

July 10, 1934.

C. F. WARD

1,966,324

EXTENSION WATER TOWER

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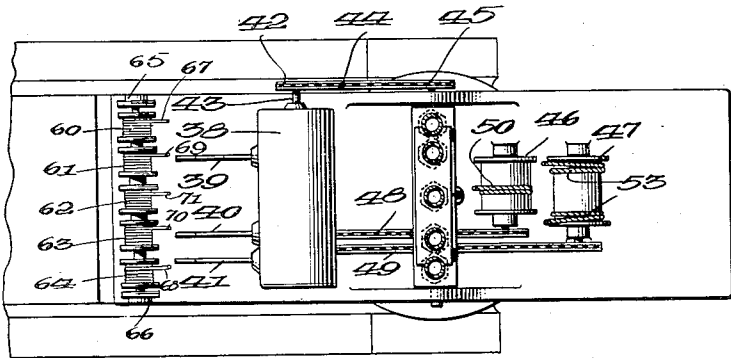
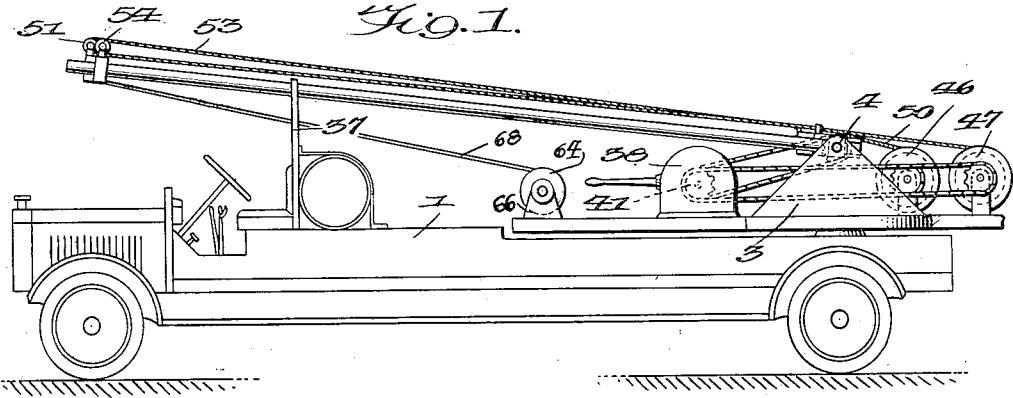
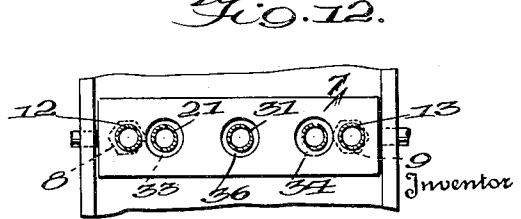
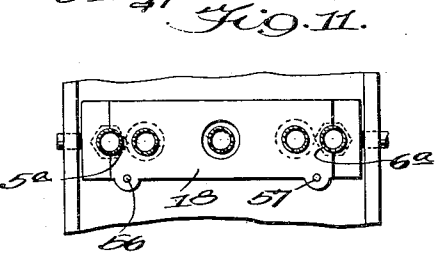
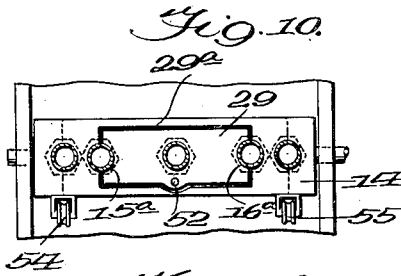
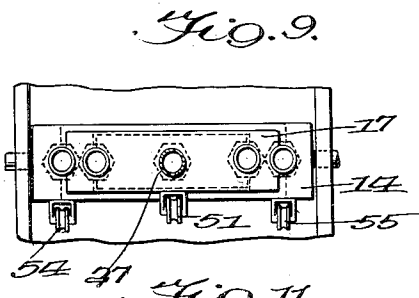


Fig. 8.



