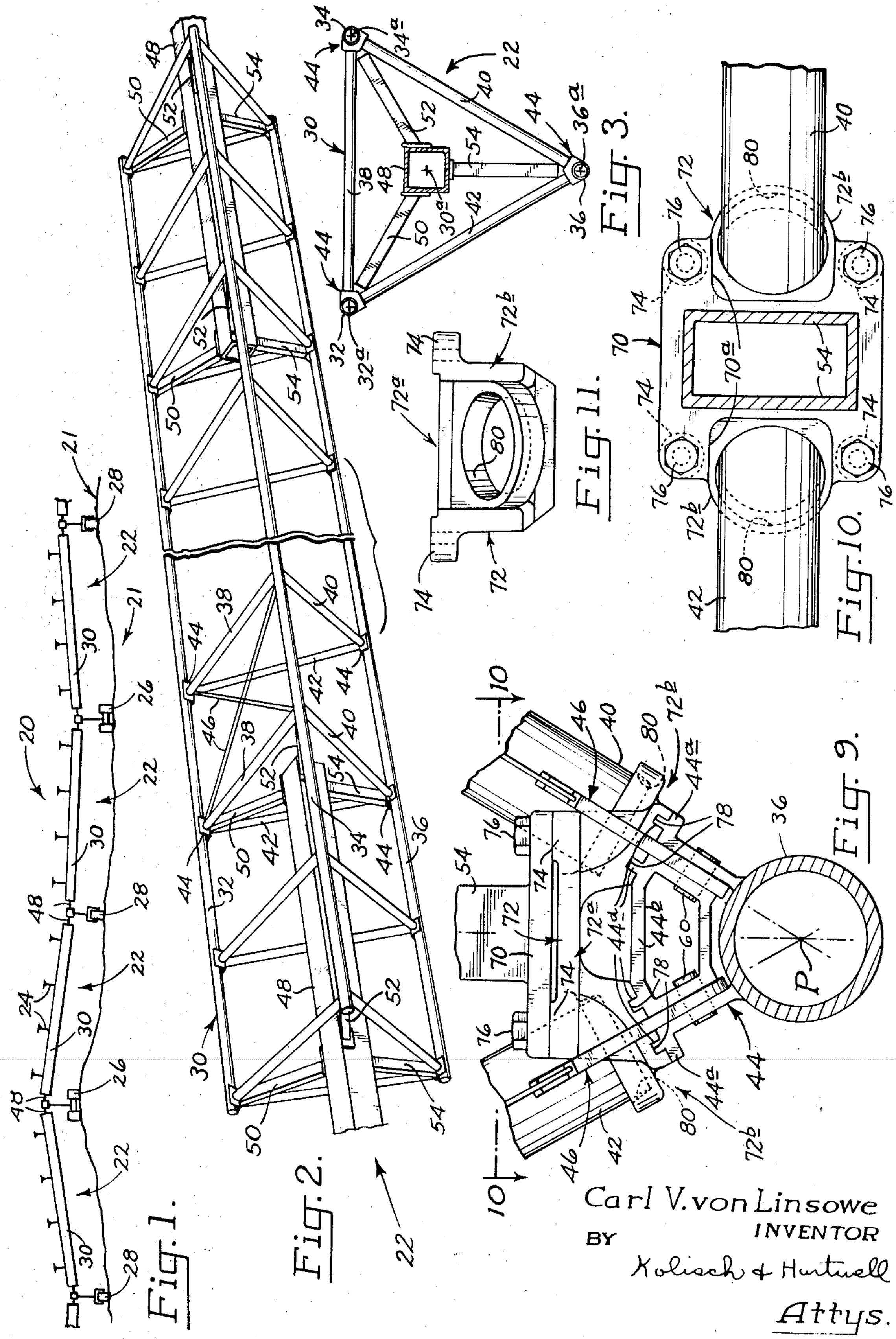
Feb. 16, 1971 C. V. VON LINSOWE 3,562,994

TRUSS

Filed Sept. 30, 1968 4 Sheets-Sheet 1



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TRUSS

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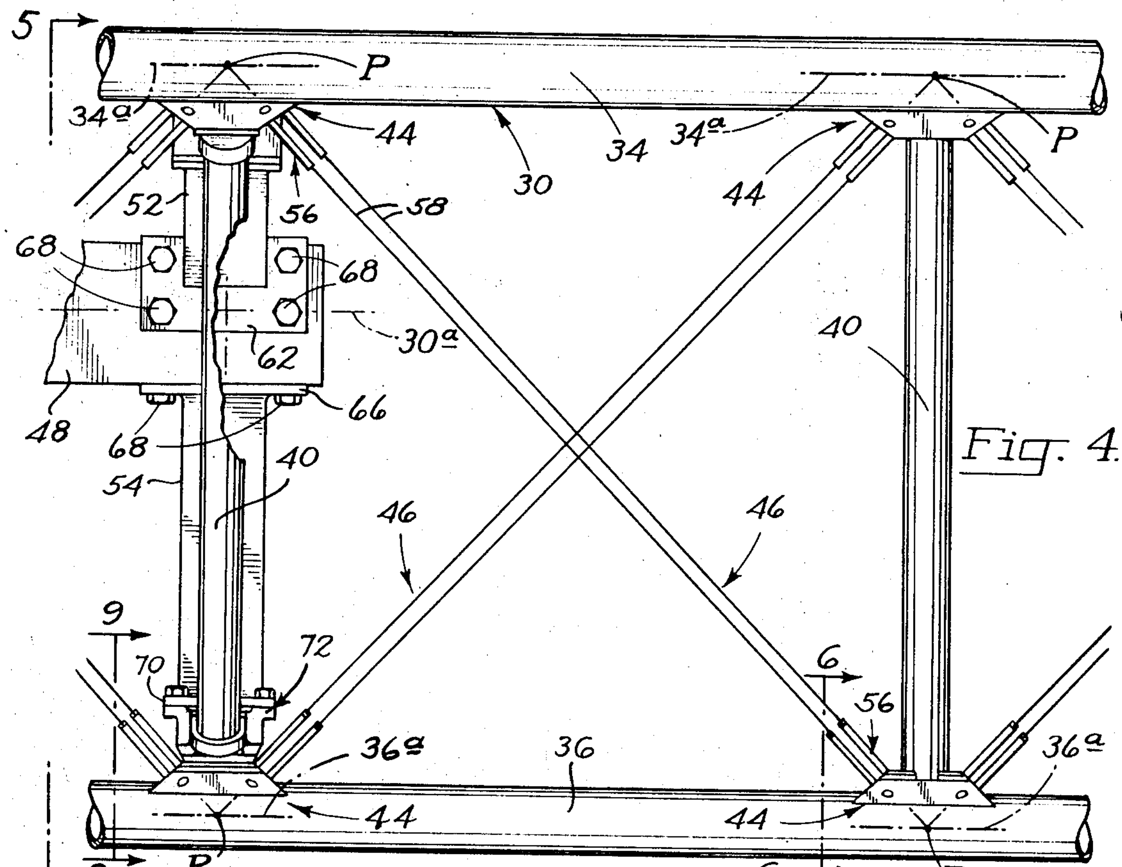

