April 21, 1936. F. E. PAYNE ET AL 2,037,736

JOINTED STRUCTURE

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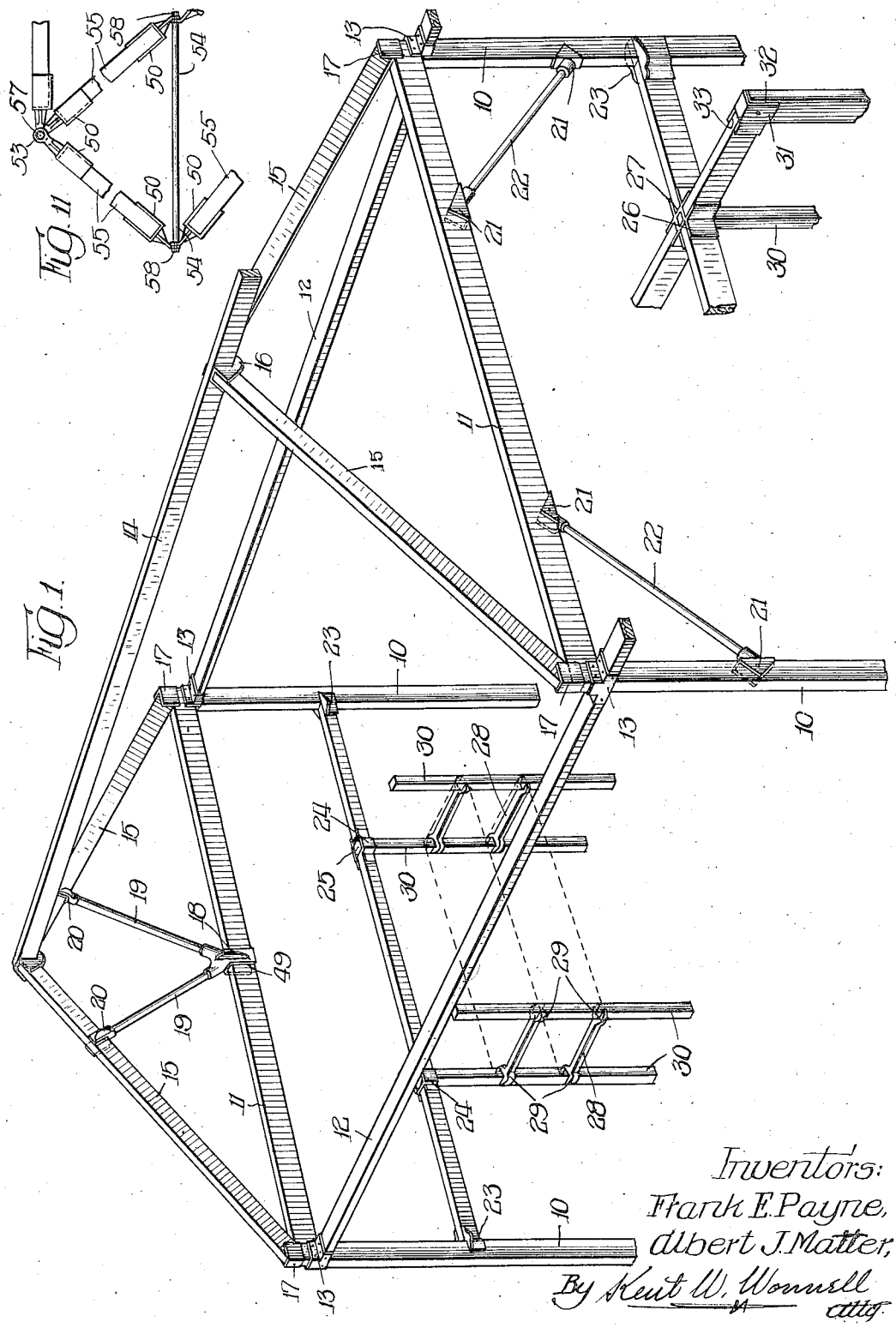


Fig. 1.

Fig. 11

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JOINTED STRUCTURE

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Fig. 2.