C. F. Ward,
Permit & Permit

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Attorneys

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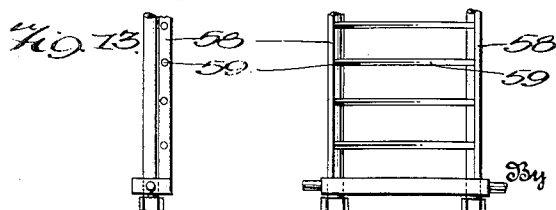
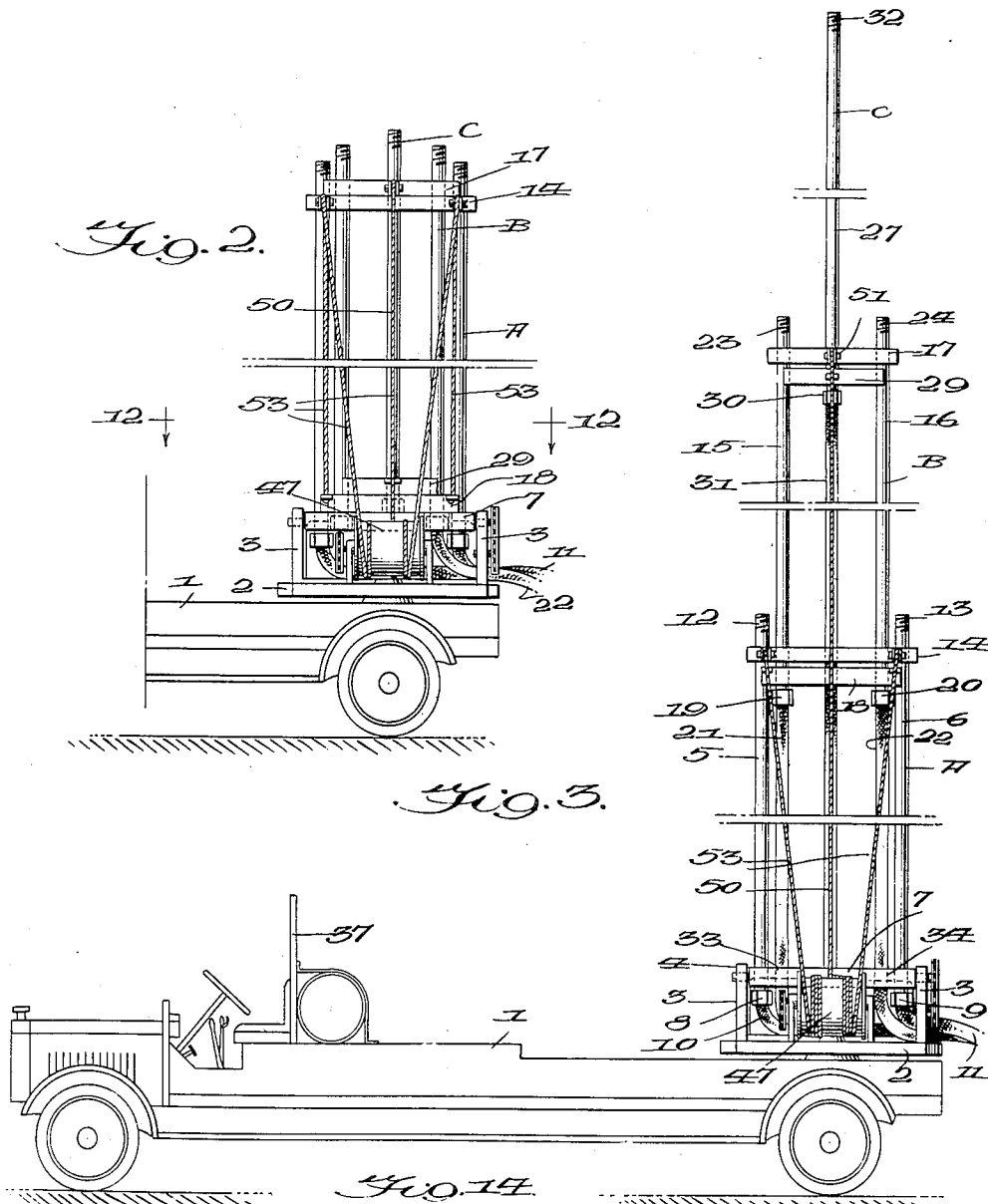
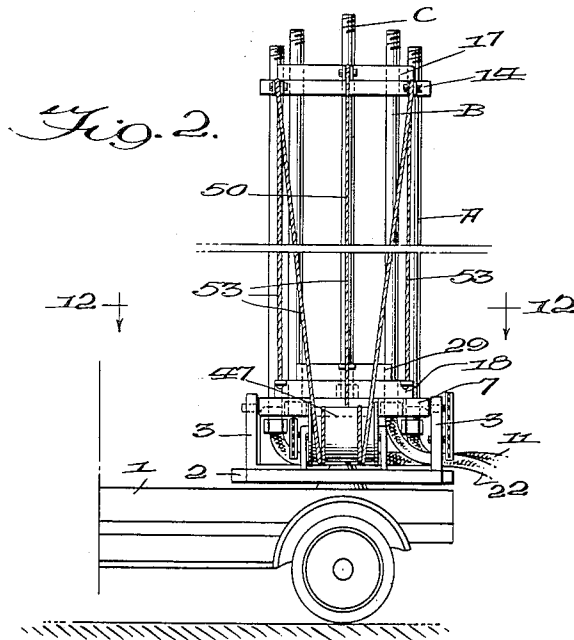
C. F. WARD

