(No Model.)

3 Sheets—Sheet 1.

H. C. SCHMIDT.

WATER TOWER.

No. 602,244. Patented Apr. 12, 1898.

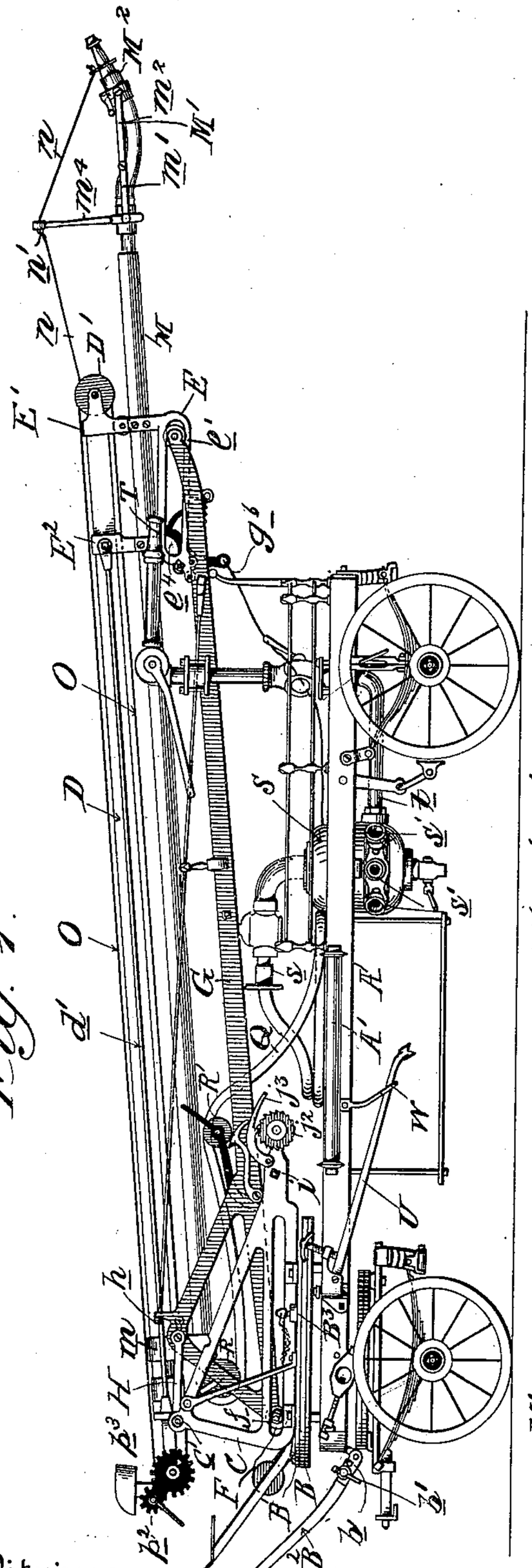

Fig. 1.

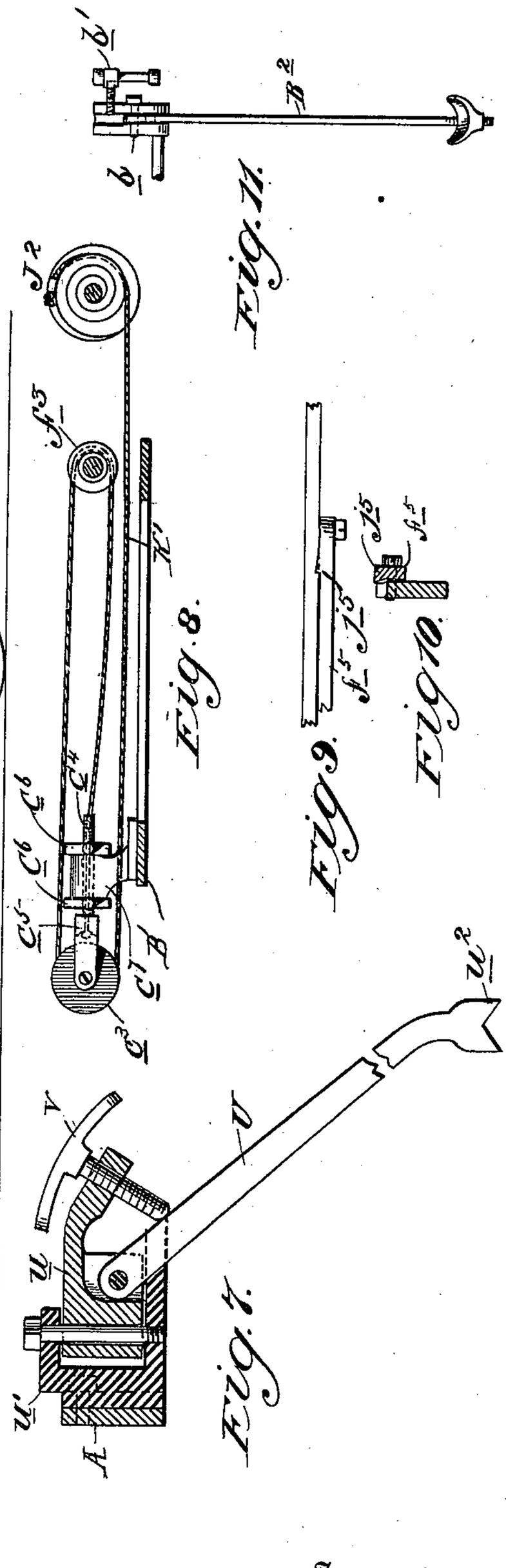

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 7.

