

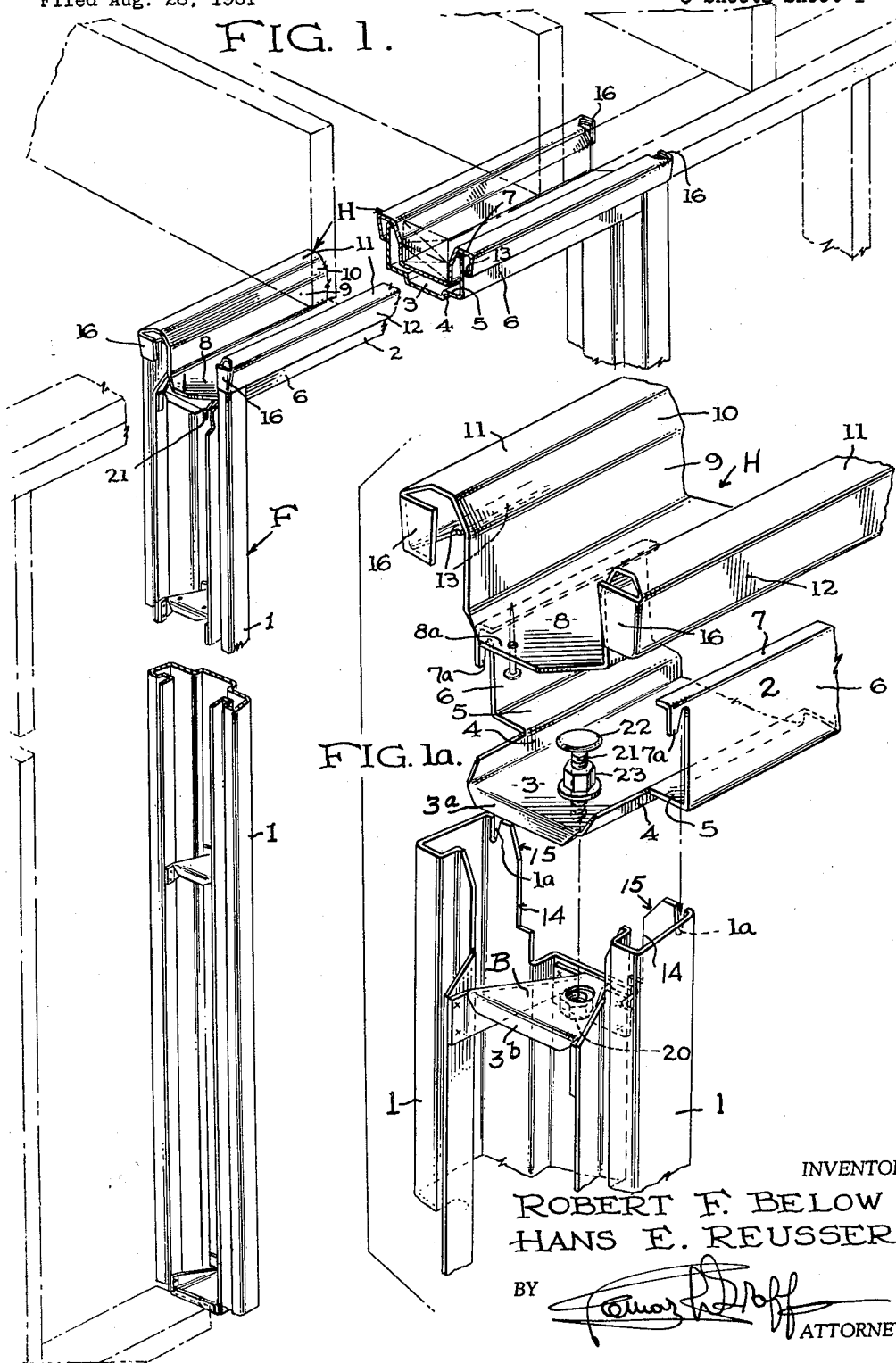
July 21, 1964

R. F. BELOW ETAL
LOAD BEARING DOOR FRAMES

3,141,533

Filed Aug. 28, 1961

3 Sheets-Sheet 1



July 21, 1964

R. F. BELOW ETAL
LOAD BEARING DOOR FRAMES

3,141,533

Filed Aug. 28, 1961

3 Sheets-Sheet 2

FIG. 2.