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3 Sheets-Sheet 2



Inventor
C. F. Ward,
Permit & Permit

Attorneys

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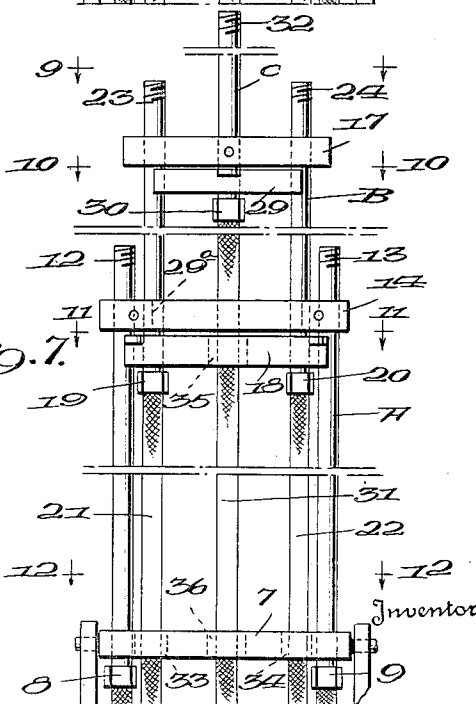
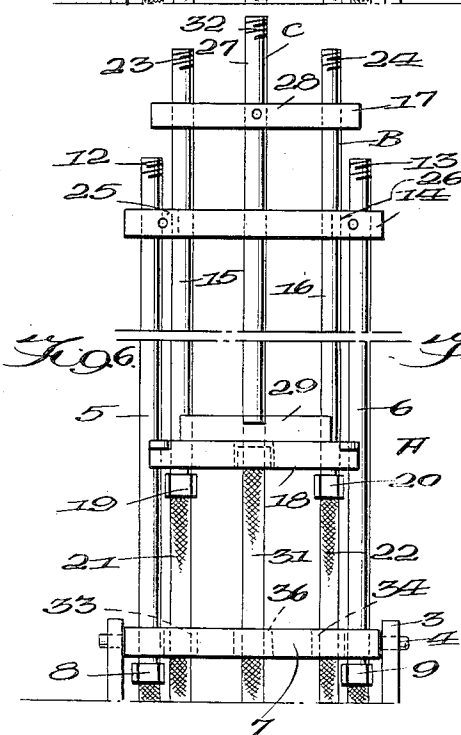
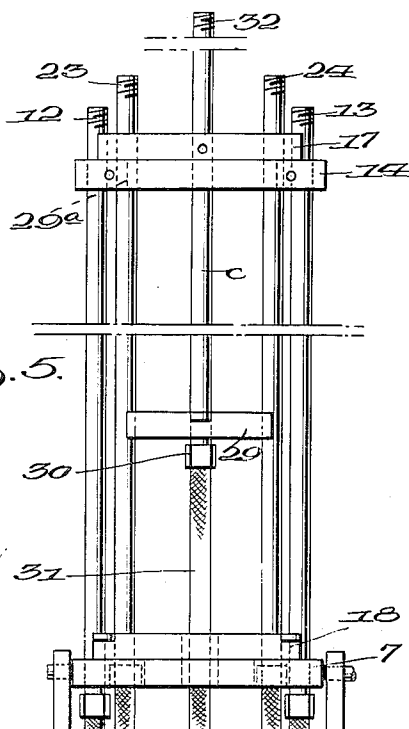
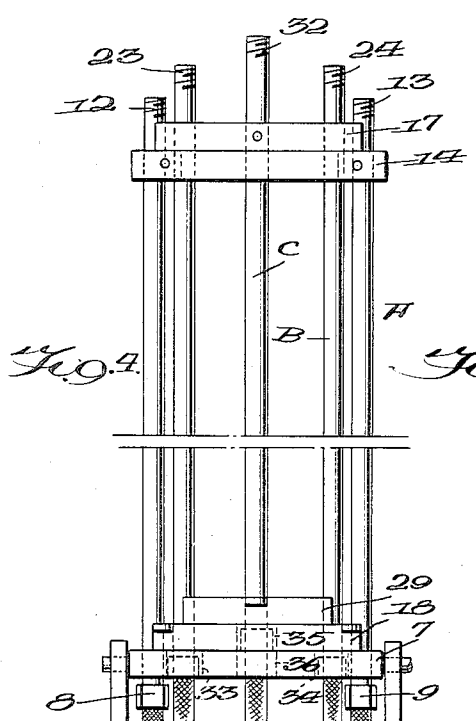
C. F. WARD

