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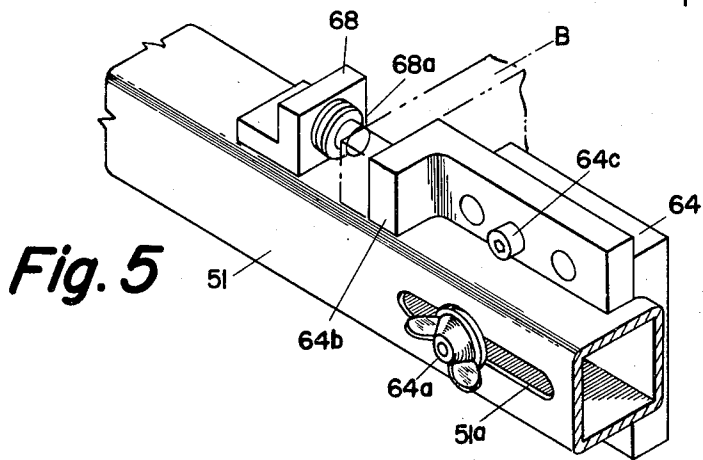
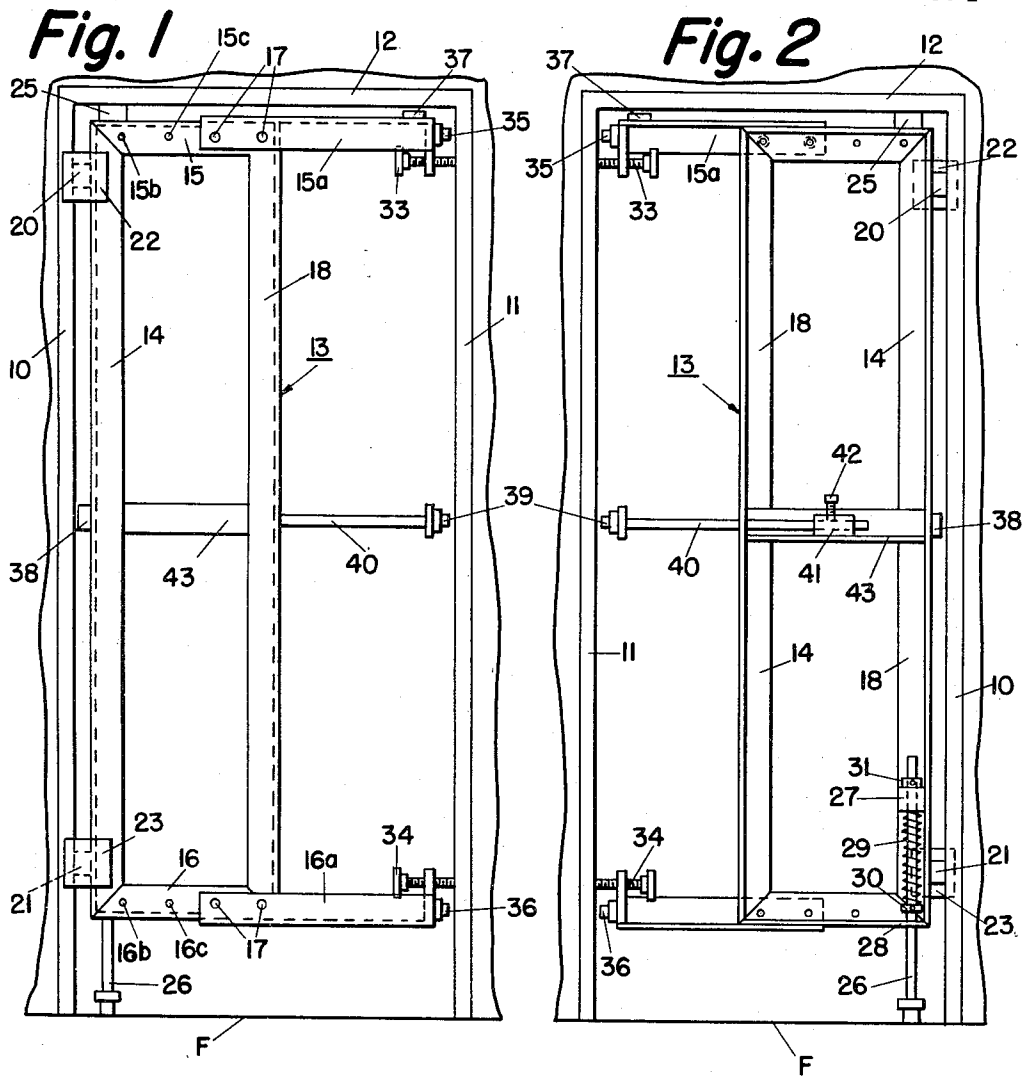
W. B. ZERN

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SYSTEM FOR HANGING DOORS

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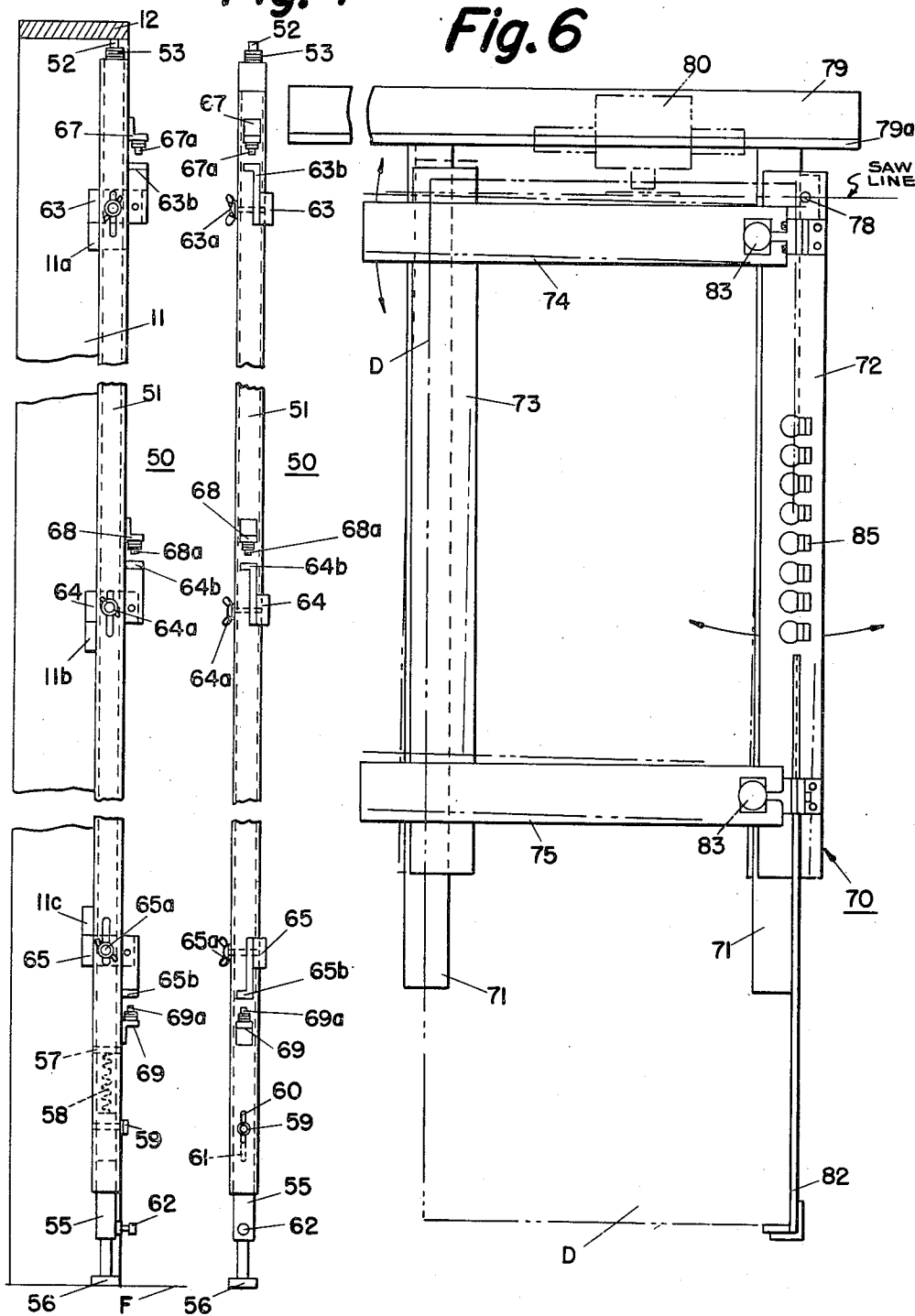
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Fig. 3

