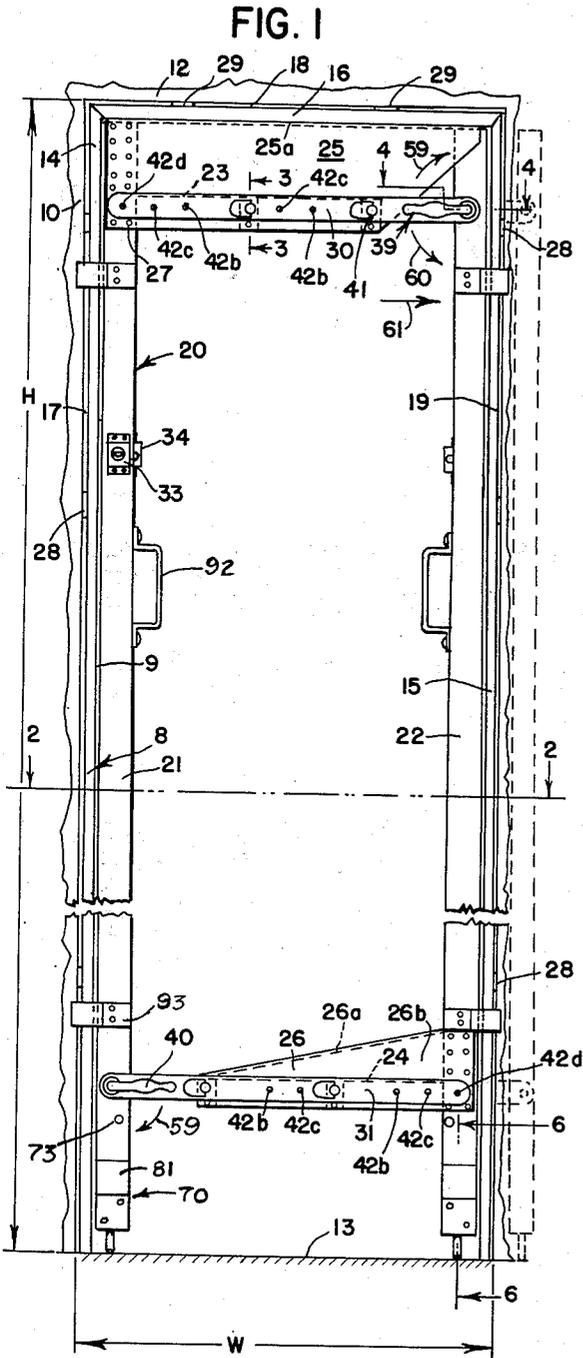
Sept. 3, 1963

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DOOR FRAME SQUARE

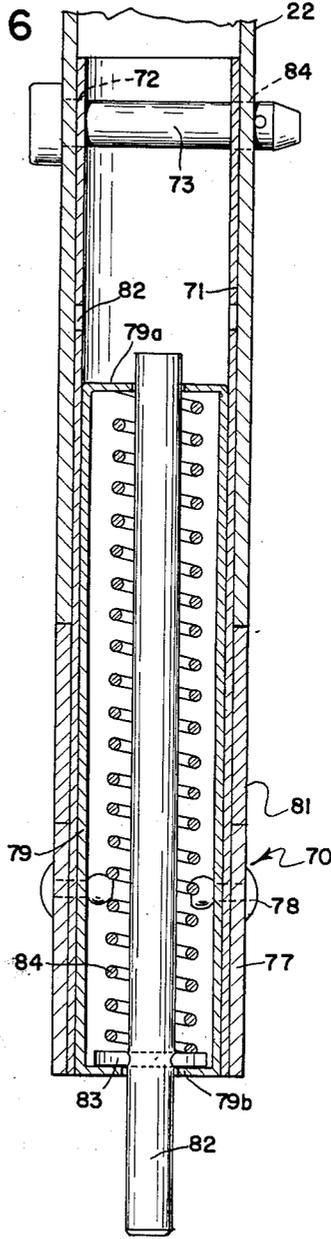
3,102,345

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2 Sheets-Sheet 1



**FIG. 6**



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2 Sheets-Sheet 2

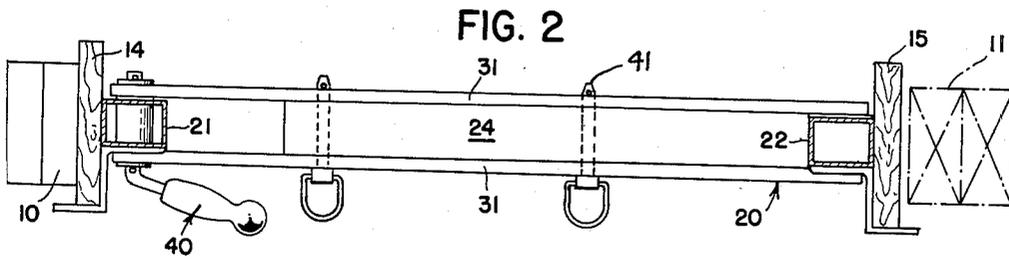


FIG. 2

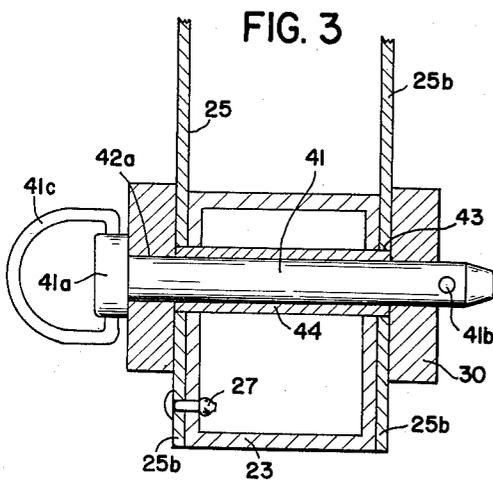


FIG. 3

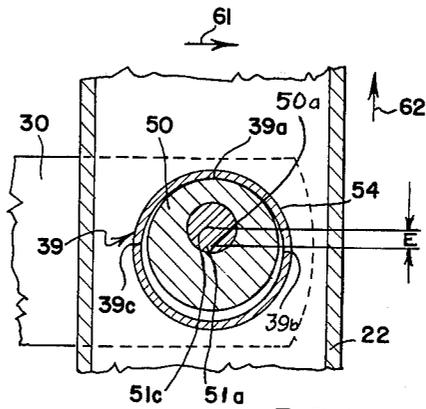


FIG. 5

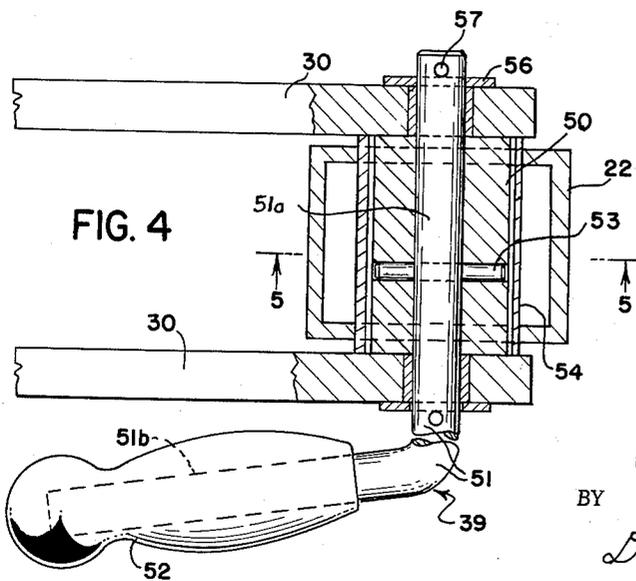


FIG. 4

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3,102,345

**DOOR FRAME SQUARE**

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4 Claims. (Cl. 33-194)

This invention relates to improvements in door frame square for purpose of the provision of a device for setting and squaring finished door jambs. More particularly, this invention relates to an improved inexpensive door frame square that may be used conveniently by a carpenter in setting and placing a finished door jamb more rapidly with less expense and greater accuracy.

In prior devices intended for this purpose the operation of said devices do not provide for accurate placing of the door jambs while at the same time being of relatively simple construction and also being readily usable for setting door jambs in doors of varying widths.

It is an object of this invention to provide an improved door frame square which is capable of temporarily supporting a complete door jamb very accurately when it is placed in a rough opening of wall, and which will permit the user thereof immediately to adjust the door frame square to the appropriate width of a door and then make a further fine adjustment to square the door jamb in the rough opening and firmly hold it while permitting fastening the door jamb firmly in place.