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EXTENSION WATER TOWER

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C.F. Ward,
Inventor
By *Frederick S. Ward*
Attorneys

UNITED STATES PATENT OFFICE

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EXTENSION WATER TOWER

Clarence F. Ward, Birmingham, Ala.

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11 Claims. (Cl. 169—25)

My invention consists in new and useful improvements in extension water towers and has for its object to provide apparatus of this character particularly designed for use in extinguishing fires in tall city buildings.

The primary object of my invention is to provide a water tower composed of a plurality of extensible sections made up of rigid pipes or tubes adapted to serve both as supporting uprights and conduits for conveying water under pressure to the point or points of utilization, said sections being slidably connected together so that when retracted they are automatically nested and foldable to lie substantially longitudinally of a truck body or the like.

Another object of my invention resides in the structure whereby one or more hose sections may be coupled to the apparatus at varying elevations so as to enable the fire fighters to simultaneously play a number of streams of water from different heights onto a burning building. Heretofore considerable time has been lost and danger encountered in carrying heavy hose up ladders or stairways in order to reach several different floors of a building at the same time, and it was to the end of avoiding these difficulties and dangers that I designed my improved water tower by means of which the water conduits can be extended to any desired height and hose connections made from any of a plurality of floors for the simultaneous discharge of water at these different heights.

A further object of my invention is to provide a combined ladder and extension water tower wherein the ladder portion is suitably secured to the upright conduits without interfering with the extension and retraction of the same.

A still further object of my invention is to provide means for preventing back-kick of the extended sections due to the force of the fluid discharged when the apparatus is in operation.

With the above and other objects in view which will appear as the description proceeds, my invention consists in the novel features herein set forth, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Referring to the drawings in which numerals of like character designate similar parts throughout the several views,

Fig. 1 is a view in side elevation showing my improved water tower in retracted and folded position on a suitable fire truck or similar vehicle.

Fig. 2 is a similar view of the rear portion of the vehicle showing the water tower raised to its initial vertical position with the sections nested.

Fig. 3 is a view similar to Fig. 1 showing the water tower in its fully extended vertical position.

Fig. 4 is an enlarged detail of the nested tower sections in the position shown in Fig. 2.

Fig. 5 is a similar view showing the top section of the tower in a partially extended position.

Fig. 6 shows the top and intermediate sections extended to a common point of discharge.

Fig. 7 shows all sections in fully extended position.

Fig. 8 is a top plan view of the truck showing the tower in section.

Fig. 9 is a transverse sectional view taken on line 9—9 of Fig. 7.

Fig. 10 is a sectional view taken on line 10—10 of Fig. 7.

Fig. 11 is a sectional view taken on line 11—11 of Fig. 7.