Fig. 4.

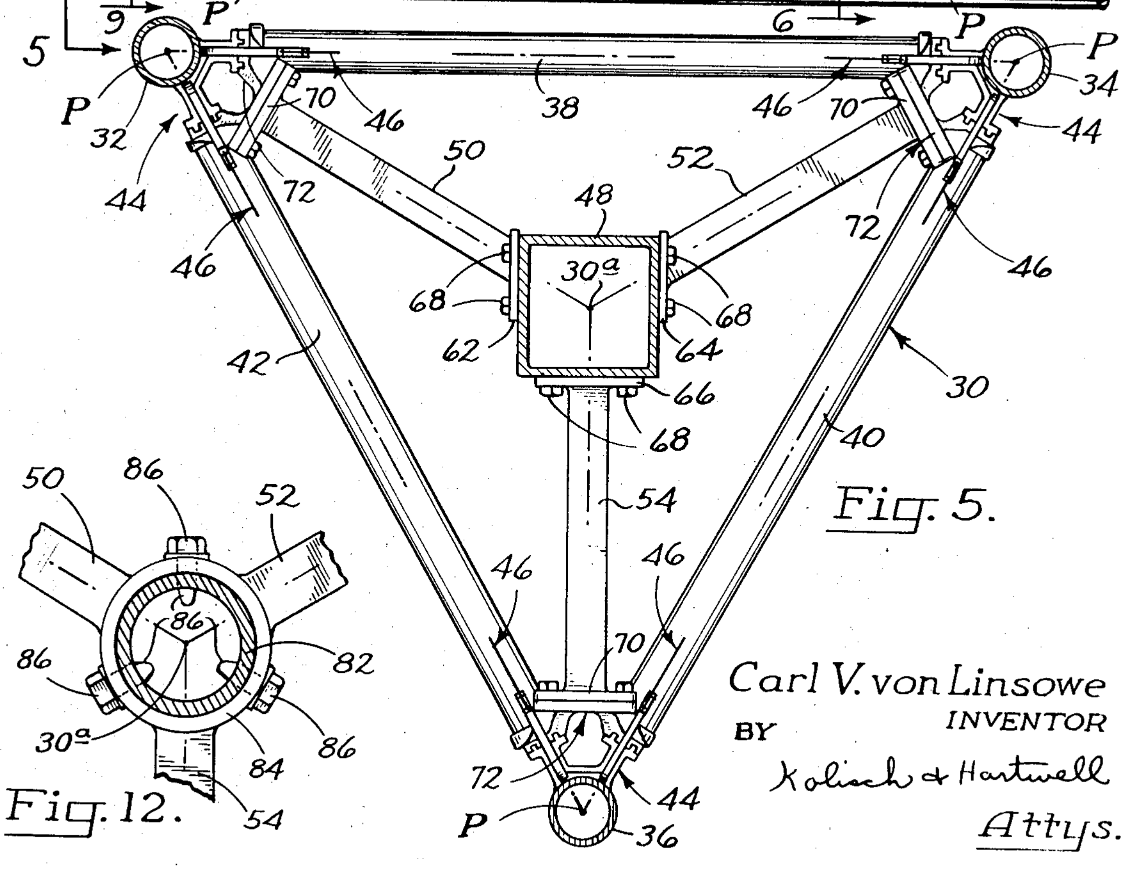

Fig. 5.

Fig. 12.

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TRUSS

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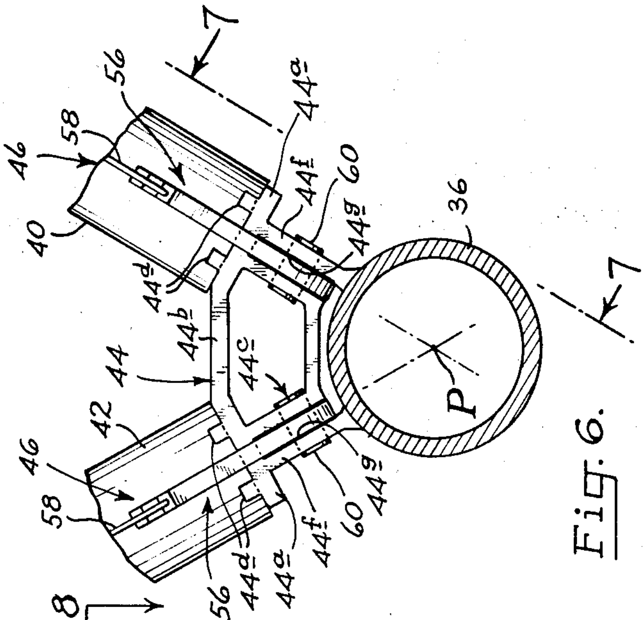

Fig. 6.

