Aug. 9, 1966 L. O. DOWNES 3,265,416

STRUCTURAL FRAMING SYSTEM

Filed June 8, 1962

3 Sheets-Sheet 1

FIG. 1.

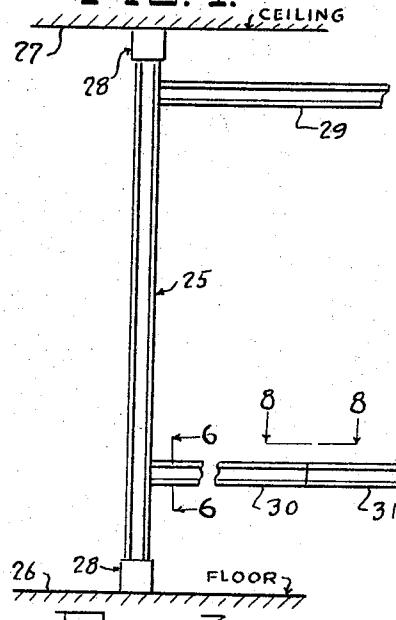


FIG. 5.

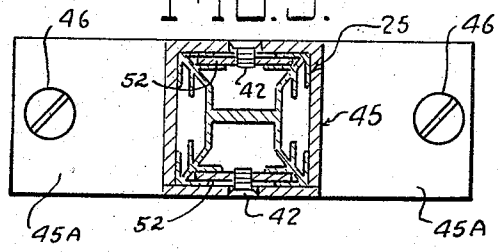


FIG. 4.

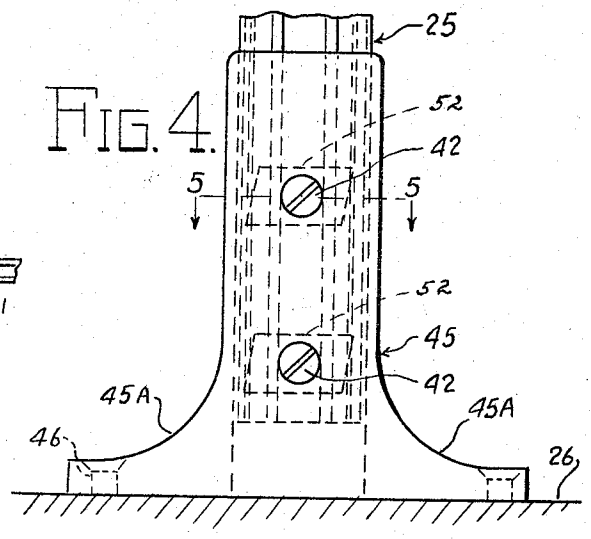


FIG. 3.

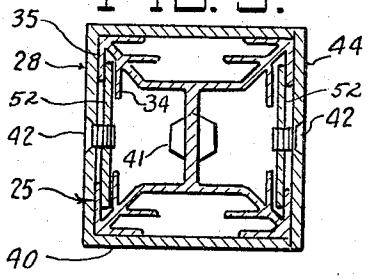
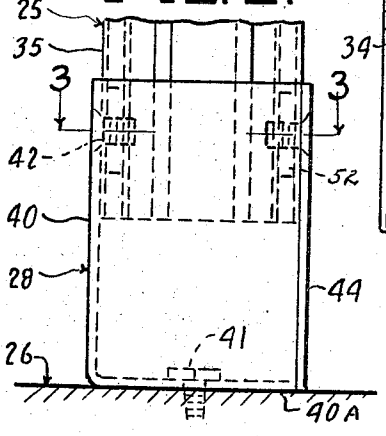


FIG. 2.



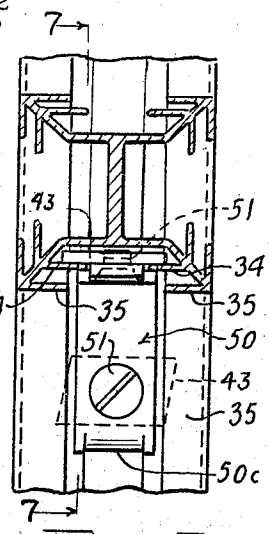


FIG. 6.