Fig. 12 is a sectional view taken on line 12—12 of Figs. 2 and 7, and

Figs. 13 and 14 are side and front elevations respectively showing a modified form of my invention wherein a ladder is combined with the tower sections.

In the drawings, 1 represents a conventional fire truck or any suitable vehicle for supporting and conveying my improved water tower structure. The rear portion of the vehicle 1 is preferably provided with a revolving platform or turn-table 2 which is adapted to be operated by the power unit of the vehicle in any convenient manner and which carries on its upper surface a pair of upright supports 3 arranged in spaced relation and having oppositely disposed openings 4 which serve as bearings for the fulcrum of the tower as hereinafter set forth.

The water tower per se is made up of a plurality of sections, the form shown in the accompanying drawings consisting of three sections, A, B and C. The lowermost section A consists of two elongated tubes or pipes 5 and 6, the lower ends of which extend through and are rigidly secured in a base member 7 in spaced relation, the longitudinal extremities of said base member terminating in reduced trunnions which are adapted to pivotally engage the bearing apertures 4 in the uprights 3 whereby the section A is fulcrumed on the uprights. The lower extremity of each of the pipes 5 and 6 is threaded to engage the couplings 8 and 9 of the hose sections 10 and 11 respectively, and the upper extremities of said pipes 5 and 6 are threaded as at 12 and 13 respectively, to facilitate the application of suitable nozzles or additional hose sections at these points, said upper

ends being retained in spaced relation by a cross bar 14 which is apertured to receive and rigidly secure said pipes in place.

The intermediate section B is essentially the same in structure as section A and consists of two tubes or pipes 15 and 16 which are held in spaced relation by upper and lower cross bars 17 and 18, the lower ends of the pipes extending through suitable openings in the lower cross bar 18 and being threaded to engage couplings 19 and 20 of hose sections 21 and 22 respectively, and the upper ends of said pipes extending through suitable openings in the upper cross bar 17 with their ends threaded as at 23 and 24 to engage nozzles or additional hose sections.

The longitudinal extremities of the lower cross bar 18 are vertically grooved as at 5a and 6a (Fig. 11) to slidably engage the adjacent peripheries of the pipes 5 and 6 respectively, the said longitudinal extremities of the cross bar 18 terminating at substantially the transverse centers of the respective pipes 5 and 6. The upper cross bar 14 of section A is apertured as at 25 and 26 to receive and slidably support the pipes 15 and 16 of section B, which pipes are spaced apart a lesser distance than the pipes 5 and 6 of section A so as to permit a nesting of section B within the confines of section A as hereinafter set forth.

The top section C of the water tower is preferably composed of a single elongated tube or pipe 27 which is adapted to slidably embrace a central opening 28 in the cross bar 17 of section B, its lower extremity extending through and rigidly secured to a cross bar 29 and being threaded to engage the coupling 30 of a hose section 31, and its upper end being threaded as at 32 to receive a nozzle or additional hose section. The cross bar 29 of section C is constructed along the lines of the cross bar 18 of section B, that is, it is vertically grooved at its longitudinal extremities as at 15a and 16a (Fig. 10) to slidably embrace the adjacent peripheries of pipes 15 and 16 respectively of section B. The cross bar 14 is cut out at its central portion as at 29a (Fig. 10) so as to permit the cross bar 29 of section C to pass there-through whereby section C may be nested within the confines of section B as hereinafter set forth more in detail.

The lower hose connections 10 and 11 are of course stationary but in order to permit the extension of the tower with hose connected to the lower end of each of the pipes, I provide vertical openings in each of the lower cross bars. In other words, the base member 7 which serves as the lower cross bar for section A is apertured as at 33 and 34 to receive and guide the hose sections 21 and 22 respectively, which are secured to the pipes 15 and 16. The cross bar 18 is apertured at 35 to permit the hose section 31 to slide there-through and obviously the central opening 29a in the cross bar 14 permits said hose section 31 to pass through this section and an opening 36 in the base member 7 slidably supports the hose 31 at the lower end of the tower.

In order to accommodate the hose couplings 8, 9, 19, 20 and 30, the openings 33, 34, 35 and 36 are of sufficient diameter to receive the respective hose couplings when all three sections A, B and C are nested as shown in Fig. 4.