It is another object of this invention to provide an improved door frame square which is strongly made and capable of holding a door jamb very accurately during the setting operation, which is of relative light weight and inexpensive yet strong, and capable of being moved readily from one place to another within a house in which several doors are being placed and is capable of being used for setting doors of varying standard widths.

Another object of this invention includes the provision of a door frame square having cam adjustment members for making a fine adjustment to square the door jamb. It is still another object of this invention to provide a door frame square having improved means for firmly holding the jamb head piece in place while permitting an adjustment for width of the door to square the jamb side pieces.

Other objects of this invention include the provision of improved door frame square of exceedingly yet rugged and simplified construction and capable of being manufactured at a relatively low cost.

Other and further objects are those inherent in the apparatus as herein illustrated, described and claimed.

To the accomplishment of the foregoing and related ends this invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principles of the invention may be employed.

The invention is illustrated with reference to the drawings wherein:

FIGURE 1 is a vertical elevational view of the door frame square of this invention shown in a rough door opening and supporting a fitted door jamb in position for nailing the door jamb solidly to the rough opening, one of the side rails of the door frame square being shown in dotted line in position for supporting a door jamb for a door of a wider width than that illustrated in solid lines.

FIGURE 2 is a horizontal view, part in cross-section, taken along the line and looking in the direction of the arrows 2-2 of FIGURE 1 to better illustrate the construction of the members for holding the jamb side pieces in position.

2

FIGURE 3 is a fragmentary cross-sectional view taken along the line and in the direction of the arrows 3-3 of FIGURE 1 to more clearly illustrate the members permitting adjustment of the door frame square for doors of different standard widths.

FIGURE 4 is a fragmentary cross-sectional view taken along the line and in the direction of the arrows 4-4 of FIGURE 1 to show the mechanism for making a fine adjustment to square the jamb side pieces prior to nailing.

FIGURE 5 is a vertical cross-sectional view taken along the line and in the direction of the arrows 5-5 of FIGURE 4 to more clearly illustrate the cam adjusting mechanism.

FIGURE 6 is a vertical cross-sectional view taken along the line and in the direction of the arrows 6-6 of FIGURE 1 to more clearly illustrate the height adjusting and compensating mechanism.

Referring to FIGURES 1 and 2, there is illustrated a rough opening in a wall of a height H and a width W, the rough opening being formed by the vertical studs 10 11 on either side thereof, the rough header 12 and the floor or threshold 13. In accordance with the usual framing procedure, the rough opening is made somewhat larger than the finished door jamb, generally designated 8, which is to be received in the rough opening, some clearance being left all around at 17, 18 and 19 so as to provide for shimming of the finished door jamb for purposes of plumbing and leveling of the finished door jamb. In this connection, it is to be noted that the aforementioned clearance and the spacing 9 between the finished door jamb and the door frame square of this invention, generally designated 20, is exaggerated for purposes of more clearly illustrating the invention.

The finished door jamb 8 is composed of a left jamb side piece 14, a right jamb side piece 15, and a jamb head piece 16. These are furnished in "sets" for various door dimensions and are usually furnished slightly oversize so as to permit the lower ends of the jamb side pieces 14, and 15 to be cut off even with the upper surface of the floor 13. Although not illustrated, it is to be understood that the clearance spaces 17, 18 and 19 throughout the length thereof are not usually uniform, thus customarily the master carpenter in installing the finished door jamb will place shims 28 and 29 intermediate the finished door jamb and the structure for forming the rough door opening as indicated in FIGURE 1. These shims are usually a pair of shingles or pieces of shingles set one against the other so as to form opposing wedges. They are driven into place so as to take up the space of clearance wherever it happens to be, after the door jamb is accurately positioned.

According to the present invention, the door frame square will accurately hold the jamb side pieces 14 and 15 of the finished door jamb and these will be parallel and plumb with the jamb head piece 16, which likewise is held perfectly level and "square" with the jamb side pieces. The plumb condition is indicated by the levels 33 and 34 of the door frame square.

The locating of the finished jamb side pieces and jamb head piece is accomplished by a door frame square of the present invention, now to be described. The door frame square 20 comprises a left side bar 21 and a right side bar 22 which may be made of rectangular shaped tubular pieces of aluminum. One end of an upper cross bar 23 is welded or otherwise secured to the left side rail adjacent the upper end thereof, while one end of a lower cross bar 24 is likewise secured to the right side bar 22 adjacent the lower end thereof. Preferably the cross bars are of a length to extend substantially three-quarters of the distance across the width of the narrowest rough opening in which the door jamb is to be set. The

cross bars 23, 24 in cross section are of the same shape and size as the side bars 21 and 22.