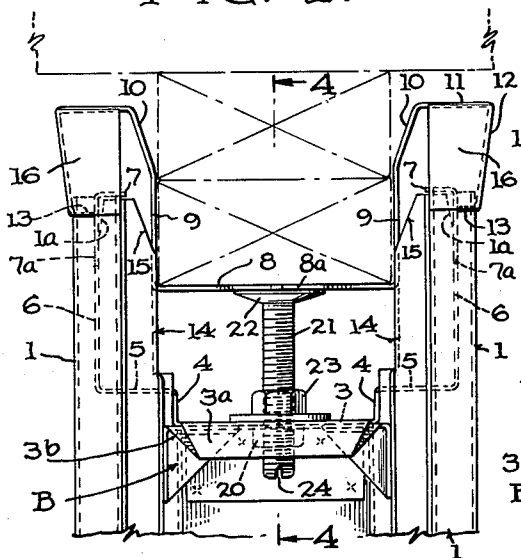


FIG. 4.

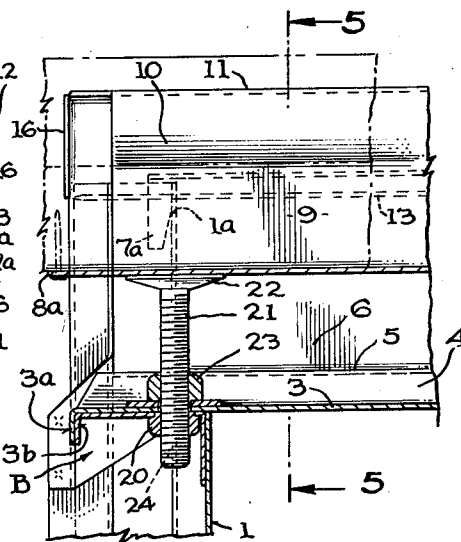


FIG. 3.

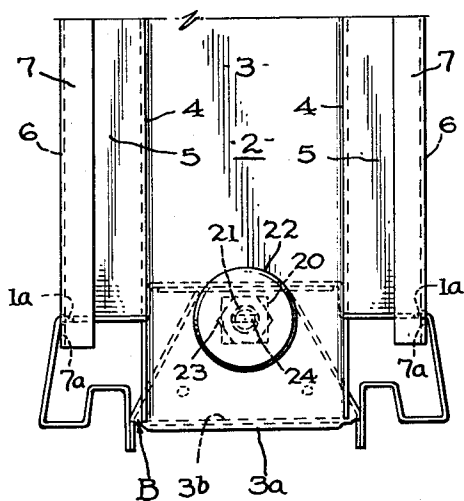
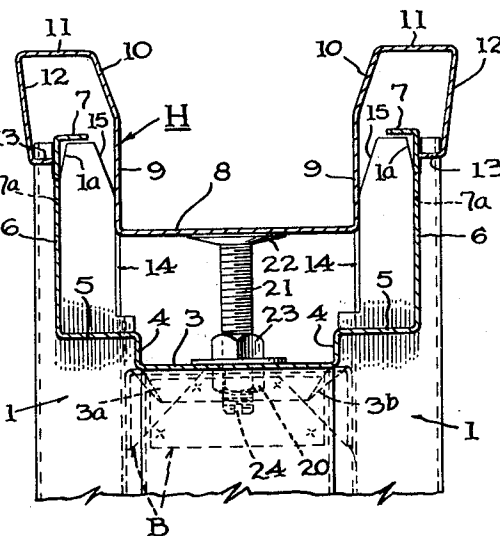


FIG. 5.