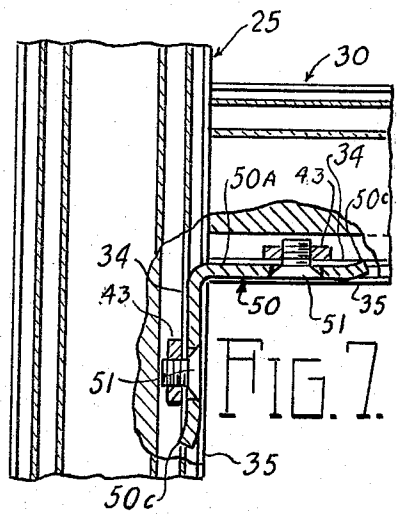


FIG. 7.

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FIG. 9.

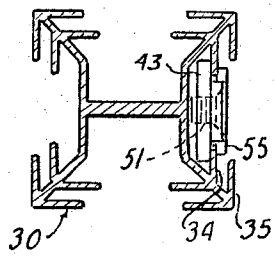
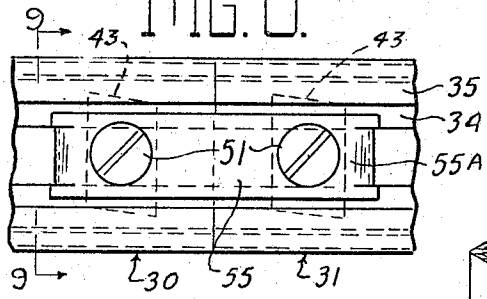


FIG. 8.



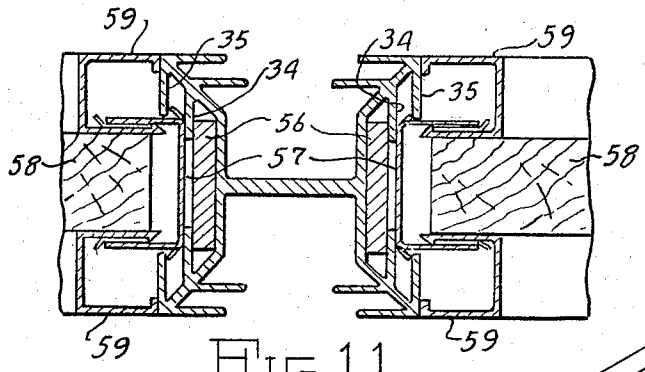


FIG. 11.

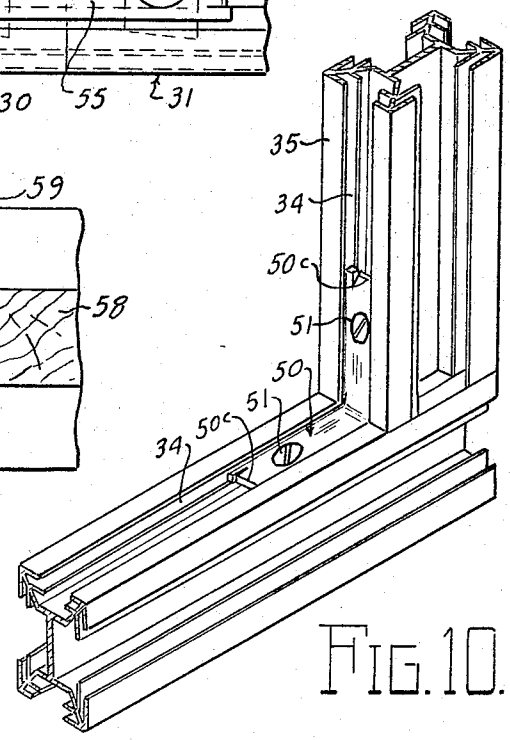
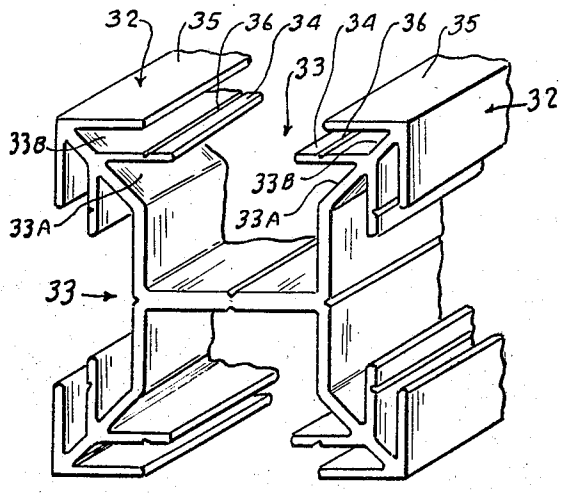


FIG. 10.