A top gusset 25 that is U-shaped in vertical cross-section is along the left hand edge portions of the legs 25b thereof secured to the left side bar by, for example, rivets 27 and along its lower horizontal edge portions is riveted to the adjacent portions of the upper cross bar. The gusset 25 has a web portion 25a that in part overlies the upper end of the bar 21 and is of a length that is slightly less than the width W of the smallest rough opening in which a door jamb is to be set. The gusset 25 is secured to the side bar 21 and bar 23 to have the upper surface of the web 25a extend at right angles to the surface of the rail 21 that abuts against the jamb side piece 14. The gusset 25 serves two primary functions, i.e. serving as a reinforcing member, and squaring the jamb head piece 16 and holding it in a "squared" condition, it being noted that the top surface of the web 25a abuts against the jamb head piece 16.

A lower gusset 26 that is generally U-shaped in vertical cross-section, has the lower edge portions of the legs 26b thereof riveted to the lower cross-bar 24 and along the right hand edge portions is riveted to the adjacent portions of the rail 22. The gusset 26 has a web portion 26a that extends from closely adjacent the left hand end of the cross bar 24 in an inclined upwardly direction to have the opposite end thereof closely adjacent the left side of the rail 22. A cut out (not shown) is formed in the web 26a to permit the legs 26b overlapping the side bar 22 on either side thereof. The gusset 26 serves as a reinforcing member for retaining the cross-bar 24 in right angular relationship to the side bar 22.

In order to retain the side bar 22 in various selected adjusted positions relative to the side bar 21, there are provided a pair of upper adjusting bars 30 that at their one end are secured to the upper end of the side bar 22 for limited horizontal and vertical movement relative thereto by the upper cam assembly 39. One adjusting bar 30 is located to overlie the outer surfaces of each leg 25b of the gusset. Likewise a pair of lower adjusting bars 31 are secured to the left side bar 21 for limited vertical and horizontal movement relative thereto by a cam assembly 40. The adjusting bars are located to abut against the outer surfaces of the legs 26b of the lower gusset. The cam assemblies will be described in detail hereinafter.

Each of the adjusting bars 30 and 31 has a pair of apertures 42a, a pair of apertures 42b, a pair of apertures 42c and an aperture 42d (in FIGURE 1 the pins 41 are extended through the apertures 42a). The spacing between each corresponding pair of apertures 42a, 42b, and 42c respectively of each adjusting bar is equal while the spacing between the aperture 42d and the aperture 42a that is formed in the intermediate portion of each adjusting bar likewise is equal to the spacing between the pair of apertures 42a. Thus, as will become more apparent hereinafter the door frame square of this invention may be used on, for example, the following door sizes: 2 feet; 2 feet, 4 inches; 2 feet, 6 inches; and 2 feet, 8 inches. It is to be understood that the aforementioned dimensions are merely given for purposes of illustration rather than to constitute a limitation on the door frame square of this invention.

Formed in each of the cross pieces 23 and 24 are a pair of apertures 43, the spacing between the apertures 43 corresponding to the spacing of each pair of apertures 42a, 42b, and 42c of the adjusting bars. Likewise, apertures 43 are provided in each of the upper and lower gussets 25 and 26 and have bushings 44 mounted therein that have openings coextensive with the apertures 43 provided in the cross bar. In order to retain the side bar 22 at a given rough width relative to the side bar 21 there are provided a pair of pins 41 for each of the cross pieces. If the door frame square is constructed for setting door jambs in

doors of the narrowest width that it is to be used with, then a pin 41 is extended through each aperture 42a of each of the upper and lower cross pieces and the apertures 43 of the respective gussets and cross pieces as illustrated in FIGURE 1 and FIGURE 2. Since a pair of horizontally spaced pins are extended through each set of upper and lower adjusting bars and the adjacent cross pieces, the adjusting bars are firmly held in position relative to the cross pieces and therefore cannot move out of right angular relationship with respect to each of the side bars 21 and 22. It is to be noted that each pin has a head 41a that bears against one of the adjusting bars and a spring loaded lock ball 41b that bears against the corresponding opposite adjusting bar for retaining the pin in the apertures through which it is extended. The pin is also provided with a handle 41c for facilitating the removal and inserting the pin through the respective apertures.