INVENTORS

ROBERT. F. BELOW
HANS E. REUSSER

BY

Guar. & Co. Inc.
ATTORNEY

July 21, 1964

R. F. BELOW ET AL
LOAD BEARING DOOR FRAMES

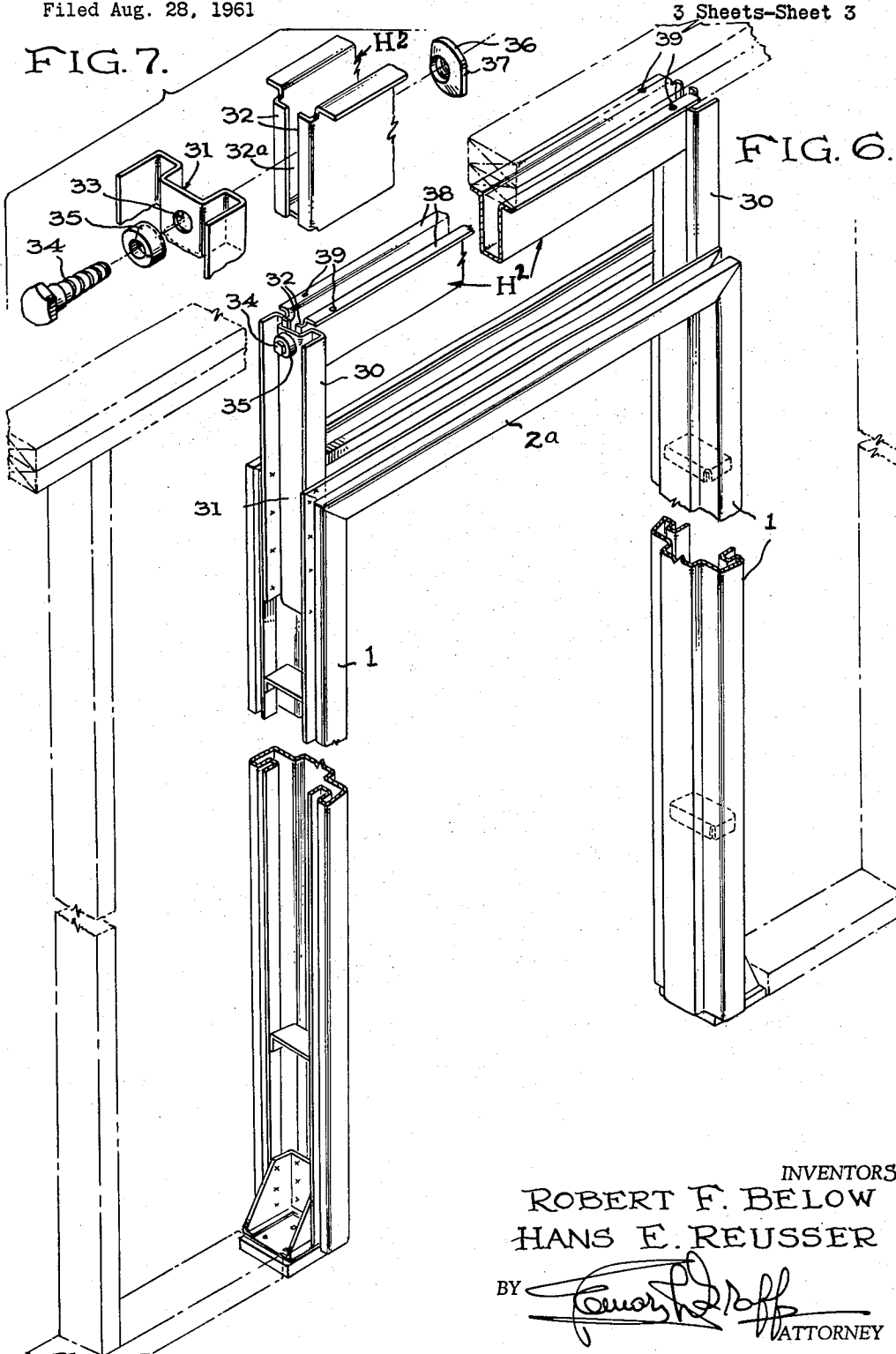
3,141,533

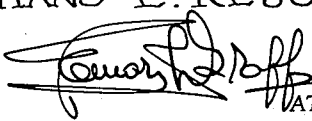
Filed Aug. 28, 1961

3 Sheets-Sheet 3

FIG. 7.

FIG. 6.



INVENTORS
ROBERT F. BELOW
HANS E. REUSSER
BY  ATTORNEY

1

3,141,533

LOAD BEARING DOOR FRAMES

Robert F. Below, Brecksville, and Hans E. Reusser, Cleveland, Ohio, assignors to Republic Steel Corporation, Cleveland, Ohio, a corporation of New Jersey
Filed Aug. 28, 1961, Ser. No. 134,204
5 Claims. (Cl. 189-46)

This invention relates to door frames, more particularly metal door frames made in standard sizes and required to fit in with previously erected studding and overhead plate of the building itself.

One of the objects of the invention is to provide means for quickly and easily installing a frame, for a nominally ceiling height door, having a load bearing head adjustable for dimensional variations in the room space framing, more particularly in the zone of the overhead or top plate, and eliminating the need for frame work of reinforced structure surrounding the door frame.

Another object of the invention is to provide structural features which lend themselves to appropriate manufacturing procedures, and once made, lend themselves equally to ready assembly by workmen installing the door.