FIG. 12.



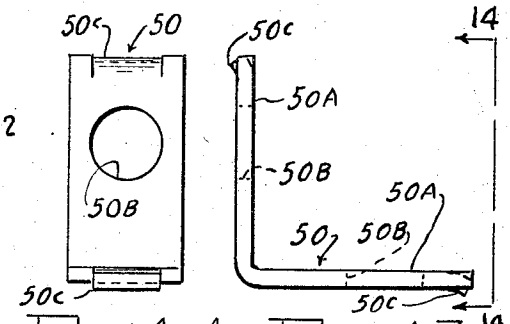


FIG. 14. FIG. 13.

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FIG. 15.

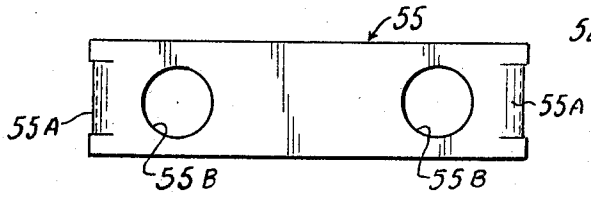


FIG. 16.

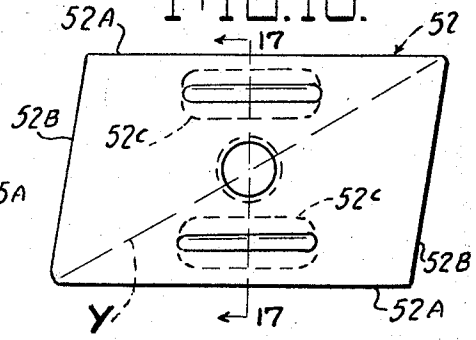
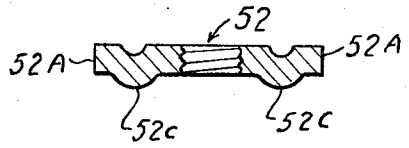


FIG. 17.



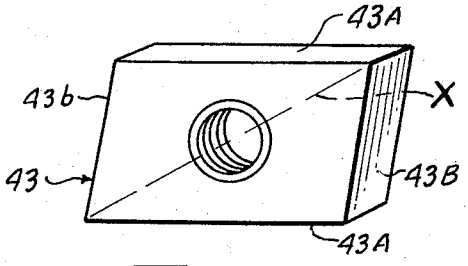


FIG. 18.

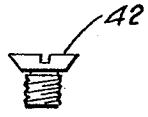


FIG. 19.

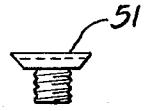
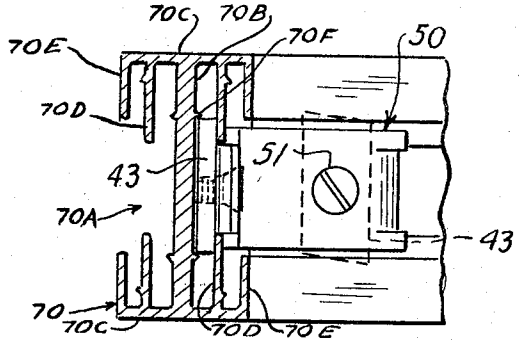


FIG. 20.

FIG. 21.



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United States Patent Office 3,265,416 Patented August 9, 1966

3,265,416

STRUCTURAL FRAMING SYSTEM

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Filed June 8, 1962, Ser. No. 201,021
6 Claims. (Cl. 287—189.36)

My invention relates to structural framing systems and more particularly to a new combination of supporting members and connecting elements adaptable for carrying wall structures and the like.

In the development of such structures heretofore, various limitations have been found to exist which prevent a single system from serving many uses or being architecturally acceptable except for certain specific types of buildings.

