Aug. 28, 1923. 1,466,174

M. KORN

ROOF TRUSS

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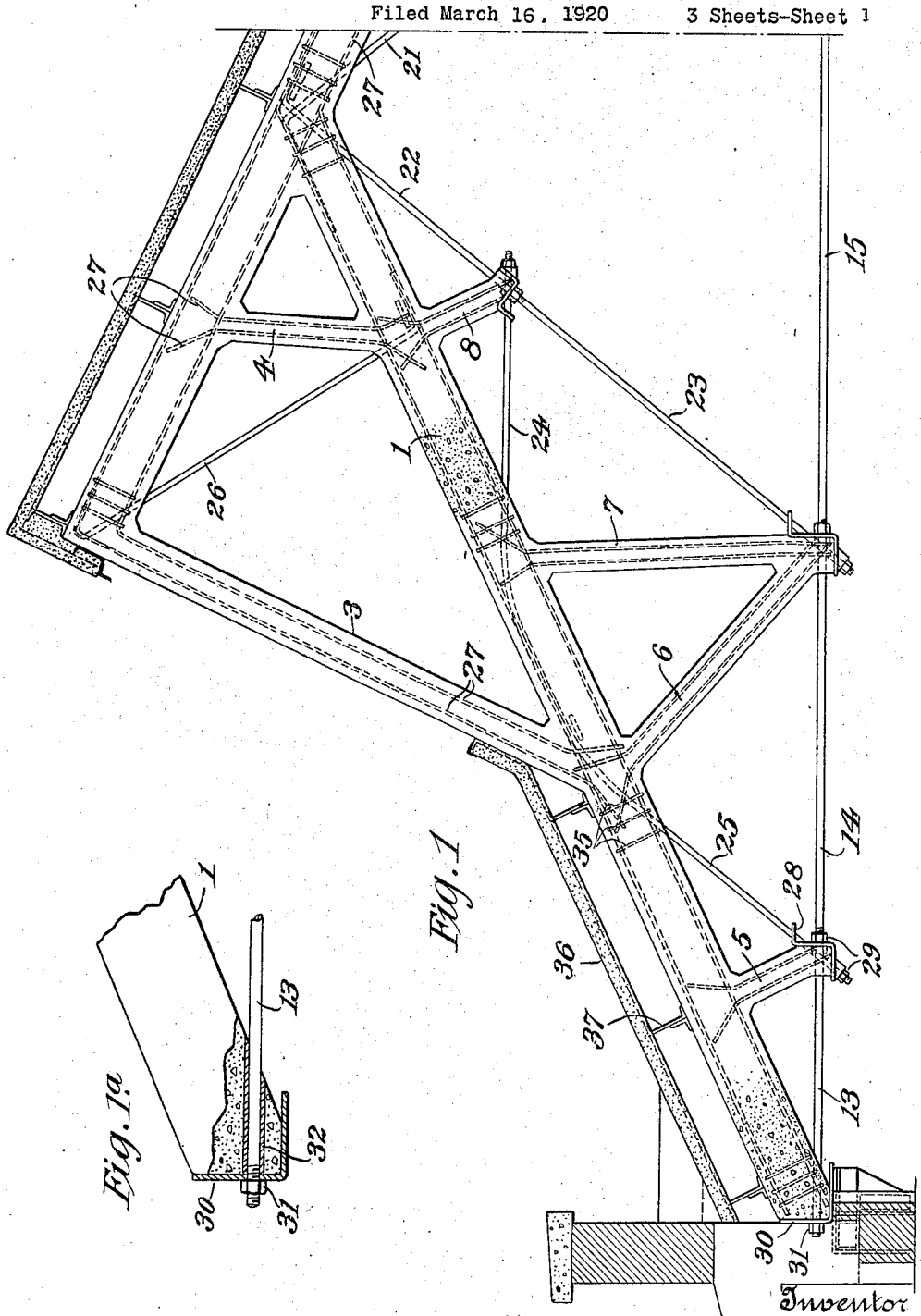


Fig. 1

Fig. 1a

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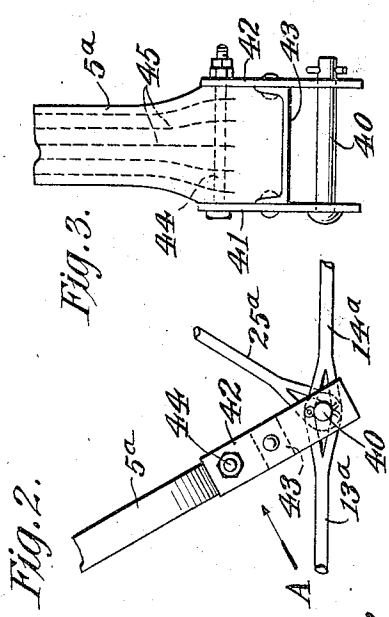


Fig. 3.