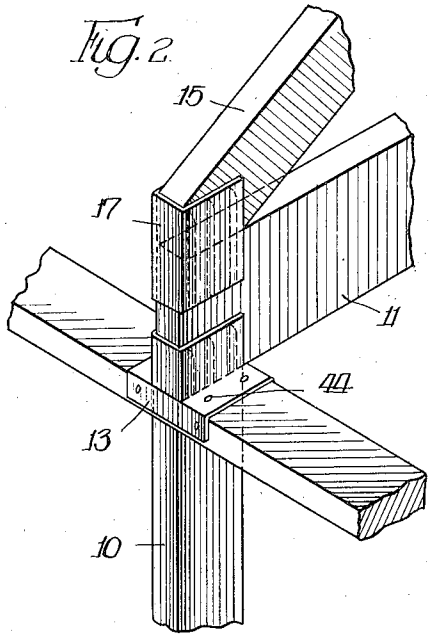


Fig. 3.

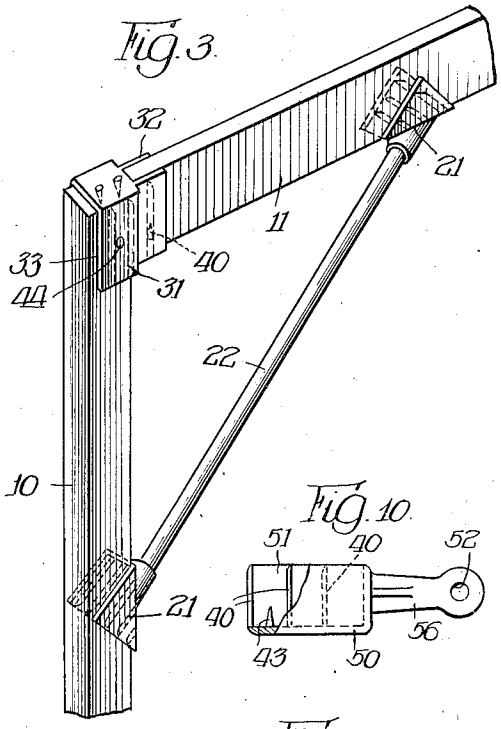


Fig. 10.

Fig. 4

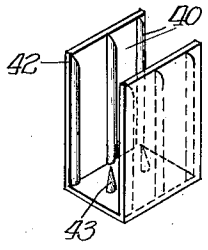


Fig. 5

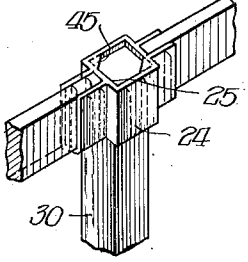


Fig. 6.

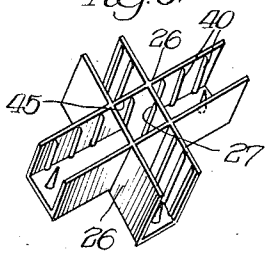


Fig. 7

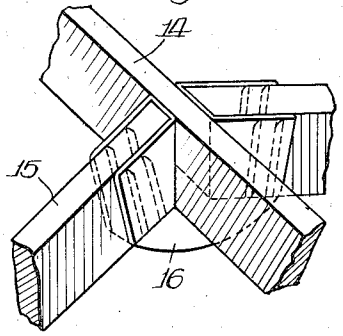


Fig. 8

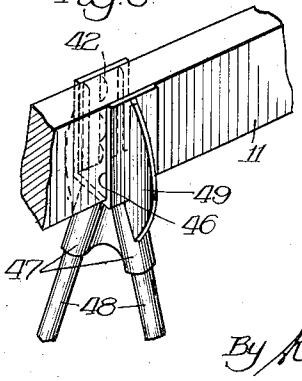
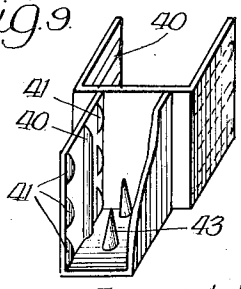


Fig. 9



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UNITED STATES PATENT OFFICE

2,037,736

JOINTED STRUCTURE

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Application December 14, 1934, Serial No. 757,458

8 Claims. (Cl. 20—92)

This invention relates in general to a jointed structure for buildings, framing, scaffolding, and the like, and has more particular reference to a variety of metal joints adapted to be quickly and easily connected to wooden beams and the like, for producing a framed structure.

An important object of the invention is in the provision of a metal joint in various forms adapted to receive and connect a plurality of wooden beams at different angles thereto.

A further object of the invention is in the provision of improved means for making a tight connection with the beams to which the metal joint is applied.

A still further object of the invention is in the provision of improved metal joint structures in which the attached beams are guided into the joints by internal ribs, together with additional fastening means for holding the members tightly together.