Fig. 4

Fig. 6



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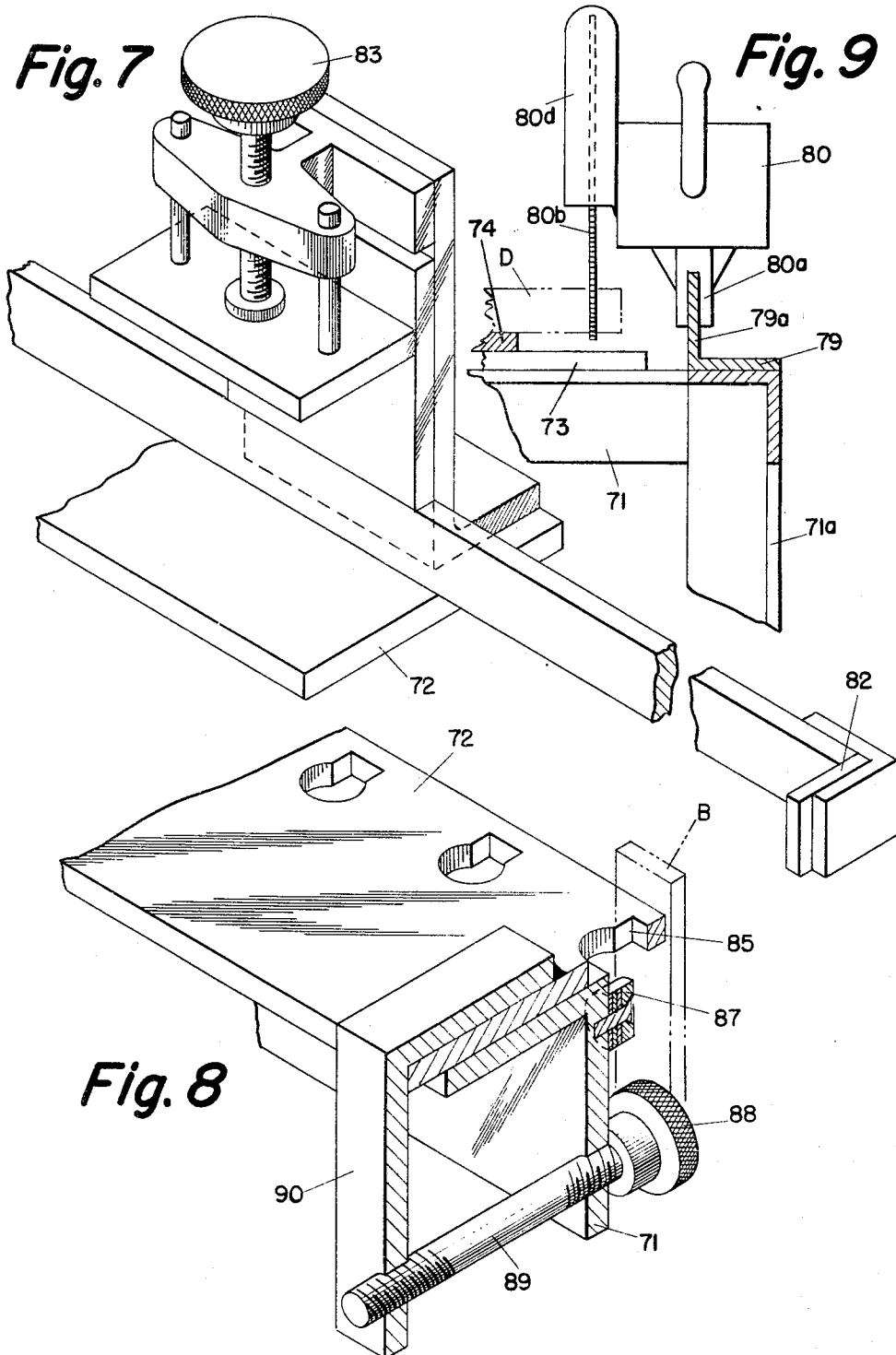
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SYSTEM FOR HANGING DOORS

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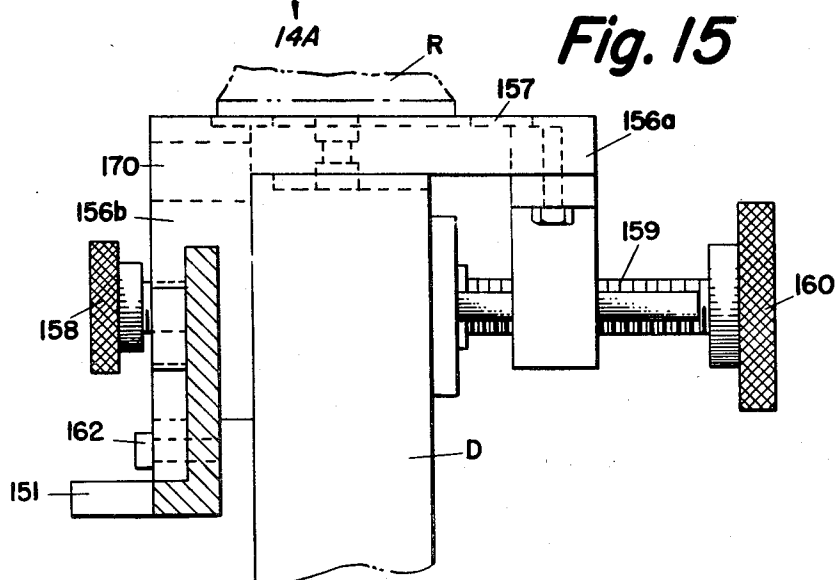
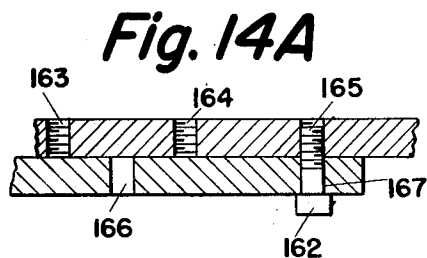
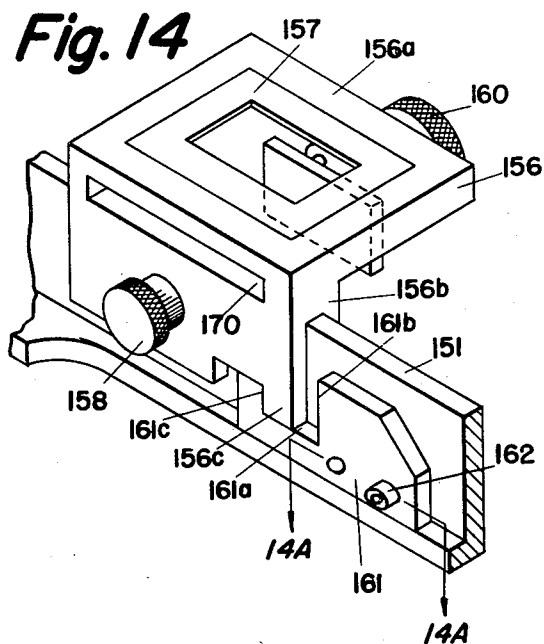
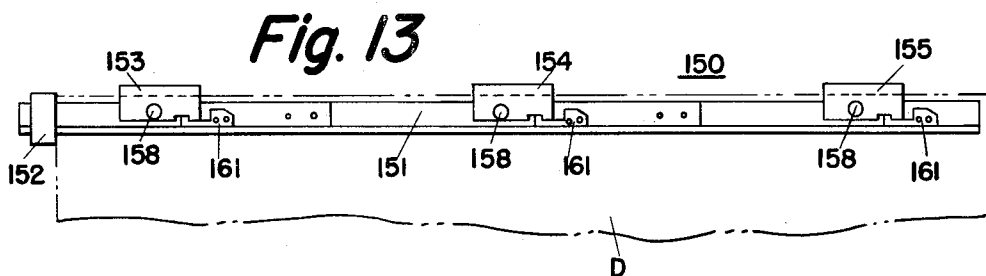
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SYSTEM FOR HANGING DOORS

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2,949,948

SYSTEM FOR HANGING DOORS

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Filed Aug. 6, 1957, Ser. No. 676,555

11 Claims. (Cl. 144—309)

This invention relates to methods of and apparatus for preparing doors for hanging, and has for an object the provision of an improved door-sizing system which will enable a workman to cut and plane a new door to its proper size and shape and to install the hinges and lock at the proper locations so that the door will hang and operate perfectly when it is completed. This improved system enables a workman to custom-fit all of the doors in any building to their respective frames so that uniform predetermined tolerances and clearances may be obtained. This invention is an improvement over the system disclosed in my copending application Serial No. 564,945, filed February 13, 1956.