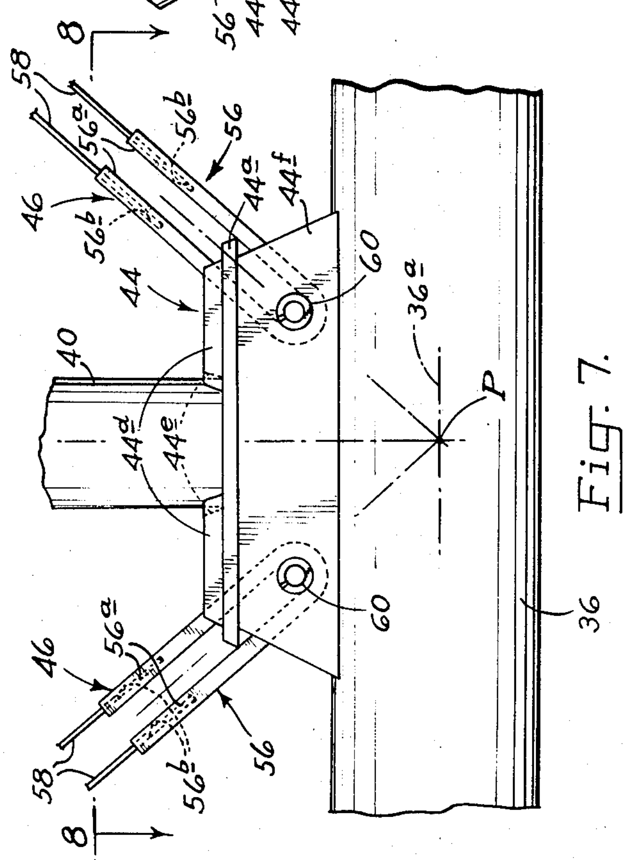

Fig. 7.

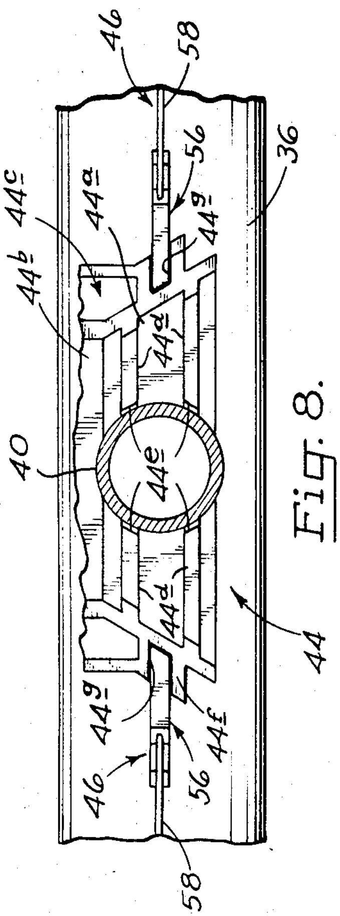

Fig. 8.

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TRUSS

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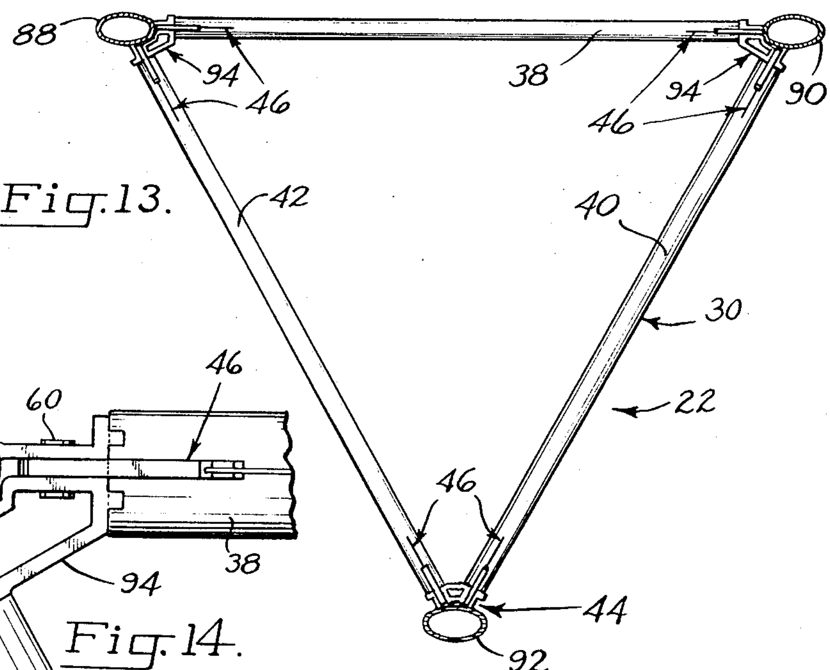

Fig. 13.

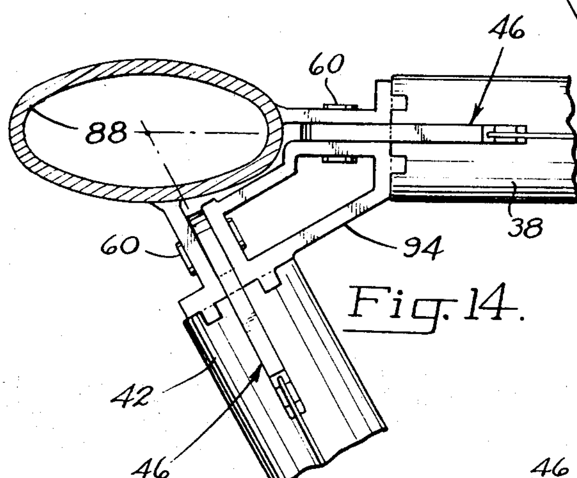

Fig. 14.