If the door frame square has the pins extended through the apertures 42a and it is then desired to use it for setting door jambs in a door opening of a wider width, for example, 2 feet, 4 inches, then the four pins 41, are removed and the side bar 22 moved away from the side bar 21 so that each aperture 42b will be coextensive with an aperture 43. The pins are again reinserted and the door frame square has been adjusted for use in setting door jambs for doors of 2 feet, 4 inches. If the door frame square is to be used for the widest width, the door pins are removed and the rail 22 is moved relative to the rail 21 so that the apertures 42d of the upper adjusting bars is coextensive with the left set of apertures 43 and the right set of apertures 42a is coextensive with the right set of apertures 43.

Due to the provision of the aforementioned apertures 43, 42a, 42b, 42c, and 42d together with the pins 41, adjustment can be made that corresponds roughly to the expectant width of the rough opening.

In order to provide a fine adjustment in the final squaring and plumbing of the door jamb, the cam assemblies 39 and 40 are provided. Thus after a rough adjustment has been made and the door frame square is set in the rough opening with the jamb pieces intermediate the structure forming the rough opening of the door frame square, the cam assemblies are set as will be described hereinafter.

Since each of the cam assemblies 39 and 40 are of similar construction, only the cam assembly 39 will be described in detail. Referring in particular to FIGURES 4 and 5, it is to be noted that each cam assembly includes a cylindrical cam 50 having a straight portion 51a of the handle bar 51 extended therethrough. Apertures are provided in the handle bar portion 51a and the cam 50 have the pin 53 extended therethrough so that the cam will be rotated upon rotating the handle bar 51. Bushings 56 are provided in the adjusting bars 30 to have the handle bar portion 51a extended therethrough and rotatably mount the handle bar, there being pins 57 for removably retaining the handle bar in the bushings 56 and adjusting bars 30. Formed integral with one end of the handle bar portion 51a and outwardly of the adjusting bar 30 is an incline portion 51b. Mounted on the portion 51b is a hand grip 52. The portion 51b is of a length and inclined at an angle sufficient to permit the user readily gripping said handle grip 52 and rotating the handle bar about the central axis of the portion 51.

Mounted in appropriate apertures formed in the side bar 22 is a cam bushing 54. The interior diameter of the cam bushing is slightly larger than the exterior diameter of the cylindrical cam. In order to give the camming action to the aforementioned structural members of the camming assembly, the handle bar portion 51a is extended through an appropriate bore formed in the cam such that the center longitudinal axis 51c of the portion 51a is offset from the center longitudinal axis 50a of the cam by a distance E. Preferably the external diameter of the cam is less than the internal diameter of the bushing 54 by a dimension E.

The hand lever is mounted in the bushings 56 to be

frictionally retained in any set position. A datum position for the handle is as illustrated in FIGURE 1 wherein the cam bears against the bushing 54 along the axial line 39a. In order to move the side bar 22 away from the side bar 21 the hand grip of cam assembly 39 is rotated in the direction of the arrow 60 to a position 90° spaced from the datum position. In the aforementioned 90° position the cams will bear against the bushings 54 along the axial line 39b. The cam in moving from position to bear against the bushing at 39a to a position at 39b forces the bushing to move horizontally in the direction of the arrow 61. At the same time the side bar 21 is permitted to move vertically downwardly in the direction opposite arrow 62 due to the foot assembly structure which will be described hereinafter. The side bar 21 moves to a downward position due to the spaced point securing of the adjusting links to the cross piece and the upward force exerted in bar 22 that is against the jamb head piece. This movement is compensated for by turning the cam assembly 40 wherein the door frame square is held in a squared condition.

If it is desired to move the side bar 22 inwardly towards the side bar 21 and then the hand lever of cam assembly 39 is moved from the datum position illustrated in FIGURE 1 in the direction of the arrow 59 (90° with respect to the datum position) to a position wherein the cam contacts the bushing 54 along the axial line 39c. This results in the side bars moving in a horizontal direction opposite the arrow 61 and the side bar 22 moving in the same manner described in the preceding paragraph.