Fig. 2.

Fig. 1.

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Fig. 4.

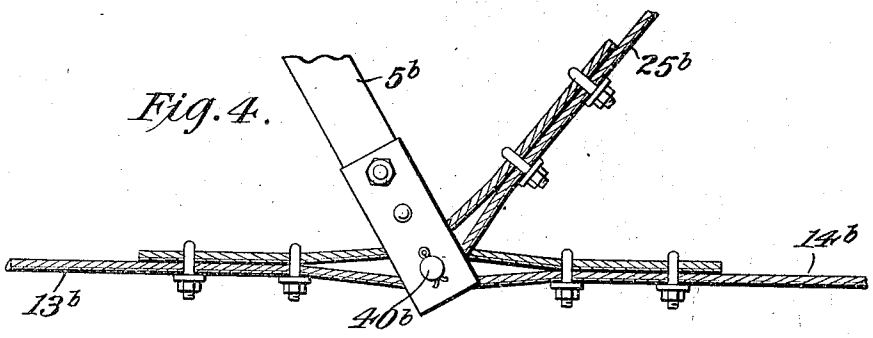
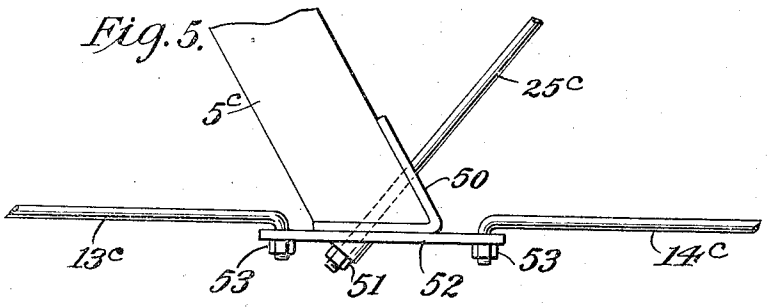


Fig. 5.



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UNITED STATES PATENT OFFICE.

MAXIMILIAN KORN, OF TEANECK, NEW JERSEY.

ROOF TRUSS.

Application filed March 16, 1920. Serial No. 366,218.

To all whom it may concern:

Be it known that I, MAXIMILIAN KORN, being a citizen of the United States, residing at Teaneck, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Roof Trusses, of which the following is a full, clear, and exact description.

This invention relates to roof trusses and has for one of its principal objects to provide a roof truss in which the compression members are of reinforced concrete and the tension members of steel or other suitable metal.

Another object is to provide a roof truss which is fire-resisting to a higher degree than the steel trusses now in use, easy to fabricate and assemble and of comparative low cost.

A further object is to provide improved joints or panel points for trusses of the above mentioned type. Other objects and advantages will become apparent as the invention is hereinafter disclosed.

Referring to the drawings which illustrate what I now consider preferred forms of my invention:

Fig. 1 is an elevation of a form of roof truss, known as the combined fink and fan truss, embodying my invention.

Fig. 1′ shows the remaining portion of the truss shown in Fig. 1.

Fig. 1ª is a detail elevation partly in section of a part of the structure shown in Fig. 1.

Fig. 2 is a detail elevation showing a modification.

Fig. 3 is a detail elevation looking in the direction of the arrow A in Fig. 2.

Figs. 4 and 5 are views similar to Fig. 2 but illustrating further modifications.

Referring to Fig. 1 it will be seen that the truss there shown comprises compression members designated 1 to 12 inclusive and tension members designated 13 to 26 inclusive. The compression members each consist of concrete reinforced by means of steel rods 27. It will be obvious that other forms of reinforcing means may be employed, some of which will hereinafter be specifically disclosed. The reinforced concrete compression members are interconnected and tied together at their points of meeting or intersection by passing the rods 27 of one member into another member which it meets or intersects, as clearly shown in Fig. 1.

The tension members 13 to 26 are shown in Fig. 1 as consisting of steel rods with threaded ends. In order to interconnect the members 5, 13, 14 and 25 at their point of intersection a plate 28 shown in the form of a Z may be provided, said plate being suitably drilled, or punched, to allow the passage therethrough of the tension rods and so arranged as to provide the desired bearing surface for the end of the compression member 5. The threaded ends of the tension members 13, 14 and 25 are provided with nuts 29 which bear against the plate 28 in order to transfer the individual stresses of the various members to the other members at this joint. Similar means are provided at the following intersections 14—6—7—23—15, 24—8—22—23, 9—19—21, 19—10—11—16—15, and 12—16—17—18.