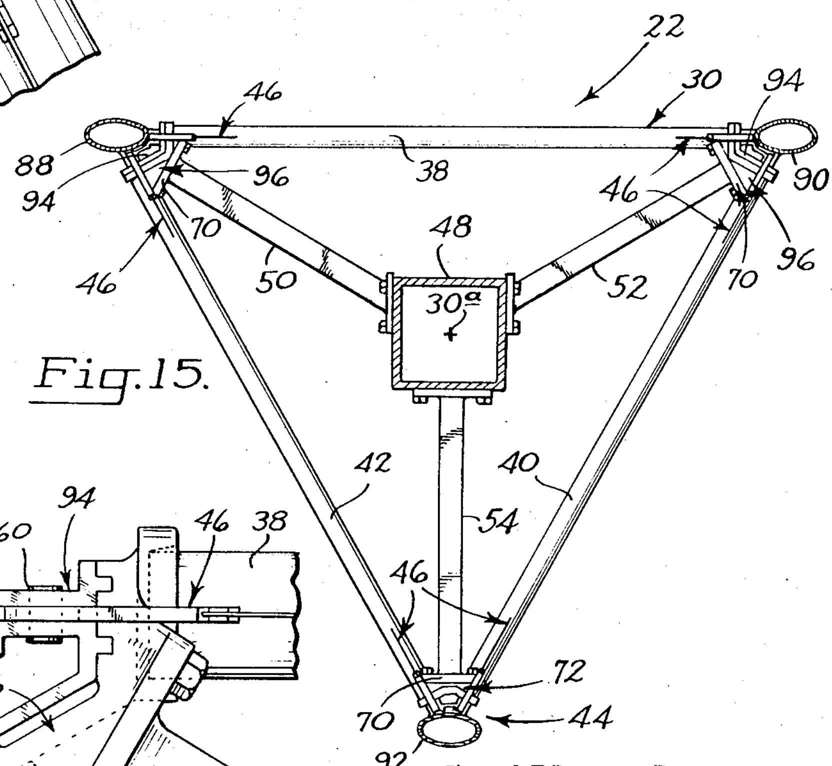

Fig. 15.

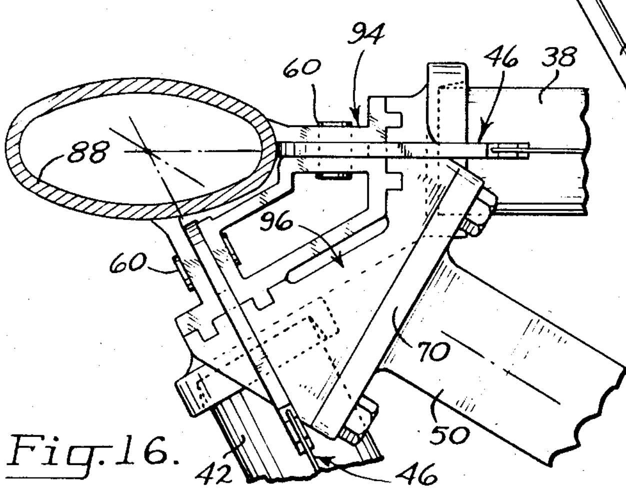

Fig. 16.

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TRUSS

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Int. Cl. E04h *12/00*
U.S. Cl. 52—655 19 Claims

ABSTRACT OF THE DISCLOSURE

An elongated truss including a frame formed from three elongated and spaced, parallel, triangularly disposed rails, struts distributed along and interposed between each combination of two rails, and tensors extending diagonally across the various spaces bounded by a pair of rails and a pair of struts. Mounts secured to and distributed along the rails support the struts and accommodate attachment of the tensors. Each mount is constructed to direct forces transmitted to it through a common point adjacent the mount and located on the longitudinal axis of the rail supporting the mount. Loads are transmitted into and out of opposite ends of the frame through members positioned on the frame's neutral axis.

This invention pertains to a truss, and more particularly, to an elongated truss adapted to span relatively long distances. The truss is described herein in conjunction with a traveling irrigation structure where it has been found to have particular utility.

In a traveling irrigation structure having relatively widely spaced ground-traveling supports—say, for example, 120 feet or so apart—one might wish to employ a truss to span the distance between such supports. One might also wish to employ the same truss to support a portion of the water-distribution system employed in the structure.

For a truss to be capable of performing satisfactorily in such a situation, a number of factors must be considered. To begin with, the truss must possess sufficient strength and rigidity to be capable of carrying with minimal deformation, all loads that might be expected to act on it. At the same time, for the sake of economy and ease of handling, the truss should be as small and lightweight as possible. Further, the truss preferably should be designed whereby loads transmitted through it are carried as uniformly as possible in the members forming the truss, with localized bending stresses in such members held to a minimum.

Still another factor which should be considered is that the truss may be subjected to relatively high winds, and should be constructed to offer minimum wind resistance.

A general object of the presnt invention, therefore, is to provide a novel elongated truss which takes these factors into account in a practical and satisfactory manner.

More specifically, an object of the invention is to provide a relatively small and lightweight, yet relatively strong and rigid, truss which is capable of spanning considerable distances.

Another object is to provide such a truss constructed to distribute loads transmitted through it uniformly in the various members forming the truss, and to hold localized bending stresses in such members to a minimum.

According to a preferred embodiment of the invention, the truss includes a frame formed from three elongated, parallel, tubular rails, which, when viewed from an end of the frame, occupy the corners of an equilateral triangle. The rails are interconnected by elongated tubular struts which are distributed at points spaced along the length of the frame. Preferably the cross-sectional configurations of the rails and tubes are circular. Opposite

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ends of the struts are seated on the rails through mounts which are secured at points spaced along the lengths of the rails, with such mounts including sockets for receiving the ends of the struts. Also forming part of the frame are plural elongated tensors which are tensed and extend diagonally across the various spaces bounded by a pair of rails and a pair of adjacent struts extending between such rails.