This invention is applicable to custom-fitting doors to previously erected door frames, and is particularly applicable to custom-fitting doors to frames comprising metal jambs. It is the practice today in constructing many large buildings, such as schools, office buildings, hospitals, and the like to employ metal door frames, known in the trade as "steel bucks." These steel bucks are put in place as the building is being erected, and the buck or jamb to which the hinges are to be applied is previously provided with hinge seat recesses.

In my aforesaid application, each door frame was measured with an adjustable gage for measuring the width and contour of the door-receiving opening in the frame and maintaining the measured relationship. The adjustable gage was then placed on an adjustable support with the latter being adjusted in accordance with the previous adjustment of the gage. A door was then placed on the support and cut to the proper size. After one door has been completed, the procedure was then to measure another door opening with the adjustable gage and repeat the foregoing procedure until all of the doors in the particular building had been completed.

In accordance with the present invention, it is possible to gage all of the doors in the building and to record the selected measurements as determined by the gage, so that at a later time doors may be cut to the proper size and shape to provide a uniform clearance between all of the doors and their respective frames. In my prior application, the door gage was adjusted when it was placed in each door frame. While this arrangement has proved to be satisfactory, there is always a possibility that the adjustable parts of the gage may be moved accidentally after the gaging operation and before the gage has been placed on the adjustable support. This, of course, would cause the door to be cut to erroneous measurements. The present invention eliminates this possibility by providing a system for gaging the door frames which employs "make-up" blocks or "feeler" gages which are inserted at selected locations between the door frame and the novel door gage of this application so as to make up the difference between the size of the door gage and the opening in the door frame.

The present invention, by employing the "feeler" type method of gaging, permits for a more accurate measurement, and also permits the measurements of a plurality

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of door frame openings to be recorded so that the doors for the particular openings may be cut to the correct size and shape at some later time. This results in a substantial saving in time, as the workman may measure all of the door frames before any of the doors are cut, rather than cutting each door before the next one can be measured, as was the practice in my aforesaid application.

In accordance with the present invention, there is provided a method of preparing wooden doors for hanging in frames, such as steel bucks, comprising the steps of measuring the contour of the frame with feeler gages, moving cutting tools along the edges of the door to change the contour of the door, and controlling the movement of the cutting tools with the feeler gages to make the contour of the door correspond to the measured contour of the frame.

Further in accordance with the present invention, there is provided a method of gaging a door frame preparatory to fitting a door for hanging therein comprising the steps of placing in the door frame opening a gage which is smaller than said opening, moving said gage against one side of the frame at the top and bottom thereof, and inserting feeler members at selected points around said gage between said gage and the door frame to gage the size and contour of the door frame opening.

Further in accordance with the invention, there is provided a novel table for cutting the door to proper length with the head end of the door being cut at an angle corresponding to the angle of the head jamb in the door frame as determined by the gage and feeler blocks.

The present invention also provides in the system means for gaging the locations of the hinge-receiving openings in the door frame with feeler gages and for positioning template assemblies lengthwise of the hinge-receiving edge of the door as controlled by said feeler gages preparatory to cutting hinge seats in the door.

Further in accordance with the invention, there is provided an adjustable support for receiving the door and for guiding a cutting tool along an edge of the door to decrease its width by an amount predetermined by the feeler blocks employed in combination with the door gage in measuring the size and contour of the door frame opening.

The various components of the novel system embody novel features which contribute to the improved results obtained with the system, as will hereinafter be described in detail.

For a more detailed disclosure of the invention and for further objects and advantages thereof, reference is to be had to the following description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is an elevation of the novel door square gage positioned in a door opening preparatory to inserting feeler blocks at selected locations;

Fig. 2 is a rear elevation corresponding to Fig. 1;

Fig. 3 is a side elevation of a novel gage for measuring the location of the hinge seats in a pre-installed door frame;

Fig. 4 is a side elevation of the gage shown in Fig. 3;

Fig. 5 (sheet 1) is a fractional view, in perspective, showing a portion of the gage shown in Figs. 3 and 4;

Fig. 6 is a top plan view of the saw table for cutting a door to the proper length with the head end of the door being cut at an angle corresponding to the angle of the head jamb in the door frame;

Fig. 7 is a fractional view, in perspective, showing parts of the table illustrated in Fig. 6;

Fig. 8 is a fractional view, in perspective and partly in section, showing parts of the table shown in Fig. 6;

Fig. 9 is an end view of the saw for cutting off the head end of the door on the table shown in Fig. 6;

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Fig. 10 is a front elevation of the adjustable support for receiving a door and cutting it to size;

Fig. 11 is a fractional view, in perspective, showing a portion of the adjustable support illustrated in Fig. 10;

Fig. 12 is a fractional view, in perspective, showing another portion of the adjustable support illustrated in Fig. 10;

Fig. 13 is an elevation view showing a plurality of template assemblies connected together in spaced-apart relation on the edge of a door preparatory to routing hinge seats therein;

Fig. 14 is a fractional view, in perspective, showing one of the template assemblies and a portion of the frame;

Fig. 14A is a sectional view taken along the lines 14A—14A in Fig. 14; and

Fig. 15 is an end elevation view of the template assembly mounted on the hinge-receiving edge of a door.

As mentioned above, this invention is particularly applicable to buildings in which the door frames are formed from steel bucks. Frames of this type are illustrated in Figs. 1 and 2 and comprise side jambs 10 and 11 and a head jamb 12. The various sections 10—12 of steel bucks are installed when the building framework is being constructed and the sections are welded together to form as nearly as possible a rectangular opening. Since the side jamb members 10 and 11 are frequently bowed either in or out; and since the head jamb member 12 frequently is not parallel to the floor, it is necessary to gage the shape and contour of each door frame in order to obtain proper fitting doors. This can readily be accomplished in accordance with the present invention where a gage 13 is inserted in the door frame opening and selected measurements made with feeler blocks or make-up members in the manner hereinafter to be described.

The gage 13 comprises an elongated member 14 and a pair of spaced arms 15 and 16 at the opposite ends thereof. The arms 15 and 16 are parallel to each other and perpendicular to the elongated member 14. Each of the arms 15 and 16 includes an extension 15a and 16a respectively. These extensions are adapted to be secured to the arms as by bolts 17. The arms 15 and 16 are each provided with a series of openings such as openings 15b, 15c, 16b and 16c, so that the gage or door square 13 may be adapted to different sizes of door frames. The various sections 14, 15 and 16, and 15a, 16a preferably are formed from angle iron to provide rigidity and ease in adjustment. To decrease the over-all weight of the door square, the various sections may be formed by a light-weight metal, such for example, as aluminum or magnesium. To increase the rigidity of the door square, there is provided a second elongated member 18 which is parallel to member 14 and interconnects the spaced arms 15 and 16.

At the upper left-hand corner of the door square 13, there is provided a locating block 20 mounted on the edge of member 14 which is adapted to engage the face of jamb 10. A similar locating block 21 is mounted on member 14 adjacent the bottom end and also is adapted to engage the face of jamb 10. On the front face of member 14, there is provided a pair of plates 22 and 23 which are adapted to overlie the respective locating blocks 20 and 21 and to engage an edge of the jamb 10 when the locating blocks 20 and 21 engage the adjacent areas of the jamb face. At the head end of member 14 and on the arm 15, there is disposed a locating block 25 which is adapted to engage the face of the head jamb 12. The locating block 25 is held against the head jamb 12 by a spring-biased plunger 26 which projects from the lower arm 16 and engages the surface of the floor F. As may be seen in Fig. 2, the plunger 26 extends through a pair of guides 27 and 28. A compression spring 29 is disposed around the plunger 26 between the guide member 27 which is fixed to frame section 14 and collar 30 on the plunger 26. A movable collar 31 is also disposed on the

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plunger 26, and by adjustment to different locations thereon, it will vary the force required to compress the spring 29. This adjustment may be made for doors of different lengths; for example, a different amount of spring force is required to hold the gage 13 in a 6' 6" door opening than for a 7' door opening. The spring force should be sufficient to insure that the locating block 25 will be held tightly against the head jamb 12. To assist in holding the door square 13 in the door frame, each of the arm extensions 15a and 16a is provided with adjustment screws 33 and 34 which are adapted to engage the side jamb 11, as shown in Figs. 1 and 2. These adjustment screws 33 and 34 insure that the locating blocks 20 and 21 are held tightly against the opposite side jamb 10.