Architecturally, panelling systems now in use, unless custom made, are generally unsatisfactory for most interiors since they lack the clean modern lines, finished joints and absence of exposed brackets and miscellaneous pieces. Moreover, for practical reasons, most systems are unsatisfactory because they require skilled assemblers and the use of many tools, are not readily disassembled or changed when desired, and are not easily maintained.

An object of the present invention is to improve structural framing systems by combining new extrusion members with new connecting members to provide a frame system adaptable to innumerable uses as suggested above.

Another object of the invention is to construct an improved framing system by providing new extrusion members connected with elements in such a way as to permit free and unobstructed assembly with panel support elements and other structure.

A further object of the invention is to improve structural framing systems by providing simplified means for readily and securely joining new types of longitudinal extrusions.

Yet another object of the invention is to provide for improved assemblies of framing systems by constructing unique extrusions and supporting parts for connecting, mounting, and strengthening said extrusions.

A still further object of the invention is to improve framing systems by providing new connections, supports and strengthening means readily adaptable to special extrusion members.

For a more complete understanding of the present invention, reference may be had to the accompanying drawings illustrating preferred embodiments of the invention in which like reference characters refer to like parts throughout the several views and in which

FIG. 1 is a fragmentary elevational view of a preferred framing system assembled in accordance with the present invention.

FIG. 2 is an enlarged fragmentary elevational view of a portion of the assembly of FIG. 1.

FIG. 3 is a cross-sectional view taken substantially on the line 3—3 of FIG. 2.

FIG. 4 is a fragmentary elevational view similar to FIG. 2 but illustrating a different modification.

FIG. 5 is a cross-sectional view taken substantially on the line 5—5 of FIG. 4.

FIG. 6 is a fragmentary cross-sectional view taken substantially on the lines 6—6 of FIG. 1.

FIG. 7 is a cross-sectional view taken substantially on the line 7—7 of FIG. 6.

FIG. 8 is a fragmentary elevational view as seen substantially from the line 8—8 of FIG. 1.

FIG. 9 is a cross-sectional view taken substantially on the line 9—9 of FIG. 8.

FIG. 10 is a fragmentary perspective view of a portion of the present frame structure.

FIG. 11 is a fragmentary cross-sectional view illustrating a method of stiffening and assembling panels with the present structure.

FIG. 12 is a fragmentary perspective view of the end of a preferred frame member utilized in the present invention.

FIG. 13 is an elevational side view of a preferred bracket utilized in the assembly.

FIG. 14 is an elevational view of said bracket as seen from the line 14—14 of FIG. 13.

FIG. 15 is an elevational plan view of the bracket used in the modification of FIG. 8.

FIG. 16 is an elevational plan view of a nut element used in the present structure.

FIG. 17 is a cross-sectional view taken substantially on the line 17—17 of FIG. 16.

FIG. 18 is perspective view of another nut used in the present structure.

FIGS. 19 and 20 are elevational views of preferred screws used in the present structure.

FIG. 21 is a fragmentary cross-sectional view similar to FIG. 6 but illustrating the bracket connection with modified framing members.

In understanding the present invention in the context of a complete framing and partition system as I have conceived and developed it, reference may be had to certain copending patent applications illustrating, describing and claiming other related articles of manufacture and assemblies.

For example, various basic longitudinal extruded frame members having characteristics in common with the member shown in FIG. 12 herein, are illustrated more fully in my copending application Ser. No. 201,032, filed June 8, 1962, now abandoned.

A number of panelling systems utilizing these basic extrusion members and carried by the present framing system are described more fully in copending application Ser. Nos. 201,021 and 201,019, both filed June 8, 1962 and the latter issuing as U.S. Patent No. 3,193,061, on July 6, 1965.

Door jamb and hinge assemblies carried by the present framing system are described in copending application Ser. No. 22,296, filed Sept. 10, 1962 now abandoned.

Other assemblies utilizing the present system are shown and described in copending applications Ser. Nos.227,370 and 222,294, filed Oct. 1, 1962 and Sept. 10, 1962 respectively and now U.S. Patent Nos. 3,223,774 and 3,166,285.

The present application is primarily concerned with a structural framing system, a preferred assembly being illustrated in FIG. 1, as comprising an upright stanchion member or element 25 mounted between a floor 26 and ceiling 27 by mounting members or elements 28 and supporting horizontal rail members 29, 30 and 31.