With the frame constructed in this fashion, a relatively strong, rigid and lightweight structure results which offers a relatively small surface area upon which wind can act. However, to take care of a situation where relatively high velocity winds are expected, a modification of the frame is proposed wherein the rails have a streamlined cross-sectional configuration further to minimize their wind resistance. More specifically, according to such modification, the rails have ovate-shaped cross-sectional configurations.

Loads are transmitted into and out of opposite ends of the frame through elongated members which are disposed with their longitudinal axes substantially coinciding with the neutral axis of the frame. Radially extending arms are provided which fasten these members to mounts on the rails. With such an organization, and with the rails disposed, as indicated above, at the corners of an equilateral triangle, loads transmitted through the truss are carried in a uniform fashion in the various parts in the frame.

An important feature in the mounts provided in the frame is that each mount is constructed to direct forces transmitted to it—i.e., by a tensor, strut or radial arm—through a common point located on the longitudinal axis of the rail supporting the mount. This organization ensures that localized bending stresses in the frame parts are held to a minimum.

Another important feature and advantage of the invention is that the various parts for the proposed truss may be prefabricated to their proper respective sizes, shipped in disassembled form, and assembled in the field with a minimum amount of effort. This is particularly important since a large truss, when fully assembled, occupies an appreciable amount of space, and may cost a considerable amount of money to ship. Also, with conventional shipping methods, a fully assembled truss may pose some handling difficulties.

These and other objects and advantages attained by the invention will become more fully apparent as the description which follows is read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a simplified front elevation illustrating a portion of an articulated traveling irrigation structure employing trusses constructed according to the present invention;

FIG. 2 is an enlarged simplified fragmentary perspective generally illustrating one of the trusses employed in the structure of FIG. 1;

FIG. 3 is a view on a larger scale than FIG. 2, illustrating an end of the truss in FIG. 2;

FIG. 4 is a fragmentary side elevation, on a larger scale than FIG. 3, illustrating details of construction of the truss of FIG. 2;

FIG. 5 is a cross-sectional view taken along the line **5—5** in FIG. 4;

FIG. 6 is an enlarged cross-sectional view taken along the line **6—6** in FIG. 4;

FIG. 7 is a view taken along the line **7—7** in FIG. 6;

FIG. 8 is a view taken along the line **8—8** in FIG. 7;

FIG. 9 is a cross-sectional view, on the same scale as FIG. 6, taken along the line **9—9** in FIG. 4;

FIG. 10 is a view taken along the line **10—10** in FIG. 9;

FIG. 11 is a view taken from the right side of FIG. 9

illustrating a shoe in the truss with the shoe removed from the other parts shown in FIG. 9;

FIG. 12 is a fragmentary cross-sectional view similar to, but on a slightly larger scale than, FIG. 5 illustrating a modified load-transmitting member in the truss;

FIG. 13 is a transverse cross-sectional view taken at one point along the length of a modified truss constructed according to the invention, with such truss including rails having generally ovate-shaped cross-sections;

FIG. 14 is an enlarged fragmentary view illustrating details of construction of a portion of the truss shown in FIG. 13;

FIG. 15 is a transverse cross-sectional view taken at another point along the length of the truss shown in FIG. 13; and

FIG. 16 is an enlarged fragmentary view illustrating details of construction of a portion of the truss shown in FIG. 15.

Turning now to the drawings, and referring first to FIG. 1, indicated generally at **20** is an elongated articulated traveling irrigation structure which extends a considerable distance over the ground shown at **21**. Spanning spaced-apart points in structure **20**, and cooperating to provide considerable length for the structure are plural elongated trusses **22** constructed according to the invention. Trusses **22** are each about 120 feet long. Trusses **22** are joined together at adjacent sets of ends through suitable means accommodating a certain amount of relative angular movement between the trusses to take care of unevenness in the ground. The trusses offer a relatively rigid support structure between the respective points that they span, and are employed to carry a suitable water-distribution system including sprinkler devices such as those shown at **24**.

Trusses **22**, and the water-distribution system that they carry, are disposed above the ground, and are supported for movement thereover in a direction normal to and out of the plane of the drawing by means such as powered ground-traveling supports **26**, and nonpowered ground-traveling supports **28**.

Referring now to FIGS. 2 and 3, and generally describing one of trusses **22**, the same includes an elongated frame **30** formed from three elongated and spaced, substantially parallel rails **32**, **34**, **36**. Frame **30** has a neutral axis **30***a* (see FIG. 3) disposed inwardly of the rails. According to a preferred embodiment of the invention, the rails comprise hollow tubes having substantially circular cross-sectional configurations. As can be seen clearly in FIG. 3, with the frame viewed from an end, the longitudinal axes of rails **32**, **34**, **36**, shown at **32***a*, **34***a*, **36***a*, respectively, occupy the corners of an equilateral triangle. Rails **32**, **34** occupy a substantially horizontal plane and define the top of the truss. Rail **36** is centered between and disposed below rails **32**, **34**, and defines the base of the truss.

The rails in each combination of two rails in the frame are supported in spaced-apart parallel relationship by means of plural elongated struts which extend between and at right angles to the rails at positions distributed along the lengths thereof. Struts **38** are provided between rails **32**, **34**, struts **40** between rails **34**, **36**, and struts **42** between rails **36**, **32**. Similar to the rails, the struts also take the form of elongated hollow tubes having substantially circular cross-sectional configurations. Opposite ends of the struts are supported on the rails through mounts **44** which will be described in greater detail later.

The rails, struts and mounts preferably are made of a lightweight metal such as aluminum.

Also forming part of frame **30**, and for the purpose of placing tension between spaced parts in the frame, are elongated tensors such as tensors **46** illustrated in FIG. 2. Only two tensors have been shown in FIG. 2—the others having been removed in order to obtain better clarity in the drawings. The tensors are disposed in pairs in the rectangular spaces bounded by each combination of two rails and each pair of adjacent struts extending between such rails. The two tensors for a particular rectangular space extend at an angle relative to one another and diagonally across the space, with opposite ends of the tensors anchored as will be more fully explained to mounts **44**. The tensors are normally tensed, and serve to counteract deformation of frame **30** such as may be produced by temperature changes or other causes.