Each of the arm extensions 15a and 16a is provided at the end adjacent jamb 11 with locating surfaces 35 and 36 respectively. The extension 15a is also provided with a locating surface 37 which is adjacent the head jamb 12 and at the same corner of the door frame as locating surface 35. As the side jambs 10 and 11 are frequently bowed either in or out, there is provided a locating surface 38 on elongated member 14 intermediate its ends and adjacent the side jamb 10. There is also provided another locating surface 39 which is in line with the locating surface 38 and disposed between locating surfaces 35 and 36 adjacent the mid portion of jamb 11. The locating surface 39 is carried by a rod 40 which is adjustable in length, for example, by the collar 41 and set screw 42 which are mounted on the angle member 43 which interconnects members 14 and 18 and provides for further rigidity of the overall door square 13. While the steel bucks or jambs 10 and 11 are frequently bowed either in or out, they are never "rippled," and thus it is sufficient to measure the contour of the door opening by measuring it at each end thereof and also at an intermediate location. For that reason, the selected measurement locations indicated in Figs. 1 and 2 will provide for a perfect fit of doors with a uniform clearance around their periphery between the edge of the door and the respective jambs. It is not necessary to gage the floor F opposite the door frame opening as the floor in the majority of installations will be horizontal, whereas the head jamb 12 is frequently not.

The present invention is applicable to all doors whether they be left-hand doors or right-hand doors. These terms refer to the swing of the door as explained in Patent 2,605,790 assigned to me. When facing a closed door so that it opens away from the observer, the position of the hinges relative to the observer, left or right, determines the swing of the door. The side of the door adjacent the observer is called the face, and if the door is provided with a beveled edge, it will slope inwardly toward the rear side of the door. Thus, the face of the door will be slightly wider than the rear side. The standard bevel is about $\frac{1}{16}$ " to 1" of thickness or an angle of about 3.5°. The taper is to prevent the door from becoming "hinge bound," as described in aforesaid Patent 2,605,790. The head end or top end of the door is that end which is adjacent the head jamb when the door is hung in its frame.

To measure the door frame opening, the operator always stands on the side of the opening away from which the door swings open and the door square 13 is placed in the opening with the section 14 thereof always disposed to the left side of the operator regardless of the location of the hinges. The locating blocks 20 and 21 are pressed into engagement with the side jamb 10 and locating block 25 is pressed into engagement with the head jamb 12 and maintained in said engaged position by the spring-biased action of plunger 26 which engages the floor F. The hand-screws 33 and 34 are adjusted to engage the side jamb 11 and hold the locating blocks 20 and 21 in engagement with the adjacent side jamb 10. With the door square 13 positioned in the door frame in

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the foregoing manner, the operator is now ready to gage the door frame at selected locations as determined by the locating surfaces 35—39. The gaging is accomplished by a set of gage blocks of the "feeler" type. The blocks are of different thicknesses so that the operator can insert first one and then another until he locates the block which is the exact size to fit between the door frame and the corresponding locating surfaces 35—39. By using feeler gages, the operator is able to obtain a very precise measurement. This measurement is more accurate than one which can be obtained by an adjustable gage; and in addition, there is eliminated any possibility of error by reason of improper adjustment of the gage or by accidentally moving the gage after it has been removed from the door frame opening. This method of gaging the door frame opening has the further advantage that the information obtained during the gaging operation can readily be recorded for use at a later time, and thus all of the door frames in a building can be gaged and the information recorded before any of the doors are cut to fit the corresponding frames.

In describing the method of gaging the door frame, it will be assumed that the door square 13 has been adjusted for measuring a door frame adapted to receive a door which is two feet wide. This is accomplished by positioning the arm extensions 15a, 16a and 40 at predetermined locations corresponding in width to a two-foot door. As may be seen in Figs. 1 and 2, the over-all width of gage 13 is something less than two feet. The reason for this is to insure that the gage will fit within a door frame opening which is supposed to be 24 inches in width.

In a preferred embodiment of the invention, the arm extensions 15a, 16a and 40 were set so that a $\frac{1}{4}$ " feeler block was required to make contact between the locating surfaces 35, 36, 39 and the corresponding surface of jamb 11 for a door frame opening which was exactly 24 inches in width throughout its length. It will be noted that locating surface 38 is spaced from jamb 10, and in the preferred embodiment a feeler gage $\frac{1}{4}$ " thick was required to make up the distance between the locating surface 38 and the adjacent surface of jamb 10. This feeler gage thickness is called the starting point.

From the foregoing, it will be seen that if the door frame was exactly 24 inches in width throughout its length, a feeler gage which was $\frac{1}{4}$ " thick could be inserted between each of the locating surfaces 35, 36, 38 and 39 and the adjacent jamb surface. For convenience, the set of feeler gages is provided with suitable marking. It has been found that feeler gages which differ in thickness in steps of $\frac{1}{4}$ inch permit the door frame openings to be gaged sufficiently accurate to insure that the doors will hang properly in the frames and to maintain a uniform clearance around the edge of the door with respect to the frame. Thus, for convenience, the feeler gages may comprise a series of blocks shaped, for example, in the manner of the blocks B shown in Fig. 11 with the blocks varying in thickness from $\frac{1}{4}$ inch to $\frac{20}{64}$ inch. While the blocks may be provided with any suitable indicia, it is preferable to mark them from 1 to 20.

Since the head jamb of a door frame is frequently farther out of line with respect to the horizontal than the side jambs are with respect to the vertical, it is preferable to position the locating surface 37 so that a feeler block of greater thickness is required to make up the distance between the surface 37 and the surface of head jamb 12 on a perfectly rectangular door frame. For example, in the preferred arrangement, locating surface 37 was disposed so that a feeler gage having a thickness of $\frac{1}{4}$ inch was required to bridge the spacing between the head jamb of a perfectly rectangular door frame and the locating surface 37.

From the foregoing, it will be seen that the operator has gaged the door frame opening at five locations corresponding to the locating surfaces 35—39. The information, namely, the thickness of the feeler block which was

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required to make up the difference between the respective locating surfaces and the adjacent jamb sections, is recorded by the operator to be subsequently employed in a manner hereinafter to be described in detail.

After the foregoing gaging operation has been completed, the only additional information needed to enable a door to be custom-fitted to the door frame is to obtain the locations of the hinge seats which have been performed in the steel bucks. This gaging operation may be performed with the hinge-seat gage 50 illustrated in Figs. 3—5.

The hinge-seat gage 50 includes a frame 51 preferably formed from a series of sections so that its over-all length may be adjusted for use on door frames of different heights. The sections are slidable relative to each other and adapted to be locked together at the selected length by suitable means, such, for example, as bolts. At the upper end of frame 51 is an adjustable member illustrated as a screw 52 which is adapted to engage the head jamb 12 of the door frame. The spacing between the frame 51 of the gage and the outer end of member 52 may be adjusted by inserting therebetween one or more shim washers 53. The shim washers 53 provide for small adjustment in the over-all length of the gage 50 in order to obtain the clearance desired between the head jamb and the head end of the door.

At the opposite or bottom end of gage 50, there is provided a telescoping member 55 which is a spring-loaded plunger having a foot 56 adapted to be positioned on the floor F beneath the head jamb in the door frame opening. A pin 57 extends across the interior of a tubular section of frame 51 and forms an abutment for one end of a compression spring 58, the opposite end of which engages the inner end of plunger 55. A bolt 59 extends through a slot 60, Fig. 4, in frame 51 and a slot 61 in the plunger 55 spaced a short distance from its inner end. When pressure is applied to the foot 56, member 55 slides into frame 51, resisted by spring 58, and bolt 59 prevents member 55 from being pushed out of the frame 51 when there is no pressure on the foot 56. The foot 56 is adjustable in member 55 and is clamped by a screw 62. This adjustment permits additional variations in length of the gage 50 and enables a steady pressure to be maintained on spring 58. The spring-loaded plunger 55 will hold the outer end of member 52 against the head jamb 12, and while the gage 50 is in this position a plurality of hinge-locating plates 63—65 may be adjusted lengthwise of the frame 51 until they are in alignment with the pre-cut hinge openings in the steel buck 11. The plate members 63—65 need not be as wide as the hinge openings 11a—11c in the steel buck, and all that is necessary is that the upper edges of the plates 63 and 64 be adjusted toward the member 52 until the edges of the plates are in engagement with the upper edges of each of the respective hinge-receiving openings 11a, 11b in the steel buck. The lower edge of the bottom plate 65 is adapted to be moved into engagement with the lower edge of hinge seat 11c. The respective plates 63—65 are then locked in these positions as by screws 63a—65a.