A further object of the invention is to provide simple and reliable means for facilitating the positioning of the adjustable load bearing head carried by the door frame relative to the overhead plate.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the invention consists in the novel construction, combination, and arrangement of parts, hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:

FIGURE 1 is a perspective view of a metal door frame having the adjustable load bearing head secured thereto.

FIGURE 1^a is an exploded perspective view of the end portions of the related load bearing head and door frame.

FIGURE 2 is an end elevation of the upper part of the door frame including the fixed head of said frame and load bearing head as shown in FIGURE 1, and as viewed from the lefthand end of FIGURE 1.

FIGURE 3 is a fragmentary top plan view of FIGURE 2 with the adjustable load bearing head omitted to show the fixed head of the door frame assembled to the jamb.

FIGURE 4 is a vertical longitudinal cross-sectional view taken on the line 4-4 of FIGURE 2.

FIGURE 5 is a transverse cross-sectional view taken on the line 5-5 of FIGURE 4.

FIGURE 6 is a perspective view of a metal door frame and load bearing header illustrating a modification of the invention for use with doors normally less than ceiling height.

FIGURE 7 is an exploded perspective view illustrating the parts shown in FIGURE 6 for effecting the position of the adjustable load bearing header.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

It is well known in the industry that metal door frames are made in standard sizes, vertically and horizontally. By way of example, it will be understood that the door frame shown in FIGURES 1-5 of the drawings pictorially illustrate a scale intended for a door nominally seven-foot-eight-inches in vertical height, and whose width will vary anywhere from two feet to three feet.

Customarily, neither the head nor the jamb members of a metal door frame carry ceiling or floor loading forces of any magnitude from above, because the frame is usually installed in a previously prepared structural opening framed with double studding and overhead trussing to pass these forces to the floor independently of the door frame.

2

To allow space for overhead trussing it is necessary that the fixed head of the door frame be lower than the ceiling and that this overhead space be covered with wall finish applied with special care to prevent the subsequent formation of cracks at points of stress.

It is also customary to anchor metal frames to the structural opening at the jambs, often involving adjustments followed by difficulty in joining wall finish to the frame. Most of these problems can be eliminated with a floor to ceiling metal door frame sufficiently rigid to carry overhead ceiling loads without the help of framing reinforcement at the opening other than a continuous double 2" x 4" top plate.

In otherwise conventional framing for a wall without openings, only a portion of the sole plate and studs at the door location are omitted for installing this frame. In this case a load bearing header is provided with an adjustment for normal floor to ceiling height variations and cooperates with the double plate of the building frame to derive beam strength for transmitting overhead loading to the jambs. When adjusted and secured to top plate and floor, the frame provides for edge insertion and retention of standard thickness wall finish materials in untrimmed sheets. To facilitate this, a gap is provided between load bearing header and ceiling joists, and jambs are formed in section with channels whose inner flanges are on a level with nearby stud faces and which are uninterrupted from floor to ceiling.

Referring first to FIGURE 1, it may be pointed out that the prefabricated standard door frame F includes the channel shape jamb portions 1 of suitable cross-sectional configuration and having their open sides or channels facing the vertical studs of the building framework.

The fixed head 2 connecting the upper ends of the jambs, includes the bottom wall or web 3 bounded by opposite side walls 4 connected with the horizontal portions 5 cooperating to form the rabbet for receiving the door, not shown, in the conventional manner. The horizontal portions 5 are connected with the vertical portions 6 of the fixed head proper and terminate in the inturned upper flanges 7, as shown in FIGURE 2.

To facilitate the initial assembly and mating of the fixed head 2 to upper portions of the jambs 1, hook tabs 7^a at the ends of the flanges are intended to engage and seat in notches 1^a provided in upper extensions of the door rabbet in the jambs 1. Downward flanges 3^a also provided at ends of web 3 of the fixed head 2 are simultaneously intended to hook over a mating flanged portion 3^b of jamb bracket B for added stability in this assembly.

The adjustable header designated generally as H includes a bottom web portion 8, side walls 9, and the upwardly and outwardly inclined portions 10 terminating in the horizontal walls 11 and the outer downwardly extending walls 12, the latter having inturned horizontal flanges 13 slidably contacting the outer faces of the walls 6 of the fixed head 2.

Also to assist in slidably retaining upper ends of jamb members 1, and to provide visual end closure means for adjusting the gap above the top of jambs, the ends of the walls 12 of the load bearing header H have flanges 16 inturned at the ends.