According to the invention loads are transmitted into and out of opposite ends of the frame by means of elongated load-transmitting members **48**. Preferably, members **48** are hollow and have a substantially square cross-sectional configuration. The members are disposed with their respective longitudinal axes substantially coinciding with neutral axis **30***a* of frame **30**. Each member extends from a point inwardly of an end of the frame to a point outwardly beyond the end.

In general terms, the load-transmitting members are anchored in place through sets of arms, with each set including arms **50**, **52**, **54**. The arms in a set extend radially from the outside of a member to mounts on the rails with the arms occupling the same plane as such mounts. The truss illustrated in FIGS. 2 and 3 includes two sets of arms, located as shown, for each load-transmitting member. Each arm is hollow and has a rectangular cross-sectional configuration (as seen in FIG. 10 for an arm **54**). Preferably, arms **50**, **52**, and **54** and members **48** are formed of steel.

Referring now to FIGS. 4–8, and describing in detail various parts in the truss, each mount **44** has a configuration such as that illustrated in FIGS. 6–8. More specifically, each mount includes a pair of elongated outwardly facing, planar decks **44***a* which occupy planes that are disposed at an angle of about 60° to one another. The adjacent edges of the decks are joined through a web **44***b*, and the back sides of the decks are braced through a generally U-shaped section **44***c*.

Formed on the front side of each deck are elongated laterally spaced ribs **44***d*, the central portions of which have been cut away to produce conical wall expanses **44***e* on the ribs. As can be seen in FIG. 7, wall expanses **44***e* diverge progressing outwardly from the deck and radially away from rail **36**. Wall expanses **44***e* adjacent each deck define a socket for freely receiving an end of one of the struts in the truss.

Each mount is jointed to a rail through a pair of webs **44***f* which extend from the back sides of decks **44***a* toward the rail, and which are secured as by welding to the outside of the rail. As can be seen particularly in FIG. 6, webs **44***f*, together with opposite sides of U-shaped section **44***c*, define a pair of channels **44***g* extending along the back sides of the decks.

Considering now the construction of the tensors, each tensor includes a pair of opposing U-shaped pieces **56**. As can be seen in FIGS. 7 and 8, each piece **56** has a rectangular cross-sectional configuration, and includes a pair of elongated substantially parallel end sections **56***a*. Extending axially into end sections **56***a* are elongated cylindrical bores **56***b*. Extending between and joining pieces **56** in a tensor are elongated cylindrical bars **58**. Opposite ends of the bars are received within bores **56***b* in the U-shaped pieces, and are suitably fastened, as by cementing, to such pieces. Preferably, the U-shaped pieces in the tensors are formed of a lightweight material such as aluminum, and the bars are formed of a relatively high tensile strength steel.

Considering now how the rails, mounts, struts and tensors in frame 30 are interconnected, and omitting for the moment a description of the connections provided where radial arms **50**, **52**, **54** are located, as previously mentioned the mounts are secured as by welding at points spaced along the lengths of the rails. As can be seen particularly in FIGS. 6 and 8 of the drawings, the mounts are oriented whereby each socket therein is disposed in the plane containing both the rail which the socket faces, and the rail to which the mount containing the socket is secured. The rails are supported in proper spaced-apart and parellel relationship by means of the struts which are disposed as shown with their respective opposite ends freely received in the sockets formed in the mounts. The struts extending between each pair of two rails occupy the same plane as that containing the rails. With the mounts constructed as described, the struts are easily placed in proper position between the rails, with conical wall expanses *44e* which define the sockets facilitating fitting of the struts into place. As can be seen clearly in FIGS. 7 and 8, progressing outwardly from the base of a socket, wall expanses *44e* diverge from the outside surface of the end portion of a strut received in the socket.

Tensors **46** are disposed as previously described with a pair of tensors extending diagonally across each of the rectangular spaces, and in the planes thereof, bounded by a pair of rails and a pair of adjacent struts extending between such rails. Each tensor is mounted with the curved portion of its U-shaped pieces received in a pair of channels **44***f* in a pair of diagonally opposing mounts. The ends of a tensor are prevented from retracting from the channels by means of roll pins, such as pins **60** shown in FIGS. 6 and 7, which are driven into suitable accommodating bores provided in the mounts. The tensors are so sized, that upon driving of the roll pins in place, the tensors become tensed, and act through the mounts to urge the rails inwardly toward the ends of the struts. Such tensing in the tensors serves both to rigidify the truss frame and to minimize the possibility of deformations in the frame such as produced by temperature changes.

Describing now in greater detail the means provided for anchoring members **48** in place, this is best illustrated in FIGS. 4, 5 and 9–11. Considering a set of three radial arms provided for supporting one of members **48**, arms **50**, **52**, **54** have their inner ends secured to the member through plates **62**, **64**, **66**, respectively, and bolts **68**. The outer ends of the arms are anchored to frame **30** through plates **70** which are joined as by welding to the outer extremities of the arms, and shoes **72** constructed according to the invention which are seated upon and fastened to mounts **44**. As can be seen clearly in FIG. 10, each plate **70** is formed with a pair of opposed cut away portions or recesses **70***a* to accommodate an end of a strut.

Considering more specifically the construction of a shoe, and referring particularly to FIGS. 9–11, each shoe is formed preferably as a single piece including a central portion **72***a* adapted to overlie a web **44***b* in a mount, and a pair of opposed wing portions **72***b* adapted to overlie and fit in matching relationship on the outer face of a deck **44***a* in the mount. Central portion **72***a* includes bosses **74** adapted to support a plate **70** and to accommodate attachment of the plate to the shoe through the use of fasteners **76**. Wing portions **72***b* include a set of channels **78** adapted to receive ribs **44***d* in a mount with the shoe seated upon the mount. The wing portions also include sockets or recesses **80** adapted freely to receive the ends of struts. As can be seen clearly in FIG. 9, sockets **80** include conical side walls which, progressing outwardly from the bases of the sockets, diverge from the outside surfaces of end portions of struts received in the sockets.