In most installations, the top hinge is positioned five inches below the head jamb, while the bottom hinge is positioned ten inches above the floor. These locations are the same for all sizes of hinges. When a third hinge is employed, it will normally be located midway between the top and bottom hinges. In Figs. 3 and 4, it will be noted that each of the plates 63—65 carries an L-shaped member 63b—65b. These members are adapted to be positioned directly opposite corresponding locating members 67—69 which are secured to the frame 51 of the gage. The locating members 67—69 are provided with adjustable means illustrated as a screw and shim washer combination for adjusting the position of locating members 67—69 with respect to the cooperating members 63b—65b carried by corresponding plates 63—65.

In practice, the locating members 67—69 on gage 50 are positioned so that a feeler block having a thickness of $1\frac{1}{4}$ inch when placed between the ends of the screw 67a and member 63b will position plate 63 at a distance of five inches below the head jamb. Similarly, the locating screw 69a on locating member 69 is adapted to position plate 65 at a distance of ten inches above the floor F when a feeler block having a thickness of $1\frac{1}{4}$ inch is inserted between members 69a and 65b. Thus, if the hinge seats were pre-cut in the steel bucks at the precise locations of five inches below the head jamb and ten inches above the floor, the same gage block having a thickness of $1\frac{1}{4}$ inch could be inserted in the foregoing manner. However, in most installations the hinge locations deviate to some extent from the five-inch and ten-inch positions, and this deviation is determined by what size of gage block will fit between the corresponding locating surfaces on members 67a and 63b at the head end of the gage and between locating surfaces on members 69a and 65b at the foot end of the gage 50. A similar gaging operation is performed with respect to the locating surfaces on members 68a and 64b with reference to the middle hinge seat. Fig. 5 is an enlarged perspective view of a section of frame 51 showing a feeler block B inserted between the locating surfaces on members 68a and 64b. The member 64b is adjustably secured to the plate 64 as by a screw 64c and the plate 64 is movable lengthwise of frame 51 by reason of the slot 51a through which the screw 64a extends. After the gaging operations with the hinge-seat gage 50 have been completed, the sizes of the feeler blocks employed during the gaging operation are recorded for further use as hereinafter to be described.

After the operator has completed the foregoing gaging operations with the door square 13 and the hinge-seat gage 50, he has recorded all the information necessary for cutting a door which will fit perfectly in the door frame opening. As this information has been recorded by the operator, he may then proceed to gage another door frame and obtain the required information. This can be repeated for all the door frames in the building, or in fact it can be repeated for a group of buildings. The only requirement is for the operator to identify the gage information with the corresponding door frame, so that when the doors are cut to size, they will be installed in the proper door frames. This represents a substantial improvement over prior gaging systems where the practice has been to gage the door frame opening and then immediately cut the door for that opening before gaging a succeeding door frame. This procedure has been followed in the past because it has not been possible to record the size information in a convenient manner.

Referring to Fig. 6, there is shown a saw table 70 for cutting the door to the proper length, with the head end of the door being cut at an angle corresponding to the angle of the head jamb in the door frame. This is accomplished in the following manner—by using a gage block corresponding to the block which was inserted between the head jamb and the locating surface 37. The saw table 70 comprises a pair of horizontally disposed supporting members 71, 71 which are adapted to be supported horizontally above the floor in any suitable manner, as for example, a plurality of legs on leg 71a being shown in Fig. 9. On top of the members 71 and adapted to slide thereover is a frame comprising side members 72 and 73 which are connected by a pair of end members 74 and 75. The members 72—75 form a rectangular frame which is adapted to pivot about bolt 78 which extends through one end of member 72 and also through member 71 of the support for the frame. The pair of supports 71 is joined together at one end by an angle iron 79, the vertical portion of which at 79a provides a track or guide for a saw 80. A door is adapted to be placed face down on the pivotal frame of the saw table 70 and the lower end of the door is moved

against the locating arm 82 which is adjusted to the proper length for the size of the door opening. The arm 82 is adjusted for a standard length of door, such for examples as 6'6", 6'8", etc. The door is adapted to be clamped to the pivotal frame by a pair of clamps 83, 83, as shown in Figs. 6 and 7. Thus, both the frame and the door are adapted to pivot together about the pivot 78. It will be noted in Fig. 6 that the pivot 78 is disposed closely adjacent the edge of the door and the saw line for saw 80 is adapted to pass over the pivot 78.

Frame member 72 is provided with a plurality of openings which are adapted to receive the gage blocks 13 mentioned above. The openings, one of which is indicated by reference character 85, are spaced from the pivot 78 at predetermined distances corresponding to the standard widths of doors. For example, reference was made above to a door having a two-foot width. Thus, it will be assumed that opening 85 is two feet from the pivot 78 and that the door positioned on the saw table 70 is two feet wide. To cut the head end of the door at the proper angle, as determined by the door square illustrated in Fig. 1, the operator refers to his recorded information to see what thickness of gage block was inserted between the head jamb of the door and the locating surface 37. This same locating block, or one corresponding in thickness, is then inserted in the opening 85, Fig. 6. The pivotal frame which includes member 72 is then rotated about the pivot 78 until the gage block B, Fig. 8, is firmly clamped against the locating surface 87 on the supporting member 71. This pivotal movement is accomplished by rotating the knob 88 attached to the end of threaded member 89 which extends through member 71. The other end of member 89 is provided with threads of the opposite hand which engage an angle member 90 which in turn is secured, as by welding, to the frame member 72. Thus, rotation of knob 88 causes rotation of the frame including member 72 about pivot 78. Since the door is clamped to the pivotal frame, it likewise rotates with it about the pivot 78. The threaded ends of member 89 being of opposite hand prevent any lost motion or slack between members 71 and 72.

Since the door is two feet wide, and since the opening 85 is two feet from the pivot 78, any movement of the door, as determined by block B in opening 85, will cause a corresponding movement of the upper corner of the door which is adjacent frame member 73 and opposite from the pivot 78.

With the saw table adjusted in the foregoing manner, the head end of the door is now ready to be cut off and it will be cut at the angle as determined by the door square 13 shown in Fig. 1. The track 79a for the saw 80 is disposed perpendicular to the normal position of the pivotal frame when a gage block having a thickness of $1\frac{1}{4}$ inch is inserted in opening 85. As mentioned above, with the dimensions selected for the door square 13, if a gage block having a thickness of $1\frac{1}{4}$ inch is inserted between locating surface 37 and the head jamb 12, Fig. 1, this would indicate that the head jamb of the door frame is perfectly horizontal. Thus, the head end of the door would be cut off at a right angle with respect to the sides of the door. If the gage block determined by the gage in Fig. 1 was either greater or smaller than $1\frac{1}{4}$ inch, that would result in the frame on the saw table being rotated one way or the other as indicated by the arrows in Fig. 6 when the gage block was inserted in opening 85. This rotation would correspond to the amount of deviation of the head jamb from the horizontal.

It is, of course, understood that a new door for a standard door opening, say for example 6'6" in height, must be cut to a dimension shorter than 6'6" by the amount of clearance required at the top and bottom of the door. Thus, when the locating arm 82 is set for a 6'6" door, the head end of the door will project beyond the pivot 78 by an amount corresponding to the desired

clearance at the head and foot ends of the door. Thus, when the door is placed on the saw table 70, it will always project beyond the saw line as indicated by the door D in Fig. 9. The saw 80 is preferably of the electric rotary-blade type well known in the art, and to the lower portion of the motor casing is secured a guide 80a, Fig. 9, which is adapted to ride on the rail 79a of member 79. The saw blade 80b which projects beyond the blade guard 80d is adapted to move along the saw line parallel to guide rail 79a, as indicated in Fig. 6. Thus, the head end of the door will be cut off at the proper angle which corresponds to the angle of the head jamb in the door frame.

After the head end of the door has been cut off in the foregoing manner, the sides of the door are then ready to be planed to fit the contour of the door frame. This is accomplished by placing the door, first, on one edge, and then on the other in the novel door sizing supporting device 100, Fig. 10. The device 100 is adjustable, with the adjustments being controlled by the same gage blocks which were determined by the use of the door square 13 described in connection with Figs. 1 and 2. The device 100 includes a frame comprising spaced vertical leg members 101, 102 which are adapted to be held in vertical position by means of side members 103. A pair of the side members 103 may be secured at their outer ends to each of the leg members 101 and 102, as shown in Fig. 11 in connection with leg 102. The members 103 are adapted to be supported at spaced locations from the legs 101 and 102 by any suitable supporting means, such for example, as a work bench or table 105. To accommodate doors of different thicknesses between the vertical legs 101 and 102 and the table 105, it is preferable that provision be made for adjustment. For example, one suitable provision for adjustment has been shown in Fig. 11 where members 103 have been provided with elongated slots having screw members adapted to extend therethrough into portions of the table 105. Thus, the spacing between the table 105 and the door sizing supporting device 100 may be readily adjusted to accommodate doors or work of different thicknesses. While the member 103 shown in Fig. 11 is straight, the corresponding supporting member 103a, Fig. 10, shown at the opposite end of device 100 is preferably U-shaped, as seen from above. In this manner, the distance between the legs 101 and 102 of the supporting device 100 may be less than the overall length of the door to be placed on the device.