Even though it has been set forth that the hand levers are moved at different times, it is to be understood that usually the carpenter will grasp one hand lever in each hand and rotate them simultaneously. Further, it is to be understood that the desired setting of the hand levers may be less than 90° from the datum position and that in properly squaring the door jamb the setting of the two hand levers with respect to the datum positions may be at different angles. The angular displacement depends on the amount of undersize or oversize of the rough door opening and the diameter of the bushing, cam and dimension E. For the door frame squares of this invention, it has been found that a dimension E of 1/8" is satisfactory, although it could be a larger dimension if desired. Using E of 1/8" and turning the hand lever 90° from the datum position, the side bars are moved 1/8" in a horizontal direction.

Additionally, it is to be mentioned that even though it is preferred that the door frame square be provided with the foot assemblies such as disclosed, it is operable even though such assemblies are not provided (provided the side bars are of a proper height).

In order to provide a height adjustment feature in order that the door frame square of this invention may be used for setting door jambs of different heights, the foot assembly, generally designated 70, is provided. Since there is a foot assembly for each side bar and each of the foot assemblies are of the same construction, only the foot assembly that is secured to the right hand side bar 22 will be described. The foot assembly 70 includes a rectangular tube that in horizontal cross section is of a size to telescope within the side bar 22 and form a close fit therewith. A pair of apertures 72 are provided in the upper end of the tube 71 and a pair of apertures 84 are provided in the side bar 22 below apertures 74, apertures 72 and 84 being at a location below the door cross piece for removably securing the foot assembly in a selected position on the lower end of the side bar. It is to be noted that the pin 73 is of a construction to have a spring loaded ball lock and a cap at the opposite end for removably locking the pin in place. The tube 71 is of a length such that when it is locked in place on the side bar it extends a substantial distance below the tubular side bar 22. The dimension that it extends below the tube is dependent upon the size or height of the door jamb to be set.

Mounted on the lower end of the tube 71 and forming a telescopic fit therewith is a side bar extension 77, and a sleeve 81, said side bar extension and sleeve 81 being of a length approximately equal to the distance that the tube 71 extends below the side bar 22. Forming a telescopic fit within the tube 71 is a hollow rectangular retainer 79, the rectangular retainer being of a length to have the lower end thereof located adjacent the lower end of the tube 71 and the upper end extend intermediate the upper end of the tubular extension and the apertures 72 formed in the tube. The side bar extension 77, the tube 71, and rectangular retainer are retained in the above described relationship by being riveted together with rivets 78.

The retainer 79 has end walls 79a with rod apertures formed therein whereby the rod 82 may be extended therethrough. The rod 82 is of a length to extend a ways above the upper retainer wall 79a and a substantial distance below the lower retainer wall 79b. A collar 83 is mounted in a fixed position on the lower end portion of the rod 82 to bear against the upper surface of the retainer wall 79b. The coil spring 84 is positioned in the retainer to have the upper end bear against the retainer walls 79a and the lower end bear against the upper surface of the collar 83 to resiliently retain the collar in abutting relationship with the wall 79b, the rod 82 being extended through the coil spring. When the collar 83 is abutting against the lower wall 79b the axial height of the door frame square together with the foot assembly from the lower end of the retainer rod 82 to the upper surface of the gusset 25 is approximately equal to the distance the jamb head piece is to be located above the floor. In the event the rough opening is of a smaller axial height than normally to be expected, the door frame square still may be used due to the provision of the resilient mounting of rod 82. That is the rod 82 in bearing against the floor will have the web 26a bear against the upper door jamb head piece and will result in the collar 83 being moved away from the retainer wall 79b. Thus, even if the height of the rough opening is less than desired, the upper door jamb head piece may be shimmed due to the resilient feature of the foot assembly.

The foot assembly as illustrated and described above is for a door of a height H. If the door frame square is to be used for a door that is in substantially shorter height, then the pin 73 is removed and the tube 71 displaced from the side bar 22 so that the sleeve 81 may be taken off the tube. The tube is again inserted into the side bar so that the upper edge of extension 77 bears against the lower edge of bar 22. At this time apertures 82 will be coextensive with the apertures 84 of bar 22. The pin 73 is reinserted and the door frame square is again ready for use. It is to be understood that sleeves of different heights may be used in place of sleeve 81, and apertures 82 correspondingly spaced to provide for door jambs of varying heights.