Preferably, each shoe which is provided in the truss is anchored as by cementing to a mount.

With the anchoring means constructed as just described, it is a relatively simple matter to fasten members **48** in place on the frame. Shoes **72** readily fit onto mounts **44** and accommodate attachment of the outer ends of radial arms **50**, **52**, **54**. Because the shoes are constructed to fit in matching relationship on the mounts, a great deal of versatility is present in the truss. More specifically, the mounts facilitate positioning of the radial arms for a member **48** at any one of a number of different locations along the length of the frame in a truss. The sockets provided in a shoe take care of the fact that wherever a shoe is seated on a mount, the shoe covers up the sockets formed in the ribs on the mount.

Referring to FIGS. 4–7 and 9, dash-dot lines have been added to indicate the longitudinal axes of the rails, strusts, tensors and radial arms in the truss. As will be appreciated by those skilled in the art, it is along lines coinciding with these axes in the struts, tensors and radial arms that forces are transmitted to the various mounts on the rails. An important feature of the invention is that each mount is constructed whereby the longitudinal axes of the struts, tensors and a radial arm supported on the mount intersects at a single common point located on the longitudinal axis of the rail to which the mount is secured. Several such points of intersection are indicated in the drawings at P. With the mounts constructed to produce this result, localized bending stresses which might damage parts in the truss are greatly minimized.

Referring particularly to FIGS. 4 and 5, it will be noted further that the longitudinal axes of the radial arms in a set of arms intersect at a single common point on neutral axis **30***a* of the truss frame. As a consequence, and also because members **48** are disposed with their longitudinal axes coinciding with the frame's neutral axis, loads transmitted into the truss through members **48** are distributed uniformly in the various parts in frame **30**.

To take care of situations where relatively large torsional loads may be transmitted into the end of a truss, a modified form of load-transmitting member is proposed, and is illustrated in FIG. 12. In this case, the load-transmitting member takes the form of an elongated hollow tube **82** having a circular cross-sectional configuration. Tube **82** is disposed with its longitudinal axis coinciding with neutral axis **30***a* of the truss, and is supported adjacent the inner ends of radial arms **50**, **52**, **54** through a collar **84**. Collar **84** surrounds the tube and is anchored thereto through fasteners **86**.

FIGS. 13–16 illustrate yet another modified form of truss wherein the rails are streamlined to take care of situations where relatively high velocity winds are expected. More specifically, the truss includes rails **88**, **90**, **92** which correspond to previously described rails **32**, **34**, **36**, respectively. In this case, each rail has a generally ovate-shaped cross-sectional configuration with the major axis thereof occupying a generally horizontal plane, and the minor axis occupying an upright plane.

Rails **88**, **90**, **92** are supported in spaced-apart and parallel relationship through struts **38**, **40**, **42** which have their opposite ends supported in much the same fashion as the previously described rails. More specifically, mounts **44** are secured at points spaced along the top side of rail **92**, and such mounts support the lower sets of ends struts **40**, **42** in the same manner as described earlier. The upper ends of struts **40**, **42**, and the opposite sets of ends of struts **38**, are supported on rails **88**, **90** through mounts **94**. As can be seen clearly in FIG. 14, the cross-sectional configuration of a mount **94** is similar in many respects to that of a mount **44**, but with sufficient difference to take care of the ovate-shaped cross section of the modified rails. Tensors **46** are connected in the same fashion as described earlier.

Referring to FIGS. 15 and 16, which illustrate how the outer ends of a set of radial arms **50**, **52**, **54** are supported, the outer end of arm **54** is anchored to a mount on rail **92** in the same fashion as earlier described through a plate **70** and a shoe **72**. The outer ends of arms **50**, **52** are supported on a pair of mounts **96** on rails **88**, **90**, respectively, through plates **70** and shoes **96**. And, as FIG. 16 illustrates, each shoe **96** is very similar in construction to a shoe **72**, except with a sufficient modification of configuration to permit the shoe to be seated upon a mount **94**.

As in the preferred embodiment of the truss described above, each mount in the modified truss illustrated in FIGS. 13–16 is constructed to direct forces transmitted to it whereby such forces act along lines that intersect at a common single point located on the axis of the rail to which the mount is secured.

Thus, the invention contemplates a truss which offers a number of important advantages. With the rails in the truss occupying the corners of an equilateral triangle, and interconnected through mounts, struts and tensors as described, a relatively strong and rigid construction results. And, the proposed geometry of the truss readily permits the use of relatively lightweight materials in many of the truss parts. As a consequence, relatively long trusses can be formed according to the invention which can easily be handled, and which will perform satisfactorily.

The novel means provided for transmitting loads into and out of the ends of a truss frame—more specifically, the load-transmitting members and the anchoring means provided for locating such members on the frame's neutral axis—ensure uniform distribution of loading within the truss parts. This further contributes to good performance in that it minimizes the possibility of localized overloading occurring in a particular region in the truss. The novel mounts and shoes cooperate in this respect by ensuring that the lines along which forces within the truss parts act intersect in a fashion minimizing local bending stresses.

Another very important feature of the proposed truss is that the parts which form it can easily be prefabricated, shipped in prefabricated form to save shipping space, and assembled in the field. The rails, struts, load-transmitting members, and radial arms for a truss can easily be precut to the desired length, and mounts presecured to the rails at the desired locations therealong. Tensors can also easily be preformed; and due to their novel construction which contemplates cementing a pair of bars in bores provided in the ends of U-shaped pieces, multiple tensors can readily be assembled to have the proper lengths.

In the field the struts and rails can be assembled relatively quickly, with fitting of the ends of the struts in the appropriate sockets in mounts and shoes facilitated by the sloped walls provided in the sockets. Tensors and load-transmitting members may then be fastened in place with relatively little effort and the truss placed in condition for use.