The elevation, extension and retraction of the sections of the water tower may be accomplished by any suitable means and I have shown in the drawings one form of mechanism which may be employed. Referring to Fig. 1, I have shown the tower completely retracted and in substantially

horizontal position with its forward end resting on a suitable support 37 extending vertically from the body of the vehicle 1. 38 represents a power unit of any suitable design, carried on the revolving platform 2 and having control levers 39, 40 and 41 for throwing the various mechanisms hereinafter described, into and out of operation. A convenient means for elevating the tower or swinging the same vertically on its fulcrum consists of a sprocket wheel 42 fixed on the shaft 43 of the power unit and connected by means of a belt or sprocket chain 44 to a second sprocket wheel 45 fixed on one of the trunnions of base member 7, the operation of said mechanism being controlled by the lever 39.

46 and 47 represent drums rotatably mounted in suitable supports on the revolving platform 2 and adapted to be driven from the power unit 38 through the medium of sprocket chains 48 and 49. A single cable 50 is reeled on the drum 46 and extends upwardly over a pulley or sheave 51 on the upper cross bar 17 of section B and from thence downwardly to the cross bar 29 of section C where it is secured to a suitable eyelet or lug 52 (see Figs. 2, 3, 9 and 10).

Likewise a double cable 53 is reeled on the drum 47 and passes upwardly therefrom over pulleys or sheaves 54 and 55 carried by the cross bar 14 and from thence downwardly to the cross bar 18 where, by means of eyelets or lugs 56 and 57, the ends of the double cable are secured.

The operation of the drum 46 is controlled by the lever 40 on the control unit and the drum 47 by the lever 41 on said control unit.

Having thus described the construction of my improved extension water tower, its operation is as follows:—

When the apparatus arrives at a building where a fire is to be extinguished, the water tower sections are nested and are in the position shown in Fig. 1 and the hose connections are immediately made at the points 8, 9, 19, 20 and 30, thus establishing five sources of water distribution. By means of the lever 39, the power unit 38 is set into operation to elevate the nested sections to a vertical position, and the revolving platform 2 is turned so as to properly locate the base of the tower structure with respect to the building. Now, in the case of a tall building where the fire has reached one of the uppermost floors and it is desired to extend the sections to their limit, the drum 47 is set into operation by manipulating the lever 41 and the drum 46 remains stationary. This reels the double cable 53 on the drum 47 and causes the cross bars 18 and 29 to simultaneously move upwardly until they abut the undersides of the cross bars 14 and 17 respectively.

In this position of the sections, it will be seen that streams of water can be played upon the fire from any or all of the upper connections 12, 13, 23, 24 and 32, and as each of these streams is conducted through a separate and independent conduit, they may be individually controlled.

In some instances it may be desirable to discharge a blast of three nozzles at one particular point on a building and this may be accomplished by extending sections B and C to a common level. This operation is brought about by causing the drum 46 to rotate in a reverse direction to unreel the cable wound thereon while the drum 47 is being rotated to reel the double cable 53 on its periphery. Fig. 6 illustrates the relative positions of the sections during this operation and it will be seen that the reeling of the double cable 53 causes the elevation of the lower cross bar 18 of section B and with it the cross bar 29 of section

C, the releasing or unreeling of cable 50 preventing relative movement of section C with respect to section B.

Again it may be desirable to elevate only section C, permitting the other sections A and B to remain stationary. This of course is accomplished by setting the drum 46 into operation to reel the cable 50 thereon, the drum 47 remaining stationary.

As shown in Figs. 13 and 14 it may be desirable to construct the tower sections in the form of a combination water tower and ladder. Various specific arrangements may be employed for effecting this combination but in the drawings I have shown what I consider one of the simplest structures for this purpose. To each of the pipes I secure a longitudinally extending strip or bar 58 of metal, either by welding or other suitable means, and between the adjacent strips I secure the rungs 59 of the ladder. The strips 58 also serve the additional purpose of a stiffening means for supporting or reinforcing the upright pipe sections.

Naturally the openings in the cross bars are shaped and the ladders so arranged that the various sections are adapted to slide within one another so as not to interfere with the hose connections.