Other objects of the invention will appear hereinafter, the accompanying drawings illustrating a variety of metal joint members embodying the invention which may also be applied to other joint members.

In the drawings, Fig. 1 is a perspective of a framed structure illustrating the present invention;

Fig. 2 is a perspective of a compound joint as shown in Fig. 1;

Fig. 3 is a perspective of an angle brace and an end connector as shown in Fig. 1;

Fig. 4 is a detail view of a portion of one of the metal joints showing the side ribs and the bottom pointed projections;

Fig. 5 is a perspective of a vertical and horizontal connector as shown in Fig. 1;

Fig. 6 is a perspective of a four-way joint and vertical connector;

Fig. 7 is an enlarged detail perspective of a ridge piece connector;

Fig. 8 is a perspective of an angular supporting joint;

Fig. 9 is a detail perspective as showing a connector with continuous and broken ribs at the sides and pointed fastening projections at the bottom of a channeled engaging recess;

Fig. 10 is a side elevation, partly broken away, of an eyelet end connector; and

Fig. 11 is a perspective of a truss formation embodying the eyelet end connector.

It is frequently desirable to temporarily erect a supporting truss or framed structure so that it may be rapidly set up and taken down, as well as to permanently connect a structure of this kind which comprises a plurality of wooden or other beams connected to each other at various angles and in various combinations. If the structures are nailed together it is difficult to disconnect them without breaking or mutilating the structural beams and much time is spent in tearing down as well as again setting up such a nailed construction. The present invention is therefore designed and intended to provide means not only for permanently connecting the beams or other members of a frame structure but also to provide simple metal joints by which the various parts of such a frame structure may be readily and firmly connected together, the structure of the joint itself being such that a tight connection is made with the beam even though it is somewhat undersized because of the sharpened ribs which guide the beams into the joint members and the pointed projections within the joint members which are engaged by the beams. These joint members are designed and intended to fit a standard size or sizes of lumber, preferably those most commonly used in building so that in order to make a frame structure of any desired shape or size it is necessary only to cut the beams or lumber to the proper length, bevel or shape, and thereupon to attach the beam members together by means of a number of forms of metal joints which are particularly designed, arranged and disposed to receive them. By having internal sharpened ribs the wooden members even though they are slightly less in size or have become shrunken or slightly warped, may be driven tightly in place and will be held firmly by the internal ribs.

Referring now more particularly to the drawings, a portion of a frame structure is illustrated in Fig. 1 utilizing a variety of joint members for connecting the wooden beams, and a number of the specific joint connections are more particularly illustrated in the other figures of the drawings. In this exemplification of the invention, a number of uprights 10 are shown cross connected at the top by cross beams 11 and 12 and joint members 13. A ridge piece 14 is supported by angularly cut rafters 15 connected at the top by a ridge joint 16 and at the lower ends by end joints 17.

The rafters may be additionally supported by an angle joint 18 connected intermediate the ends of a cross beam 11, having diverging legs 19 connected at their upper ends to the rafters 15 by joint members 20.

An angle brace as shown also in Fig. 3 may consist of end connectors 21 joined by a single bar 22

and adapted to extend between beam members as 10 and 11, connected at angle thereto.

For making interior or detailed joint connections, there may be a straight and connector joint 23 or a double end connector 24 having an intermediate socket 25 or the joint member may comprise a four-way connector 26 having an intermediate socket 27 as shown more clearly in Fig. 6. It is also contemplated that for a short connector a double ended joint member 28 may have a connecting rib intermediate the gripping extremities 29 so that a short connector of this kind may be used for providing shelves, steps or the like, in connection with adjacent uprights or other members 30.

Another common connector is shown more clearly in Fig. 3 comprising a joint member 31 having an open channel 32 extending in one direction and another channel 33 extending in the opposite direction.

In all of these forms having receiving recesses, sockets and channels there are pointed ribs forming grippers 40 at the sides of the sockets or recesses disposed at the proper angle so that a beam applied thereto will be guided in the right direction into the joint member. In most cases the ribs of the recessed portions are at the sides so that the ends of the beam members are applied laterally thereto, and the ribs of the sockets are so disposed that the ends of the beams must be inserted endwise therein. Instead of making the sharpened ribs 40 continuous throughout their length there may be a series 41 of such ribs either in alignment or in parallel relation within the joint member and it will be observed that the outer or first contact edges 42 of all of the ribs are beveled so that a beam or piece can be started most easily in the socket or recess of the joint member.