The legs 101 and 102 preferably are formed of angle members, and there is provided a horizontal section 107 forming a supporting section between the two legs 101 and 102. The section 107 also is preferably formed of right-angle members and includes an upper angle member 108 and a lower angle member 109 secured thereto as by rivets or other clamping means 110, Fig. 12. The aligned vertical faces of angle members 108 and 109 provide the work-engaging surface of section 107 and are adapted to hold the work firmly against the opposed surface of the work table 105. The section 107 is readily removable from the vertical legs 101 and 102. The legs 101 and 102 each is provided at its upper end with a vertical slot 102a, Fig. 11, to receive the interlocking angle blocks 112 and 114, Fig. 10, which are carried underneath the angle member 108 and at its opposite ends. The interlocking member 112 at the left-hand end of device 100, as shown in Fig. 11, is similar to member 114 except it additionally includes a section 112a which projects parallel to the portion 102b of leg 102 in which slot 102a is formed. This section 112a is adapted to be moved toward the left in Fig. 11 until it is in engagement with the adjacent portion 102b of leg 102. This will locate the horizontal section 107 with respect to the vertical legs 101 and 102 and prevent it from sliding out of position as the plane P passes over it.

An adjustable guide rail 116 is carried by the vertical section of angle member 108, Figs. 10-12. The guide

rail 116 is of flexible construction and preferably is formed from a bendable material, such as cold rolled steel. The guide rail 116 is secured at its opposite ends to the member 103. However, the intermediate portion of the rail 116 is adapted to be moved vertically with respect to the member 103, so that it may conform with the contour of the jambs. As shown in Fig. 12, the rail 116 has secured thereto a threaded block 117 which is adapted to receive one end of a threaded member 118. The opposite end of member 118 is adapted to be received by a threaded opening 120 in the horizontal portions of angle members 108 and 109. The threads on the opposite ends of member 118 are of the opposite hand, and thus when member 118 is rotated in one direction by its wheel 118a, the block 117 will tend to be moved toward the horizontal portion of member 108 without lost motion, thus lowering the upper edge of rail 116 with respect to the member 108. When the threaded member 118 is rotated in the opposite direction, the block 117 and the horizontal portion of member 108 tend to spread apart, thus raising the upper surface of guide rail 116 with respect to member 108.

As may be seen in Fig. 12, another block 122 is secured to the adjustable rail 116 adjacent the block 117. Opposite block 122 is a locating surface 123 which is positioned on the horizontal portion of member 108. The locating surface 123 may be adjusted by means of a plurality of shim washers 124 disposed beneath locating surface 123. The locating surface 123 is adapted to cooperate with the lower surface of block 122 to receive therebetween the feeler block as determined by reference points 38 and 39 of door square 13 in Fig. 1, as hereinafter to be described.

To support the door on the device 100, each of the legs 101 and 102 is provided with an adjustable platform or support. The platform or support may take various forms. However, the preferred form is illustrated as support 125, Figs. 10 and 11. The support 125 may be attached to the leg 102 by suitable means, such for example, as a threaded clamping member or knob 126 which is adapted to have an end extend through one of the openings in the leg 102 and into the body portion of the support 125. The openings in legs 101 and 102 are formed as slots 127, the open ends of which are inclined upwardly. The threaded portions of clamping members 126 are adapted to engage the closed ends of the slots 127 when they are in position on the respective legs 101 and 102. The open ends of the slots 127 permit quick transfer of the adjustable supports 125 from one slot to another to accommodate doors of different widths without the need to remove the threaded member 126 from member 125. The body member of support 125 includes a vertical section 125a which has a thickness corresponding to the thickness of the vertical portions of angles 108 and 109, and thus is adapted to cooperate with these portions to hold the door in a vertical plane between the legs 101 and 102 of device 100 and the opposed vertical face of table 105. The support 125 includes a horizontal section which is provided with a horizontal pad 128 adjustable in elevation to provide the desired clearance at the sides of the door. A clearance of $\frac{1}{16}$ " on each side of the door is in general preferred. Thus, for a door frame two feet wide, the finished door would be $23\frac{7}{8}$ " in width. Such adjustment is provided by the use of shim washers 129, as shown in Fig. 11. The leg 101 has a similar support 125.

The slots 127 in the legs 101 and 102 preferably are disposed at two-inch intervals to accommodate the various standard widths of doors. It will be assumed that the supports 125 have been positioned in a slot 127 corresponding to a two-foot door. Both supports 125 are adjusted to the same height, so that the door will be supported horizontally on one of its edges. As may be seen in Fig. 11, the leg 102 is provided with a block 130 which is secured to portion 102b. The upper end of the block

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130 is provided with a locating surface or plate 131 which is a predetermined elevation above the supports 125. The locating plate 131 is positioned adjacent the slot 102a directly beneath the member 112 which projects below the angle member 108. The locating plate 131 is adapted to receive one of the feeler blocks B and to space the member 112 above the plate by a distance corresponding to the distance of the feeler member B. A similar locating plate is provided on leg 101 at the opposite end of the door sizing supporting device 100. It is also adapted to receive a feeler block B and to support the member 114 above the locating plate a distance corresponding to the thickness of the block B.

It will be assumed that the desired clearance on each side of the door is to be $\frac{1}{16}$ inch. It will be recalled that when the door square 13 was inserted in the two-foot wide door frame opening, the gage dimensions were selected so that a feeler block having a thickness of $\frac{1}{16}$ inch would just fit between the jamb and the respective locating surfaces 35 and 36. Thus, the predetermined elevation of locating plates 131 with respect to supports 125 would be such as to plane a door to a minimum width of $23\frac{3}{4}$ inch as will now be seen. In order that the rail 116 will be positioned above the horizontal pads 128 a distance corresponding to the width of the door, plus the desired clearance, a feeler block B having a thickness of $\frac{2}{16}$ inch is inserted between the plates 131 and the corresponding members 112 and 114. This raises the section 107, and, therefore, the rail 116 which is carried by it to the proper elevation to plane the door to a width of 24 inches. The feeler block that was inserted between locating surface 33 and jamb 10 in Fig. 1 is then inserted between the locating surface 123 and block 122 which is carried by rail 116. The adjusting wheel 118a is rotated until the block 122 is spaced from surface 123 a distance corresponding to the thickness of the feeler block. This adjustment causes the contour of the upper edge of rail 116 to correspond to the contour of jamb 10 in Fig. 1.

As may be seen in Fig. 10, the rail 116 forms a guide for the shoe 135 which is connected to the plane P. The plane P is then moved lengthwise of the door to take the first cut of material off of the edge of the door. The plane P is moved back and forth until the rail 116 prevents any further material from being removed. At this time one edge of the door will have been shaped to correspond to the contour of the left-hand jamb 10 ready for installation of a lock or hinges as the case may be. The plane P is adapted to provide the door with either square edges or beveled edges as described in my copending application, Serial No. 564,945. The horizontal section 107 is then removed so that the door may be turned over end-for-end with the opposite edge disposed upwardly for planing. When a bevel is planed on the door edge, it always slopes away from the operator. A set of feeler gages B preferably is carried on a chain 136, as shown in Fig. 11, and the chain is adapted to encircle a pin 137 which projects from the leg 102. When the horizontal section 107 is removed, so that the door may be turned over, the weight of the plurality of feeler gages at the bottom of the chain will cause the feeler gage, which has been inserted between the locating plate 131 and member 112, to automatically be removed and the chain will catch on the pin 137. This insures that when the horizontal section 107 is again replaced on the sizing device, the operator will remember to insert the proper feeler gage as determined by the door square described in connection with Fig. 1.