This ladder structure may obviously be applied to the top section C by simply adding vertical supports on either side of the conduit 27, or if desired, this single conduit may be replaced by a pair of conduits as in the case of the sections A and B.

One important feature of the particular form of hoisting cable hook-up shown in the drawings is the speed with which the sections may be extended for use. It will be noted that when the entire unit is to be extended to its limit to reach the highest point on a building, the stationary drum 46 retains the cable 50 immovable and when the double cable 53 is reeled on the drum 47 to extend the section B, the upper cross bar 17 of said section, through the sheaves 51 and immovable cable 50 connected to the cross bar 29 of section C, causes said latter section to be extended at a speed twice that of the other sections, so that all sections reach their upper limits simultaneously.

In order to prevent back-kick of the extended sections when streams of water are being played on the building, I provide a series of drums 60, 61, 62, 63 and 64, the drums 60 and 64 being mounted on a common shaft supported in suitable bearings 65 and 66 carried on the upper surface of the turn-table 2 as clearly shown in Fig. 8. The drums 61 and 63 are mounted on a second common hollow shaft which surrounds and is arranged co-axial with the first mentioned shaft, and the drum 62 is interposed between the drums 61 and 63 on a short hollow shaft or sleeve which surrounds and is arranged co-axial with the shaft carrying the drums 61 and 63. In other words, the drums 60 and 64 are adapted to operate in unison and the drums 61 and 63 likewise operate in unison.

Drums 60 and 64 are adapted to reel cables 67 and 68, the opposite ends of which are secured to the respective longitudinal extremities of the upper cross bar 14 of section A, the drums 61 and 63 are adapted to reel cables 69 and 70, the opposite ends of which are secured to the longitudinal extremities of the upper cross bar 17 of section B, and on the drum 62 is reeled a cable 71, the opposite end of which is secured to

the upper extremity of the conduit 27 of section C.

Suitable means may be provided for automatically operating these drums and gearing the same synchronously with the mechanism for elevating and extending the various sections whereby if the sections are elevated in their nested position for the purpose of playing a blast of five nozzles at a single elevation, the cables 67 and 68 will be effective to prevent back-kick of the sections. On the other hand, when the sections are extended either to their extreme positions or any intermediate position, the drums and cables just described will automatically assume the proper restraining position with respect to the various sections.

It will thus be seen that a structure of this type affords a water tower of the maximum flexibility of use with a minimum of danger to the firemen. By avoiding the necessity of carrying heavy hose up ladders or stairways in order to reach a number of points in a building at the same time and yet enabling the fire fighters to make hose connections so as to combat fires at different levels in a building simultaneously, my improved extension water tower provides a distinct advantage and improvement in the art.

From the foregoing it is believed that the construction and operation of my improved water tower may be readily understood by those skilled in the art without further description, it being borne in mind that numerous changes may be made in the details of construction without departing from the spirit of the invention as set forth in the following claims. For example, additional fins or supporting strips may be applied to the upright conduits for strengthening; hand operated mechanism may be applied to the drums for use in the event of the failure of power; safety appliances may be installed to automatically prevent the lowering of the sections in case of a broken cable, and obviously with slight changes in design, the principle embodied in the present invention may be applied to a device for use as a gin pole or the like.

What I claim and desire to secure by Letters Patent is:—

1. An extension water tower comprising a base member, a conduit section pivotally secured to said base member, additional conduit sections carried by said pivoted section and arranged to lie in lines parallel to one another and to the longitudinal center of said pivoted section, a hose removably secured to the lower extremity of each conduit, the upper end of each conduit being adapted to receive a discharge extension, means for swinging said pivoted section vertically, and means for selectively extending and retracting said additional sections.

2. An extension water tower comprising a base member, a conduit section pivotally secured to said base member, additional conduit sections carried by said pivoted section and arranged to lie in lines parallel to one another and to the longitudinal center of said pivoted section, a hose removably secured to the lower extremity of each conduit, the upper end of each conduit being adapted to receive a discharge extension, means for swinging said pivoted section vertically, and means for simultaneously elevating each of said additional sections.