It will now be seen that the side walls 9 of the adjustable load bearing header are slidably fitted within the edge portions 14 of the upper ends of the jamb members 1. To facilitate the fitting of the side walls of the header between said edges 14-14, the entrance portions 15 are inclined as shown in FIGS. 1^a, 2, and 5.

According to both forms of the invention, the means for adjusting the load-bearing header H relative to the fixed head includes fixed elements secured in the chan-

3

nels of the jambs and having means for adjustably engaging said load-bearing member.

In FIGS. 1-5, this fixed member is in the form of a nut 20 welded or otherwise secured to the aforesaid bracket B which is in turn welded in the channel portion of a related door jamb 1. This nut is intended to receive the threaded shank 21 of a header adjusting screw having an enlarged head portion 22 bearing against the underside of the web 8 of the header. The threaded shank portion 21 receives a lock nut 23 and an accompanying bearing washer as shown. It will be observed that the lower end of the threaded shank 21 of the adjusting member is provided with a transverse slot 24 to receive a screw driver or similar tool for turning the threaded shank 21 to raise or lower the web 8 of the header relative to the bottom wall 3 of the fixed head 2.

The web portion 8 of the header H is provided with a perforated extension 8^a at each side intended to receive a nail or the like to anchor the load bearing header after erection, and after final adjustment of the load bearing header H with reference to the fixed head.

The assembly of the frame before erection in the field includes a first step (a) fitting the fixed head 2 to the jambs 1 as they are laid out on the floor by fully engaging both hook tabs 7^a and end flanges 3^a respectively, with notches 1^a and jamb bracket flanges 3^b; (b) running the locking nut 23 up on shank 21 along with a flat washer, and full threading shank 21 into both nuts 23 and 20 to make a temporary fastening for further handling the frame assembly; (c) the adjustable load bearing head H is then placed over the jambs 1-1, bottoming on heads 22 of adjusting screws 21. During the procedure, the screw adjustments are checked for minimum height to facilitate tilt-in installation under the double plate shown in dotted lines as comprising overlaid two-by-fours.

Referring now to the modification shown in FIGURES 6 and 7, it will be understood that another form of adjustment is applied to the load bearing header H² which extends upward in concealment behind wall finish from a frame intended for standard doors of less than ceiling height. Otherwise this frame has the same broad functional characteristics as previously described and shown in FIGURES 1-5, inclusive.

In this modification, the fixed elements, welded between channel flange portions of the jambs, are in the form of channel-shaped sections 30 acting as extensions of the jambs above fixed head 2^a. The load-bearing header H² is therefore adjustable relative to said extensions 30 and fixed head 2^a as will now appear.

It will be observed that the extension 30, while having the general cross-sectional shape of a double or reverse channel, is provided with a web 31 pressed inwardly to provide a pocket for slidably receiving and guiding the mating inwardly flanged end portions 32 of the header H².

As shown in FIGURE 7, the web 31 is provided with an opening 33 to receive a cap screw 34 cooperating with the flat surface of a washer 35 that has a conically recessed or cupped opposite face.

The inner end of the screw, after it passes through the cupped washer and slot 32^a, engages the threaded portion of a cone shaped nut 36 having flat sides 37 engaging the inner side faces of the header H² adjacent to inturned flanges 32 to prevent rotation of the nut. Said screw, cupped washer, and cone shaped nut comprise an assembly for locking ends of header H² to extensions 30 after adjustment.

It will thus be understood that the adjustable header H² of generally U-shaped cross section has its flanges 32 engaged for slidable adjustment at the inner web face 31 prior to tightening of said locking assembly. Header H² is vertically adjusted to bring flanges 38 in contact with the plate consisting of overlaid two-by-fours, and initially anchored to this with nails or the like through

4

holes 39. Header locking assemblies are then tightened to permanently maintain said head adjustment in relation to a fixed head 2^a while transferring overhead loading forces to jambs through fixed extensions 30. Permanent maintenance of said adjustment is a function of matching conical surfaces, on cupped washer 35 and nut 36, acting to deform sandwiched portions of extension web 31 and header flanges 32 under clamping pressure derived from tightening cap screw 34.

The manner of placing the structure of FIGS. 6 and 7 in position is substantially as follows: (a) the door frame is set on finished floor, or suitable shim blocks on sub floor, in the opening of sole plate; (b) the header section is then raised to proper height against the underside of the top plate; (c) with the jambs approximately plumb, the header section is centered under the plate and nailed in place; (d) the header lock assemblies are then tightened; (e) the jambs are aligned and plumbed with the wall; (f) the jambs are then secured by nailing through anchor brackets and into the flooring.