The head end of the door is always maintained at the same end of the sizing device 100 for the first planing operation and this operation is always performed on the left-hand edge of the door. With the door in its turned position, the head end now at the opposite end of device 100, the operator inserts between locating plate 131 and member 112 a feeler gage corresponding in thickness to the one which was inserted between locating

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surface 35 on door square 13 and the adjacent frame 11, Fig. 1. The feeler gage which was inserted between locating surface 36 and door frame 11 is now inserted between the locating plate 131 and member 114 at the opposite end of the door sizing device 100. As mentioned above, if the door frame is perfectly rectangular and exactly two feet in width, the thickness of the feeler gages to be inserted will be $\frac{1}{16}$ inch. This is $\frac{1}{16}$ inch less than the feeler gages which were previously inserted at the ends of sizing device 100 and will provide the door with a total clearance of $\frac{1}{8}$ inch, i.e., $\frac{1}{16}$ inch on each side of the door. Thus, for a frame 24 inches wide, the door will be planed to a width of $23\frac{3}{8}$ inches. For frames which are not 24 inches wide, the door will be planed to a correspondingly different width as determined by the particular feeler gage blocks, but the uniform clearance around the door edge of $\frac{1}{16}$ inch is maintained. With the predetermined feeler gages inserted at either end of the door sizing device as above, the feeler gage which was determined by the position of locating surface 39 with respect to the jamb 11 in Fig. 1 is then inserted between block 122 and locating surface 123 and the wheel 118a adjusted until the feeler gage fits perfectly between block 122 and surface 123. This adjusts the contour of rail 116 so that it corresponds to the contour of the right-hand jamb 11 as determined by the door square 13 in Fig. 1. The rail 116 is fixed at each of its ends to the angle member 108, and after adjustment by wheels 118a, the central portion of rail 116 may be locked to the angle member 108 by clamp 140 which extends through a slot 141 in rail 116 and is threadedly received by an angle member 108, Fig. 12.

With the sizing device 100 adjusted in the foregoing manner, the plane P is then moved across the edge of the door until the shoe engages the guide rail 116 and prevents further material from being removed from the door. At this time this edge of the door will have been planed to correspond to the contour of the side jamb 11 in Fig. 1. The width of the door will have been reduced so as to provide the selected uniform clearance of $\frac{1}{16}$ inch around the edges of the door adjacent the jambs.

After the door has been planed to fit its door frame, the respective edges of the door are adapted to be provided with hinge seats or lock seats. It is preferable to provide each edge of the door with the required seats directly after it has been shaped to fit the contour of the jamb. This permits all of the operations to be performed on one edge of the door before the door is turned over and the second edge is planed. The lock side of the door may be drilled and routed with any suitable apparatus, such, for example, as that disclosed in my Patents Nos. 2,605,791 or 2,801,655.

The hinge seats may be routed in the edge of the door with the hinge-seat jig 150 shown in Fig. 13. The jig 150 comprises an elongated frame 151 preferably adjustable in length comprising a plurality of sections. At one end of the frame 151 is a locating member 152. Along the frame 151 disposed at spaced locations corresponding to the locations of the hinges are template assemblies 153—155. As may be seen in Fig. 13, the jig is adapted to rest on the hinge-receiving edge of the door D preparatory to routing hinge seats in the edge of the door. Each template assembly comprises a frame 156, Fig. 14, which includes a horizontal portion 156a, Fig. 15, which is adapted to extend over the edge of the door and support a template 157 for guiding a routing tool R. The template frame 156 also includes a vertical portion 156b having a slot therein adapted to receive the frame 151. The template 156 is adapted to be locked to the jig frame 151 by means of knob screw 158. As may be seen in Fig. 15, the door D is disposed beneath frame section 156a and is held against depending section 156b by a threaded clamp 159 which depends from the template frame and is adapted to be moved against the door by knob 160. The template assemblies 153—155 are in

general similar to those shown in my aforesaid Patent No. 2,801,655 with the exception that they do not include a provision for clamping a jamb adjacent the door. The template assemblies may be adapted for use on either square-edge doors or bevel-edge doors, as described in my Patent 2,801,655.

The hinge seat jig 150 includes a novel provision for locating the template assemblies lengthwise of elongated frame 151 in accordance with the gage dimensions obtained with the hinge seat gage 50 illustrated in Figs. 3 and 4. As may be seen in Fig. 14, the frame 151 is provided with a locating member on block 161 which is secured thereto by a screw 162. One of these locating blocks 161 is provided for each of the template assemblies 153-155. However, only one will be described here. The locating blocks 161 are adapted to be secured to the frame 151 at the normal hinge locations. The locating block for the template assembly 153 at the head end of the door is adapted to locate that assembly for routing a hinge seat five inches below the head end of the door. The locating block for template assembly 155 at the foot end of the door is positioned for locating a hinge seat ten inches from the bottom of the door. The locating block for the middle assembly 154 is positioned to locate a hinge seat midway between the upper and lower hinge seats. It is customary practice to locate the hinge seats at the foregoing locations regardless of the size of the hinges within a normal series of sizes. To accomplish this, the jig frame 151 is provided with a series of equally spaced threaded openings 163-165, as shown in Fig. 14A. The locating members 161 are provided with a series of openings 166 and 167 having a different equal spacing. As standard hinges vary in length one-half inch, such, for example, as 3½ inches, 4 inches, etc., the openings 163-165 in frame 151 are spaced apart one-half inch from each other, while the openings 166 and 167 in member 161 are spaced apart three-quarters of an inch. The difference in dimension between the two series of spacings corresponds to one-half the difference between size variations in the normal series of hinge sizes. Thus, by removing screw 162 from the aligned openings 165 and 167 and moving opening 166 into alignment with opening 164, the locating member 161 will have been moved to the right, as shown in Fig. 14A, a distance of one-quarter inch. This will correctly locate the template assembly for the next hinge size, and all that remains to be done is to replace the template 157 with another template having the proper size opening corresponding to the new size of hinge.

It will be noted in Fig. 14 that the locating member 161 is provided with a cut-out portion 161a which is adapted to receive a portion 156c of the template frame 156. The portion 156c is adapted to be moved between the shoulders 161b and 161c when the clamp 158 is loosened. The shoulder 161b on frame 151 associated with template assembly 153 corresponds to the position of locating surface 167a on gage 50. The feeler gage which was inserted between members 67a and 63b in Fig. 3 is adapted to be inserted between members 67a and 63b in Fig. 3 is adapted to be inserted between shoulder 161b and projection 156c. Thus, the dimension obtained from the pre-cut hinge seat at the head end of the jamb 11 with the gage 50 is transferred to the hinge seat jig 150 by the same feeler gage. Similarly, the shoulders 161b on frame 151 associated with template assemblies 154 and 155 correspond to the position of locating surfaces 68a and 69a on gage 50 and corresponding feeler members are adapted to be inserted in a similar manner to position the template assemblies lengthwise of the door at locations corresponding to the locations of the pre-cut hinge seats in jamb 11.

The template frame 156 is provided with a cut-out or chip slot 170 in the vertical section 156b of the frame adjacent the template 157. This permits the discharge of chips from the door cut by the routing tool R, Fig.

15, during the routing operation. This is an important feature since it will be noted that the ends of the horizontal section 156a of the template frame rest on the hinge-receiving edge of the door and slot 170 provides the necessary escape route for the wood chips to prevent clogging.

While the foregoing system has been described with the apparatus adjusted in accordance with a starting point based upon feeler gages having a thickness of 1¼ inch disposed at predetermined points along the vertical edges of the door and a feeler gage having a thickness of 1⅞ inch at the head end of the door, it is to be understood that the equipment may be adjusted to have a different starting point which would entail different thicknesses of feeler gages. The foregoing thicknesses were selected for the starting point because they have been found to provide good results.

An example of the type of data derived in operating the improved system disclosed herein is shown on the following list of the numerical values of the feeler gages expressed in 64ths of an inch at the selected locations around the door frame in one particular installation:

Gage Position	Measured Gage Thickness	Standard Gage Thickness
Door Frame Contour:		
A Between head jamb 12 and surface 37.	13	16
B Between side jamb 11 and surface 35.	8	12
C Between side jamb 11 and surface 39.	10	12
D Between side jamb 11 and surface 36.	13	12
E Between side jamb 10 and surface 38.	10	12
Hinge Seat Locations:		
AA Between surfaces 67a and 63b.	11	12
BB Between surfaces 68a and 64b.	10	12
CC Between surfaces 69a and 65b.	13	12

From the foregoing table, comparing the standard gage thickness, which corresponds to a door frame of standard size, with the measured gage thickness will show in what manner this particular installation deviated from the standard. It will also be seen that by merely recording the information in the measured gage column, this information can be preserved and used at any time to cut a door so that it will be custom-fitted to the door frame from which the measured gage information was obtained.