In order to facilitate moving the door frame square from one door opening to another a handle 92 is secured to each of the side rails. To aid in retaining the door frame square in the door opening, a plurality of brackets 93 are mounted on each of the side bars. The brackets 93 each have a lateral extending portion to bear against the inner surface of the door jamb and another portion at right angles thereto to bear against the outer edge of the door jamb and overlap the structure to which the door jamb is secured.

In using the door frame square of this invention, for setting door jambs, first a door jamb head piece is cut one-eighth oversize if desired. Next the jamb may be nailed together on the floor and then inserted into the rough door opening. Now the head piece is shimmed solid. After the head piece has been shimmed, the door frame square is positioned within the spaced jamb and then the level of the jamb head piece is checked.

After the jamb head piece has been leveled, the cam

hand levers are rotated in the direction for the desired width of door over size or under size. If the desired width is undersized, then the hand levers of the cam assemblies 39 and 40 are respectively rotated in the direction of the arrow 59. It is to be noted that in, for example, setting the door frame square for an undersized door, the hand levers of the two cam assemblies are rotated in opposite directions and are located diagonally at cross square from one another thereby facilitating properly setting the handles. Since the hand levers are frictionally mounted, they will remain in a set position until they have been manually moved therefrom. Now the shims 28 are inserted between the stud and the adjacent door jamb side piece so that they form a snug fit against the door frame square without the use of excessive force on the shim. After shimming the side piece, the door jamb is nailed as desired and then the door jamb is rechecked for plumbing, the hand levers again moved to a datum position and the door frame square is removed from the opening.

As many widely apparent different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that I do not limit myself to the specific embodiments herein.

What I claim is:

1. A door frame square comprising a first elongated vertical member, a second elongated vertical member, a first cross piece extending intermediate said members and having one end connected to the upper end portion of said first member, a second cross piece extending intermediate said members and having one end connected to the lower end portion of said second member, first cam means connecting the opposite end of the first cross piece to the upper end portion of the second vertical member for selectively horizontally moving said first cross piece relative to said second member, and second cam means connecting the opposite end of the second cross piece to the lower end portion of the first vertical member for selectively horizontally moving said second cross piece and second vertical relative to said first member the same direction as produced by corresponding operation of the first cam means to retain said members in parallel relationship of varying horizontal spacing.

2. A door frame square comprising a first elongated vertical member, a second elongated vertical member, a first cross piece having one end connected to the upper end portion of the first member, a second cross piece having one end connected to the lower end portion of the second member, first and second cam means for selectively varying the spacing between the elongated members to upon being rotated the same angular amounts movably retain said members in parallel relationship, the first cam means being rotatably mounted in the upper end portion of the second member and connected to the other end of said first cross piece, and the second cam means being

rotatably mounted in the lower end portion of the first member and connected to the other end of said second cross piece.

3. A door frame square comprising a first vertical elongated member, a second vertical elongated member, a first cross piece connected at one end to the upper end of one of said members, a second cross piece connected at one end to the lower end portion of the other of said members, first rotatable cam means connecting the other end of the first cross piece to the upper end portion of the other of said vertical members for upon being rotated in a given direction to selectively vary the spacing between the upper end portions of said members, and second cam means connecting the other end of the second cross piece to the other of said vertical members for upon being rotated in a direction opposite said given direction the same angular distance to selectively vary the spacing between the lower end portions of said members, said cross pieces and said cam means upon being rotated in opposite directions the same angular amount horizontally moving the elongated members while retaining them in parallel relationship.

4. A door frame square comprising a first elongated vertical member, a second elongated vertical member, a first cross piece fixedly secured to the upper end portion of said first member to extend at generally right angles thereto, a second cross piece fixedly secured to the lower end portion of said second member to extend at generally right angles thereto, a first adjusting bar, a second adjusting bar, first means for disattachably connecting and retaining the first cross piece and first adjusting bar in the same vertical and horizontal relationship, second means for disattachably connecting and retaining the second cross piece and second adjusting bar in the same vertical and horizontal relationship, first cam means rotatably mounted on the upper end portion of the second member and connected to the first adjusting bar, second cam means rotatably mounted on the lower end portion of the first vertical member and connected to the second adjusting bar, said cam means being provided for being rotated to adjustably space the first and second elongated members and hold them parallel to one another in the adjusted position, and floor engaging means connected to the lower end portions of each of said vertical members for resiliently urging said vertical members in an upward direction.

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