In the bottoms of some of the recesses are a number of pointed projections 43 which become embedded in the beams as they are inserted in the joint members for holding them more firmly in place. Some of the joint members may also be provided with perforations or openings 44 through which nails, screws or other fastening devices may be inserted for additionally holding them in place.

In order to prevent the insertion of a socket member in some of the joints as 24 and 26, one end thereof may be provided with an internal ridge 45 at one end of the socket which engages the end of a post or other member inserted therein and prevents it from extending entirely through the socket thereof.

A supporting joint as shown by Fig. 8 may include an open channel 46 having angularly disposed sockets 47 extending oppositely therefrom for receiving legs 48 either of wood or of metal, such for example as tubular or other steel shapes so that this form is readily adapted for sawhorses and trestles.

All of these supporting joints are designed and intended to be made of metal of sufficient thickness and rigidity, preferably metal castings, and in some forms it is necessary to provide strengthening ribs 49 as shown more clearly in Fig. 8, to add the necessary rigidity to the structure.

Instead of directly connecting a plurality of beams in each joint by means of the edged grippers 40, a joint member 50 may be used in which one end 51 is an open channel having the edged grippers 40 at the sides of the channel and with one or more pointed projections 43 at the bottom thereof. The other extremity comprises an extending bar 56 having an eyelet 52 at the end for connection with a number of similar eyelets as shown in the joint 53 of Figure 11 and a plurality of joints may be connected to a cross bar 54 as shown at the bottom of this figure, the eyelets 52 being connected by a fastening bolt and nut 57 or a fastening nut 58 at the end of the bar 54, the method of making these connections being well known. In this structure the joint member 50 is connected at each end of a bar or beam 55 of the proper length and this construction is particularly adapted for the formation and connection of trussed structures as used in bridges, supporting beams, and the like. It is even contemplated that a miniature structure of this kind is well adapted for a mechanical building toy.

With these joint structures a frame or other building structure can be easily and quickly erected and taken down; the pieces forming the framing may be repeatedly used and may be stored compactly for repeated use; the joint members may be of any desired or suitable construction for connecting the structural beams at an angle to each other and in a variety of ways; and in each case the joints and structural members are secured together against looseness and unevenness because of the internal angular rib structure with which the joint members are provided.

Although we have shown a number of joint members which are apparently well adapted for connecting a variety of structures, it is apparent that a number of other joint members may also be added for effecting other joint connections entirely within the scope and intent of our invention.

We claim:

1. A jointed structure for building and the like, comprising connecting beams, and metal joints therefor having portions to engage and connect a plurality of beams and with sharp edged grippers at the inner sides of said portions to engage and score the beams and to determine the direction of application of the engaged portion of the beam to the joint.

2. A jointed structure in accordance with claim 1, in which the metal joints are provided with openings to receive the beams at different angles to each other, each portion having the grippers in the form of sharp ribs extending from the inner edge of the opening to guide the beam inserted therein in the proper direction.

3. A joint structure in accordance with claim 1, in which the metal joints provided with grippers in the form of sharp ribs in the sides are also provided with pointed projections which engage into the beams in the direction in which they are inserted to additionally hold and secure them in place.

4. A joint structure in accordance with claim 1, in which the sharp edged grippers which form the internal ribs are continuous and of short sections, all extending parallel in the direction the beam is inserted.

5. A joint structure in accordance with claim 1, in which the metal joints are provided with openings in the walls through which fastening devices may be inserted into the beams for additionally securing them in place.

6. A joint structure in accordance with claim 1, in which the metal joints are provided with internal sharp edged ribs of long and short sections to score and grip inserted beam ends, with pointed projections at the bottom of the portion into which a beam is inserted, and with openings in the walls through which additional fastening

means are inserted into the beams for holding the joined parts together.

7. A joint structure in accordance with claim 1, in which the metal joint has sockets and recesses for receiving the beams, some of the recesses being of open channel form with the sharp edged gripper ribs on the inner side walls and with pointed projections at the bottoms to engage and hold the beams.

8. A joint structure in accordance with claim 1, in which the metal joint has a socket and recesses with sharp gripping ribs for receiving and scoring inserted beams, and one or more of the sockets having a projection transverse to the ribs therein to limit the insertion of a beam therein although guided and retained by the ribs.

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