As described in detail above, it is not necessary for the workmen to know the exact measurement of the door. All the information he needs is the number of the gage blocks at the selected locations around the door frame and along the hinge seats. With this information he can operate the cutting tools disclosed in Figs. 6, 10 and 15 to cut the door to a contour corresponding to the pre-installed door frame and to route the hinge seats in the edge of the door at locations corresponding to the pre-cut hinge seats in the pre-installed door frame.

Since the gage measurements are obtained solely by use of the feeler members, there are no adjustable parts that might be accidentally moved and thus provide erroneous results. The feeler type measurements provide very accurate gaging, and thus insure that the door when cut in accordance with recorded information will be custom-fitted to the corresponding door frame.

While there has been described a preferred embodiment of the invention, it will be understood that further modifications may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

What is claimed is:

1. A system for hanging doors in frames comprising a door square gage, a hinge-seat gage, a plurality of feeler members for cooperating with said gages to measure the contour of a door frame and the location of hinge seats in the frame, and cutting-tool-controlling guide means adjustably positioned relative to a door, said cutting-tool-controlling guide means being adjusted in accordance with said feeler members to the measured contour of the door frame and hinge seat locations therein for guiding cut-

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ting tools along the edges of the door to cut the contour of the door and the location of hinge seats in the door to correspond to the contour of said frame and the location of hinge seats therein.

2. A method of fitting a door for hanging in a door frame opening comprising the steps of placing in the door frame opening a gage of predetermined size which is smaller than said opening, moving the gage against one side of the frame at the top and bottom thereof, inserting feeler members at selected points around the gage between the gage and the door frame to gage the size and contour of the door frame opening, placing a door on a support having a cutting-tool-controlling guide in predetermined position corresponding with said predetermined size of the gage, adjusting the cutting-tool-controlling guide from its predetermined position relative to the door in accordance with the thickness of the feeler members inserted at said selected points, and moving a cutting tool along the guide and the edges of the door to change the contour of the door to fit the contour of the door frame opening.

3. A method of fitting a door for hanging in a door frame opening according to claim 2, wherein said selected points around the gage for inserting feeler members are located at top, bottom and intermediate positions along one side jamb of the frame, at an intermediate position along the other side jamb of said frame, and at one of the ends of the head jamb of said frame.

4. A method of cutting the head end of a door at an angle corresponding to the angle of the head jamb in the door frame comprising the steps of inserting a gage in the door frame along the head jamb thereof, inserting a feeler gage between the gage and the head jamb to determine the spacing therebetween, placing a door in a horizontal position with the head end thereof adapted to be pivoted about one corner, placing said feeler gage at a distance along the side edge of the door corresponding to the width of the door from said one corner, pivoting said door about said one corner a distance corresponding to the thickness of said feeler gage to move the opposite corner at the head end of the door through a corresponding distance, and moving a cutting tool along a line passing through said one corner of the door to cut off the head end of the door at an angle determined by the feeler gage.

5. A method of routing hinge seats in the edge of a door at locations corresponding to pre-cut hinge seats in a pre-installed door frame comprising the steps of gaging the location of the pre-cut hinge seats in the door frame, determining the deviation in location of said pre-cut hinge seats from predetermined normal locations by means of feeler gages, positioning template assemblies along a support corresponding to the edge of a door at locations corresponding to said predetermined normal locations, and using said feeler gages to measure adjustment of the template assemblies along the edge of the support relative to said predetermined normal locations in accordance with the measured position of said pre-installed hinge seats in said frame preparatory to routing hinge seats in the edge of the door, and routing the hinge seats in the edge of the door in accordance with the adjusted template assemblies.

6. The method of preparing a door for hanging in a frame comprising inserting a contour gage in the opening of the frame, inserting feeler gages at predetermined locations around the frame opening between the frame and the contour gage, adjusting a cutting-tool-controlling guide relative to a door in accordance with the thickness of the feeler gages inserted at said predetermined locations, moving a cutting tool along the guide and the edges of the door to change the contour of the door to match the contour of the frame, inserting a hinge-seat gage in the hinge seats in the frame, inserting feeler gages at the hinge locations to measure the deviation of the hinge seats in the frame from a predetermined standard loca-

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tion, adjusting hinge-seat templates along the hinge-receiving edge of the door by means of said feeler gages to position the templates in accordance with the deviation of the hinge seats in the frame from said predetermined standard locations, and moving a cutting tool relative to said templates to cut hinge seats in the edge of the door corresponding to the locations of the hinge seats in the frame.

7. The method of preparing a door for hanging in a frame comprising inserting a contour gage in the opening of the frame, inserting feeler gages at predetermined locations around the frame opening between the frame and the contour gage, adjusting a cutting-tool-controlling guide in accordance with the thickness of the feeler gages inserted at said predetermined locations to match the guide to the contour of the frame, supporting a door relative to the guide, and moving a cutting tool along the guide and the edges of the door to change the contour of the door to match the contour of the frame.

8. The method of preparing a wooden door for hanging in a metal frame comprising inserting a hinge seat gage in the hinge seats in the metal frame, inserting feeler gages at the hinge locations to measure the deviation of the hinge seats in the metal frame from a predetermined standard location, adjusting hinge-seat templates along the hinge-receiving edge of the door in accordance with the thickness of the feeler gages to position the templates in accordance with the deviation of the hinge seats in the metal frame from said predetermined standard locations, and moving a cutting tool relative to the templates to cut the hinge seats in the edge of the door corresponding to the locations of the hinge seats in the metal frame.

9. A method of cutting a door to proper length with the head end of the door being cut at an angle corresponding to the angle of the head jamb in the door frame comprising the steps of inserting a gage in the door frame with a vertical section of the gage extending along a side jamb from the floor to the head jamb and a horizontal section of the gage projecting from the vertical section and extending along the head jamb, inserting a feeler gage between the horizontal gage section and head jamb to determine the spacing therebetween, placing a door in horizontal position with the head end thereof adapted to be pivoted about a point adjacent one corner, the bottom end of the door being positioned relative to said pivot point in accordance with the determined length, placing the feeler gage at a distance along the side edge of the door corresponding to the width of the door from the pivot point, pivoting the door about the pivot point a distance corresponding to the thickness of the feeler gage to move the opposite corner at the head end of the door through a corresponding distance, and moving a cutting tool along a line passing substantially through said pivot point to cut off the head end of the door at an angle and length as determined by the gage and the feeler gage.

10. The method of preparing a door for hanging in a frame comprising inserting a contour gage in the opening of the frame, inserting feeler gages at predetermined locations around the frame opening between the frame and the contour gage, recording the thicknesses of the feeler gages which were inserted at said predetermined locations, adjusting a cutting-tool-controlling guide in accordance with the recorded thicknesses of the feeler gages to match the guide to the contour of the frame, supporting a door relative to the guide, moving a cutting tool along the guide and the edges of the door to change the contour of the door to match the contour of the frame, inserting feeler gages at the hinge locations to measure the deviation of the hinge seats in the frame from a predetermined standard location, recording the thicknesses of feeler gages inserted at the hinge locations, adjusting hinge-seat templates along the hinge-receiving edge of the door in accordance with the recorded thicknesses of feeler gages to position the templates in accordance with the deviation of the hinge

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seats in the frame from said predetermined standard locations, and moving a cutting tool relative to the templates to cut hinge seats in the edge of the door corresponding to the locations of the hinge seats in the frame.

11. A method of preparing a plurality of doors for hanging in their respective frames according to claim 10 wherein all of the door frames are gaged for contour and hinge seat location with feeler gages and the thicknesses of the feeler gages are recorded before the cutting tools are adjusted in accordance with the recorded information preparatory to changing the contour of the doors to match the contours of their respective frames and to cutting hinge seats in the edges of the doors corresponding to the locations of the hinge seats in their respective frames.

References Cited in the file of this patent

UNITED STATES PATENTS

385,125 Lee June 26, 1888

918,504
987,703
1,237,487
1,767,012
5 1,788,256
1,909,510
2,400,862
2,511,900
2,570,430
10 2,605,790
2,605,791
2,609,014
2,679,696
2,763,301
15 2,801,655
2,821,028
2,823,462

18

Burgess Apr. 20, 1909
Curtin Mar. 28, 1911
Dickie Aug. 21, 1917
Pfau June 24, 1930
Sherwin Jan. 6, 1931
Welch May 16, 1933
Zern May 21, 1946
Bryant June 20, 1950
Cramer Oct. 9, 1951
Schwarzer Aug. 5, 1952
Zern Aug. 5, 1952
Schwantes Sept. 2, 1952
Reeder June 1, 1954
Christopherson Sept. 18, 1956
Zern Aug. 6, 1957
Godfrey Jan. 28, 1958
Greenfield Feb. 18, 1958