Obviously, and to take care of different situations, the dimensions of various parts in a truss can be modified appropriately.

While a preferred embodiment of the invention has been described herein, and certain modifications indicated, it is appreciated that other modifications and variations are possible without departing from the spirit of the invention. Accordingly, it is desired to cover all such variations and modifications which would be apparent to one skilled in the art and that come within the scope of the appended claims.

It is claimed and desired to secure by Letters Patent:

1. In a truss including three elongated and spaced substantially parallel rails:

a plurality of mounts secured to each rail at points spaced along the length thereof, each mount including a pair of sockets with each facing a different one of the other rails in the truss and disposed in the plane occupied by such other rail and by the rail to which the mount containing the socket is secured, and with each socket defined by opposing generally conical wall expanses which diverge progressing outwardly from the base of the sockets;

and for each combination of two rails,

plural elongated struts distributed along the lengths of and extending at substantially right angles between the rails, in the plane containing the same, each strut having its opposite end portions freely received in sockets in different mounts, said end portions being configured whereby, progressing outwardly from the base of a socket, the wall expanses of the socket diverge from the outside surface of the end portion received in the socket, and

intermediate each pair of adjacent struts, and in the plane containing such struts, a pair of elongated tensors disposed at an angle relative to one another, each having its opposite ends fastened to a different mount, and each being tensed and extending diagonally across the space bounded by said combination of two rails and said pair of struts,

said tensors, through the actions of their ends on the mounts, urging said rails in said combination toward one another, and the extremities of said end portions of said struts against the bases of said sockets.

2. The truss of claim 1, wherein each mount is constructed to direct the forces transmitted to it whereby such forces act along lines that intersect at a common point located on the longitudinal axis of the rail to which the mount is secured.

3. A truss comprising:

an elongated frame having a triangular outline as viewed from an end, and including three elongated and spaced substantially parallel rails, and a neutral axis substantially paralleling and located inwardly of said rails;

plural mounts secured to each rail at points spaced along the length thereof, each mount including a pair of sockets each facing a different one of the other rails in the frame, and each defined at least partially by a pair of opposed, generally conical wall expanses that diverge progressing outwardly from the base of the socket;

and for each combination of two rails,

plural elongated struts distributed along the lengths of and extending at substantially right angles between the rails, each strut havings its opposite end portions freely received in sockets in different mounts, said end portions being configured whereby, progressing outwardly from the base of a socket, the wall expanses of the socket diverge from the outside surface of the end portion received in the socket, and

intermediate each pair of adjacent struts, a pair of elongated tensors disposed at an angle relative to one another, each being tensed and extending diagonally across the space bounded by said combination of two rails and said pair of struts,

said tensors urging said rails in said combination toward one another, and the extremities of said end portions of said struts against the bases of said sockets.

4. The truss of claim 3, wherein each end portion of a strut is cylindrical, and the outside diameter thereof is no larger than the inside diameter of a wall expanse in a socket with such diameter measured adjacent the base of the socket.

5. The truss of claim 3, wherein each strut which extends between rails in one combination of two rails is disposed in a plane normal to said neutral axis also occupied by struts which extend between rails in the other two combinations of two rails, and which further comprises an elongated, unitary load-transmitting member for transmitting a load to said frame through one end thereof, and anchoring means disposed in at least two of said planes anchoring said member to said frame, with the member positioned with its longitudinal axis substantially coinciding with said neutral axis.

6. The truss of claim 5, wherein each mount comprises a pair of substantially planar decks disposed at an angle relative to one another and facing radially away from the rail to which the mount is secured, and plural elongated raised ribs on each deck substantially paralleling the longitudinal axis of said rail, and said wall expanses are formed on said ribs.

7. The truss of claim **6**, wherein said anchoring means comprises an arm joined to and radiating from said load-transmitting member, and a shoe seating the outer end of said arm on one of said mounts, said shoe including one side shaped to fit in generally matching relationship on the decks in said one mount in a position covering the sockets in the mount, and another side including a pair of generally conical recesses, each overlying one of said sockets and freely receiving and holding an end portion of a strut.

8. The truss of claim **7**, wherein the conical face of a recess in a shoe, progressing outwardly from the base of the recess, diverges from the outside surface of the strut end portion received in the recess.

9. The truss of claim **5**, wherein said rails are positioned relative to one another whereby their longitudinal axes intersect a plane normal thereto at points which occupy the corners of an equilateral triangle.

10. The truss of claim **5**, wherein said anchoring means comprises at least two sets of arms joined to and radiating from said load-transmitting member at points spaced along the length thereof, with each set disposed in a different one of said two planes, each set of arms including for each rail, an arm extending toward and fastened to a mount on the rail.

11. The truss of claim **10**, wherein said load-transmitting member is hollow and has a rectangular outline when viewed from an end.

12. The truss of claim **10**, wherein said load-transmitting member is hollow and has a circular outline when viewed from an end.

13. The truss of claim **3**, wherein each mount further includes, on each side of a socket, means constructed to accommodate attachment of an end of a tensor to the mount.

14. The truss of claim **13**, wherein each mount is constructed to direct the forces transmitted to it whereby

such forces act along lines that intersect at a common point located on the longitudinal axis of the rail to which the mount is secured.

15. The truss of claim **13**, wherein each tensor is constructed in the form of an endless loop.

16. The truss of claim **15**, wherein each endless loop comprises a pair of opposing U-shaped parts each having a pair of elongated substantially parallel arms and an elongated recess extending axially into each arm, and the loop further comprises a pair of elongated bars extending between said U-shaped parts, each bar having its opposite ends received and anchored within the recess in a different one of said U-shaped parts.

17. The truss of claim **3**, wherein said rails and struts comprise hollow tubes.

18. The truss of claim **17**, wherein said hollow tubes each has a cylindrical cross-sectional outline.

19. The truss of claim **17**, wherein the tubes forming said rails each has an ovate cross-sectional outline with the minor axis of such outline disposed upright.

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