From the foregoing it will now be seen that in both forms of the invention, simple and practical means are provided for adjusting the load bearing header relative to the plate of the framing and the fixed head of the door frame.

We claim:

1. An installation for doorways between pre-erected studding and underplate members of the interior wall bearing frame, comprising,

a metal door frame assembly having vertical jambs and a head fixed thereto, said jambs and head both having a web and outwardly extending flanges providing outwardly facing vertical channel portions, an adjustable load bearing header above said head, means for effecting adjustment of said load bearing header relative to the head of the metal door frame, said means including,

brackets connected with the webs of said jambs adjacent the upper ends thereof and having a downwardly turned flange and an opening inwardly of said flange, the web of said head having extensions at each end thereof, each of said extensions terminating in a downwardly turned flange which overlies the related flange of said bracket when the head is assembled with the jambs, said extensions also having an opening inwardly of said flange,

the related openings of said brackets and extensions being in registry when said members are in assembled position,

a nut fixed to the lower surface of each of said brackets beneath the openings therein,

a headed bolt threadedly engaged with each of said fixed nuts and extending above the plane of said extensions,

a lock nut engaging said bolts near the upper end thereof and between the head of the bolt and the upper surface of said extensions,

the adjustable load bearing header terminating at its ends in flanges that embrace said related ends of the jambs during initial stages of assembling the adjustable head to the jambs,

whereby, when said jambs, head, and load bearing header are in assembled position, rotation of said bolts will cause movement of said load bearing header to the desired adjusted position.

2. An installation for doorways between pre-erected studding and underplate members of the interior wall bearing frame, comprising,

a metal door frame assembly having vertical jambs and a head fixed thereto, said jambs and head both having a web and outwardly extending flanges providing outwardly facing vertical channel portions, a load bearing header above said head,

the web portions of the jambs being cut away at their upper ends to provide a recess with outwardly

5

tapered upper edges, said load bearing header including a plate engaging channel comprising side flanges connected at their bottom edges by a web, said side flanges and web guided into telescopic engagement with said fixed head by said tapered upper edges of the recess, said load bearing header also including portions telescopically fitting over the related portions of the jambs and fixed head of the door frame, means for effecting adjustment of said load bearing header relative to the head of the metal door frame, said means including,

a fixed member connected with the web of said jambs and disposed wholly within and between said flanges which provide the outwardly facing channel portion of each jamb,

and means cooperating with said fixed member to alter the position of the load bearing header relative to the said head according to the position of the underplate relative to the door frame assembly.

3. An installation for doorways between pre-erected studding and underplate members of the interior wall bearing frame, comprising,

a metal door frame assembly having vertical jambs and a head fixed thereto, said jambs and head both having a web and outwardly extending flanges providing outwardly facing vertical channel portions,

a load bearing header above said head,

means for effecting adjustment of said load bearing header relative to the head of the metal door frame, said means including,

structural channel members secured at one end in the upper portion of the channel of each jamb and constituting extensions thereof, the other end of said members each having an opening, the load bearing header having vertical end slots, threaded fastenings

6

passing through said openings and slots to receive a clamping nut, whereby, when the fastenings are loose, the header may be adjusted relative to the fixed head of the door frame and when tightened secure the parts in final position.

4. In a metal door frame according to claim 3, wherein the extensions are of outer and inner channel formation and the ends of the header engage with the inner channel, and the upper side edges of the channel of the load bearing header have offset flanges.

5. In a metal door frame according to claim 3, wherein, the threaded fastenings are cap screws cooperating with a conically recessed washer, the screw body passing through said openings and slot to receive a clamping nut with a matching conical working face, whereby, when the fastenings are loose, the header may be adjusted relative to the fixed head of the door frame and when tightened secure the parts in final position by means of simultaneous conical deformation to intervening portions of both supporting and adjustable load bearing header members.

References Cited in the file of this patent

UNITED STATES PATENTS

1,826,981	Baum	Oct. 13, 1931
2,531,075	Miller	Nov. 21, 1950
2,608,276	Kelly	Aug. 26, 1952
2,774,997	Zitomer	Dec. 25, 1956
2,888,070	Smith	May 26, 1959
3,007,559	Goldberg	Nov. 7, 1961
3,060,522	Parker	Oct. 30, 1962

FOREIGN PATENTS

521,765	Belgium	Aug. 14, 1953
---------	---------	---------------