Each member or element 25, 29, 30 and 31 may be of many desired configurations such as those of my copening application Ser. No. 201,032. One preferred member is shown in present FIG. 12 as having, in cross-section, a substantially square periphery, each side 32 being flat and having a medial longitudinal recess 33.

Such a recess is common to all frame members utilized in the system. It is provided at its sides with a pair of innermost or inner flanges 34 disposed in a common plane and a pair of outermost or outer flanges 35 disposed in another common plane. The edges of the inner flanges 34 are spaced closer to each other than are the edges of the outer flanges 35, but are preferably provided with longitudinal grooves 36 which permit portions of the inner flanges 34 to be readily broken off to equalize the described spacings where desired.

The recess 33 thus includes slots or spaces 33A disposed inwardly of the inner flanges 34 and slots or spaces 33B disposed between the inner and outer flanges 34 and 35.

The vertical member or element 25, incorporating the characteristic portions described with reference to the member of FIG. 12, is shown in FIGS. 2 and 3 as being supported by the fixture 28. The fixture 28 comprises a channel member 40 having a closed end portion 40A secured to the floor by any means such as a hex-head screw 41. A flat head screw 42, preferably of the type shown in FIG. 19, secures the base web of the channel 40 to a flat nut element 52 of the type shown in FIGS. 16 and 17 which is disposed between the inner and outer flanges 34 and 35 of one side of the member 25, the ends of the nut 52 underlying the outer flanges 35 and adapted to clamp them against the inner surface of the channel 40. The open side of the channel 40 is closed by a flat plate 44 which is similarly secured to the opposite side of the member 25 by another screw 42 and nut 52.

It will be seen that the member 25 need not be cut to the exact distance between floor and ceiling since the end can be supported in a raised position with the member 28 only being anchored directly.

FIGS. 4 and 5 illustrate another preferred tubular mounting member 45 capable of supporting greater loads, being provided on opposite sides with extended feet 45A anchored to the floor 26 by any means such as screws 46. Each side of the member 45 is preferably secured by two screws 42 and nuts 52 in the same fashion as shown in FIGS. 2 and 3.

As illustrated, the nuts 52 have parallel side edges 52A longer than the space between the outer flanges 35 but laterally spaced a distance less than the space between the flanges 35, with parallel inclined end edges 52B such that the greater diagonal Y is longer than the space provided between the sides of that recess portion disposed inwardly of the outer flanges 35. These nuts 52 are relatively thin but take considerable stress, and hence parallel strengthening ribs 52C are provided as shown close to the nut perforation.

FIGS. 6 and 7 illustrate how the members 25 and 30 may be joined, the end of the member 30 abutting the side of the member 25. FIG. 10 is a perspective view of a similar assembly.

The members 25 and 30 are connected by connecting means comprising an angle bracket 50, shown in detail in FIGS. 13 and 14. This bracket comprises end portions 50A each perforated as at 50B. The width of the bracket 50 is less than the space between the outer flanges 35 of the members but greater than the inner flanges 34. The ends of the bracket portions 50A have inwardly displaced projections 50C which are as wide as the space between the inner flanges 34. Thus the bracket 50 will pass between the outer flanges 35 to rest on the inner flanges 34 with the projections 50C engaging the edges of the inner flanges 34 to locate and retain the bracket 50 in place. Flat head screws 51, preferably of the type shown in FIG. 20, and nuts 43 as seen in FIG. 18 clamp the bracket 50 to the inner flanges 34, the nuts 43 being disposed to underlie the inner faces of the flanges 34 as shown in FIGS. 6 and 7.

It will be seen that the nuts 43 have parallel side edges 43A longer than but laterally spaced a distance less than the space between the inner flanges 34. The parallel end edges 43B of the nut 43 are inclined as shown in FIG. 18, with the longer diagonal X being longer than the distance between the sides of the recess portion disposed inwardly of the inner flanges 34. Thus, on installation, the nut 43 will be insertable under the inner flanges, and when turned, will engage the sides of the recess so that they are held in place automatically as the screws 42 are tightened. These nuts 43 are thicker than the nuts 52, and hence need no strengthening ribs for normal application.