An L-shaped plate 30 is provided at the intersection of the members 1 and 13. This plate 30 serves as a seat for the lower end of the compression member 1 but also forms the connection plate between the truss and its supporting structure such as a column or wall, etc. The threaded end of the member 13 is shown provided with a nut 31 adapted to seat against the plate 30. A similar joint is effected at the intersection of the members 2 and 17.

The ends of the tension members 18, 20, 21, 22, 24 and 25 opposite the threaded ends are embedded in the corresponding compressing members to a distance sufficient to permit them properly to transfer their stresses (see Fig. 1). This is also true of both ends of the member 26. Those of the tension members which pass at their threaded ends through compression members are longitudinally slidable with respect to the latter. This may be effected by passing the threaded ends through a pipe or tube section provided in the compression members. Thus in Fig. 1ª I have shown a section through the joint 1—13. The tube 32 is embedded in the concrete of the member 1 and the tension member 13 passes therethrough. By virtue of this construction the tension members may be caused to assume their correct computed lengths between joint centers by simply tightening or loosening the nuts 29 and 31 after the concrete compression members have been cast and hardened.

At the points where the tension members are anchored in the compression members,

as for example where the member 25 enters the member 1 and at any other desired points, the compression members may be reinforced against bending and shearing by means of transverse steel bands or hoops 35. The roofing material 36 may be supported by means of suitable purlins 37 supported by the roof trusses.

A modified panel point connection is illustrated in Figs. 2 and 3. The compression member 5^a and tension members 13^a, 14^a and 25^a will be recognized in view of the description of Fig. 1. In Fig. 2 the ends of the tension members 13^a, 14^a and 25^a are provided with forged loops (instead of threads and nuts) through which a pin 40, carried by the compression member 5^a, passes. The said pin 40 is shown carried by two plates 41, 42 which, together with the channel member 43 secured thereto, form a seat for the end of the compression member 5^a. A bolt 44 is passed through the plates 41, 42, embedded in member 5^a and securely anchored in the latter by means of light wire mesh 45 which extends around the said bolt and up into the concrete of the said member 5.

The tension members may assume other forms. Thus, instead of steel rods, wire cable may be employed to form the tension members as illustrated in Fig. 4. A further modification in the means for connecting the tension members and compression members is illustrated in Fig. 5 in which the members 5^c, 13^c, 14^c and 25^c will again be recognized. In this form of the invention an angle plate 50 forms a seat for the compression member 5^c and is riveted or otherwise secured to a plate 52. The tension member 25^c passes through the angle 50, member 5^c and plate 52 and is provided with a nut 51 for transmitting the load thereto. The tension members 13^c and 14^c pass through the plate 52 and are provided with nuts 53.

Among other advantages it should be noted that my improved roof truss is much more resistant to fire than all metal trusses. The principal cause of collapse and failure of structural steel trusses in case of fire is that the unprotected steel compression members warp and buckle. There is comparatively little likelihood of destruction of the tension members.

The roof truss forming the subject matter of my invention is also cheaper to construct than all steel trusses. Reinforced concrete is practically the cheapest material for carrying compressive stresses. In my roof truss it is possible to decrease the sizes of the concrete compression members and steel tension members in proportion to the decreasing stresses from the points of support toward the center, thereby effecting a saving of material. In steel roof truss construction this reduction in size toward the center is impracticable and therefore never carried out. My truss may be shipped "knocked down" to the site of construction so that transportation charges are materially reduced.

Concrete is more readily obtainable than steel so that delays in construction are reduced. The truss area requiring painting is greatly reduced and may even be eliminated. The concrete members are also capable of withstanding attacks of corrosive gases.

Obviously my invention may be embodied in other forms of roof trusses than that illustrated in Fig. 1. To avoid surplusage I have omitted further illustration.

What I claim is:

A roof truss comprising in combination, a plurality of compression members of concrete reinforced by longitudinally extending steel rods, and tension members consisting substantially entirely of steel rods, means comprising Z-shaped plates forming a seat for certain of said compression members and to which certain of said tension members are adjustably connected at one end, the opposite ends of the last named tension members being embedded in the concrete of certain others of said compression members, a plurality of steel hoops embedded in the concrete of certain of said compression members and surrounding the reinforcing rods of said compression members and the ends of certain of said tension members, L-shaped bearing plates connected to the opposite ends of said truss and through which horizontal tension members extend, and a plurality of roof-supporting purlins carried by said truss.

In testimony whereof I hereunto affix my signature.

MAXIMILIAN KORN.