3. In combination with a vehicle, an extension water tower comprising a base member revolvably mounted on said vehicle, a lower section ful-

crumed on said base member and comprising a pair of spaced cylindrical uprights forming conduits, at least one intermediate section comprising a pair of spaced uprights forming conduits independent of said first named conduits, said intermediate section being slidably secured to said lower section so that its uprights lie parallel to the uprights of said lower section but spaced therefrom, a top section comprising a single upright forming a conduit independent of either of said first named conduits and slidably engaging said intermediate section in parallel, spaced relation from the conduits thereof, means for swinging said lower section vertically on its fulcrum, and means for extending and retracting said intermediate and top sections.

4. Apparatus as claimed in claim 3 wherein said sections are provided with ladders, secured thereto and adapted to be extended and retracted therewith.

5. An extension water tower comprising a base member, a lower section comprising a pair of spaced cylindrical uprights forming conduits, a lower cross bar engaging the lower ends of said uprights and provided with trunnions whereby said section is fulcrumed to said base member, an upper cross bar for supporting the upper ends of said uprights, at least one intermediate section comprising a pair of uprights retained in spaced relation by upper and lower cross bars, said uprights forming conduits independent of said first named conduits, said intermediate section being slidably secured to said lower section so that its uprights lie parallel to the uprights of said lower section but spaced inwardly therefrom, a top section comprising a single upright forming a conduit independent of either of said first named conduits and provided with a cross bar which is adapted to slidably embrace the uprights of the intermediate section, hose removably secured to the lower end of each of said conduits, certain of said cross bars being provided with openings adapted to serve as guides for said hose, means for swinging said lower section vertically on its fulcrum, and means for extending and retracting said intermediate and top sections.

6. An extension tower comprising a base member, a lower section comprising a pair of spaced conduits rigidly supported by a cross bar adjacent the lower extremities, said cross bar being fulcrumed on said base member and adapted to swing vertically thereon, a second cross bar rigidly embracing the upper ends of said conduits, at least one intermediate section comprising a pair of spaced conduits independent of said first named conduits, cross bars rigidly secured adjacent the upper and lower extremities of said intermediate conduits to retain the same in spaced relation, a top section comprising a single conduit independent of either of said first named conduits and having a cross bar rigidly secured to its lower extremity, the conduits of said inter-

mediate section lying in a plane parallel to the conduits in said lower section but spaced inwardly therefrom, the conduit of said top section lying in a plane parallel to said other conduits and intermediate said pairs of conduits, the conduits of each section passing through guide openings in the upper cross bar of the section next below, the lower cross bars of the top and intermediate sections slidably engaging the peripheries of the conduits next below, each of said conduits having means at its lower extremity for attaching a section of hose and at its upper extremity for attaching a discharge line, means for swinging said extension tower vertically on its fulcrum, and means for extending and retracting said sections.

7. In combination with a vehicle, an extension water tower comprising a base member revolvably mounted on said vehicle, a lower section fulcrumed on said base member and comprising a pair of spaced cylindrical uprights forming conduits, at least one intermediate section comprising a pair of spaced uprights forming conduits independent of said first named conduits, said intermediate section being slidably secured to said lower section so that its uprights lie parallel to the uprights of said lower section but spaced therefrom, a top section comprising at least one upright forming a conduit independent of either of said first named conduits and slidably engaging said intermediate section in parallel, spaced relation from the conduits thereof, means for swinging said lower section vertically on its fulcrum, and means for extending and retracting said intermediate and top sections.

8. The combination as claimed in claim 7 wherein said last named means comprises a plurality of drums, cables reeled on said drums and operatively engaging the respective sections, and means for rotating said drums to cause said sections to be elevated selectively and simultaneously.

9. An extension tower comprising a plurality of conduits, means for slidably connecting said conduits in parallel relation, independent means for supplying fluid to each of said conduits, means for extending said conduits longitudinally, and means for discharging to atmosphere independent streams one from each of said conduits simultaneously at different elevations.

10. An extension tower as claimed in claim 9 wherein the upper extremity of each conduit is adapted to receive a discharge extension.

11. An extension water tower comprising a plurality of nested pairs of conduits, independent means for supplying water to each of said conduits, means for extending said pairs of conduits, and means for discharging to atmosphere independent streams one from each of said conduits, the streams of each pair being discharged at different elevations simultaneously.

CLARENCE F. WARD.