FIGS. 8 and 9 illustrate how the two members 30 and 31 may be assembled end to end by the use of a flat strap-like bracket 55 shown in FIG. 15 which, except for being straight rather than at any angle, is the same as the bracket 50 of FIGS. 13 and 14; namely, in the provision of end portions having displaced elements 55A engaged between the edges of the inner flanges 34, and in the provision of perforations 55B arranged for connection, by means of screws 51, to nuts 43 disposed inwardly of and engaging with the inner flanges 34.

It will be seen that the brackets 50 and 55, by being clamped to the inner flanges 34, are disposed completely inwardly of the exterior flat plane surface of the members, so that other elements may be installed flush with the exterior surfaces or slightly inwardly thereof.

In FIG. 21, the bracket 50 is shown as clamped in similar fashion to a modified framing member 70 having only a pair of recesses or slots 70A, and comprising a medial web 70B, side webs 70C from which inwardly extend inner and outer flanges 70D and 70E as shown. Spaced ribs 70F are provided on the web 70B to act as stops for and prevent rotation of the nut 43 which is disposed between the web 70B and flanges 70D.

In some instances, where large stresses may be imposed on the extrusion members, the space disposed inwardly of the inner flanges 34 provides for the inclusion of longitudinal steel strengthening members such as the members 56 illustrated in the assembly of FIG. 11. Yet panelling assemblies and the like may be assembled with no interference from such members 56. In FIG. 11, for example, one such panelling system is indicated as comprising spring clip members 57 disposed to be engaged inwardly of the outer flanges 35 and rest on the inner flanges 34. These clips support panels 58 and also edge molding elements 59.

This and other panelling systems supported by the present framing structure are disclosed and described in detail in my copending application Ser. Nos. 201,024 and 201,019.

It will be apparent to one skilled in the art to which the present invention pertains that various changes and modifications may be made therein without departing fram the spirit of the invention or the scope of the appended claims.

I claim:

1. In a structural framing system, the combination of
(a) a pair of support members, each comprising an elongated element of substantially uniform cross-sectional shape,
(b) said elements each having at least one flat side provided with a substantially medial longitudinally extending recess,
(c) a pair of flanges extending into said recesses from each side thereof, the innermost pair of said flanges being more closely spaced than the outermost pair of said flanges,
(d) said elements being disposed on repectively normal axes with the end of one element abutting the recessed side of the other element, and the recesses of said elements facing each other,
(e) connecting means comprising an angle bracket disposed in the recesses of said elements, said angle bracket being dimensioned to pass between said outermost pairs of flanges and to engage against said innermost pairs of flanges and means clamping said bracket to said innermost pairs of flanges,
(f) the end portions of said bracket each provided with an end part displaced from the plane of said end portion, and
(g) said end parts each being dimensioned to fit closely between and being disposed to engage the inner edges of said innermost pairs of flanges to limit lateral displacement of said bracket with respect to said elements.

2. The combination as defined in claim 1 and in which said recesses each include a longitudinal space inwardly of said innermost pairs of flanges and a longitudinal stiffening element is disposed within said space of at least one of said elements.

3. The combination as defined in claim 1 and in which said clamping means comprises

(a) a pair of flat nuts disposed in said recesses and respectively engaged with the timer surfaces of said innermost pairs of flanges, and

(b) a pair of screws received respectively by said nuts and by said bracket to clamp said bracket against the outer surfaces of said innermost pairs of flanges.

4. The combination as defined in claim **3** in which said bracket, said nuts and said screws are disposed entirely inwardly of the outer surfaces of said outermost pairs of flanges.

5. The combination as defined in claim **3** and in which

(a) said recesses are each further defined by a portion of said elements inwardly disposed of said innermost pairs of flanges and having laterally opposite side walls and an inner web connecting said side walls,

(b) a pair of elongated spaced ribs being formed on said inner web, and

(c) said nuts each having ends respectively engaging said ribs upon rotation of said nuts whereby rotation of said nuts in said recesses is limited by said ribs.

6. The combination as defined in claim **3** and in which each of said nuts has stiffening ribs displaced from the plane of said nuts.

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J. L. RIDGILL, *Assistant Examiner.*