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(No Model.) 3 Sheets—Sheet 2.

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WATER TOWER.

No. 602,244. Patented Apr. 12, 1898.

Fig. 2.

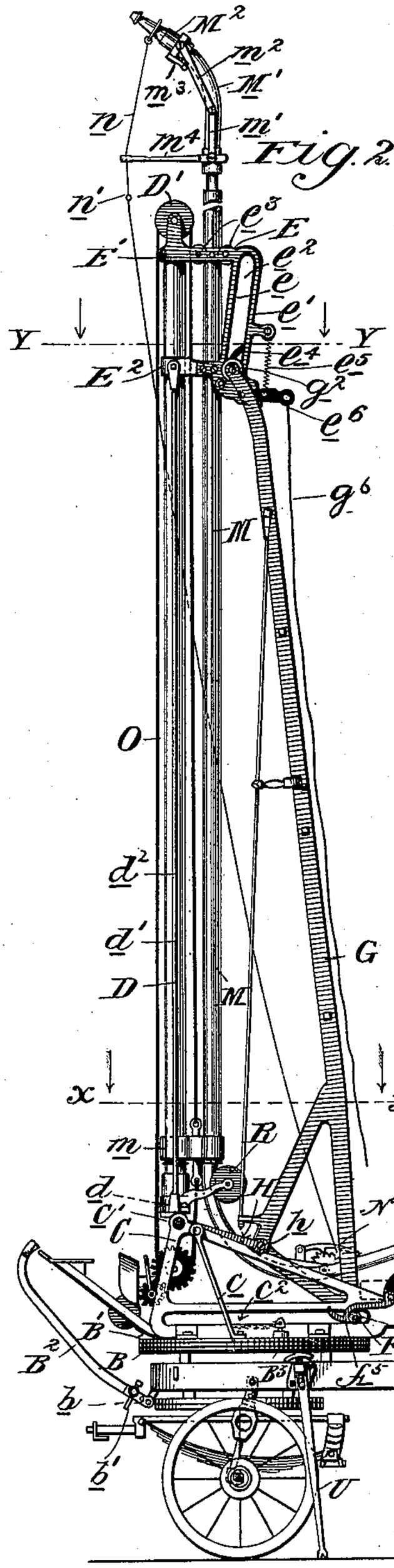


Fig. 5.

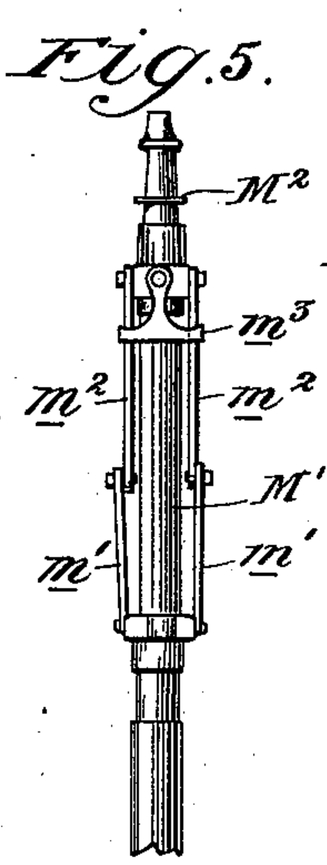


Fig. 3.

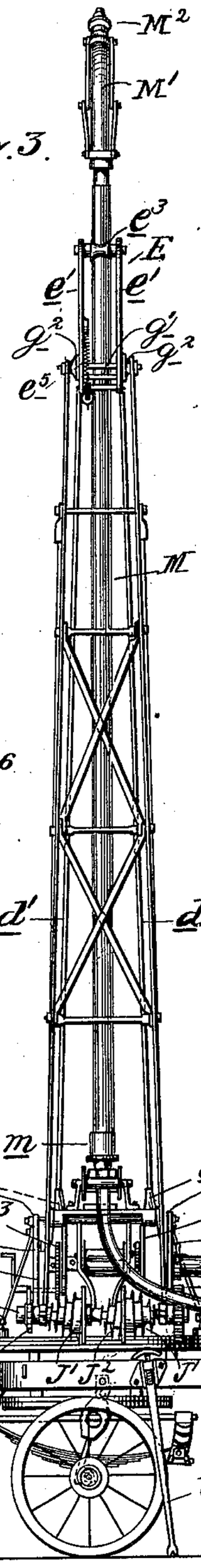
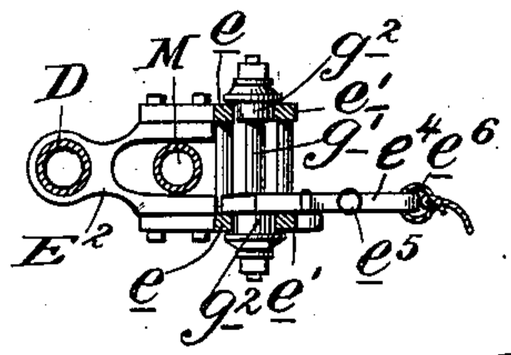


Fig. 6.



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3 Sheets—Sheet 3.

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WATER TOWER.

No. 602,244. Patented Apr. 12, 1898.

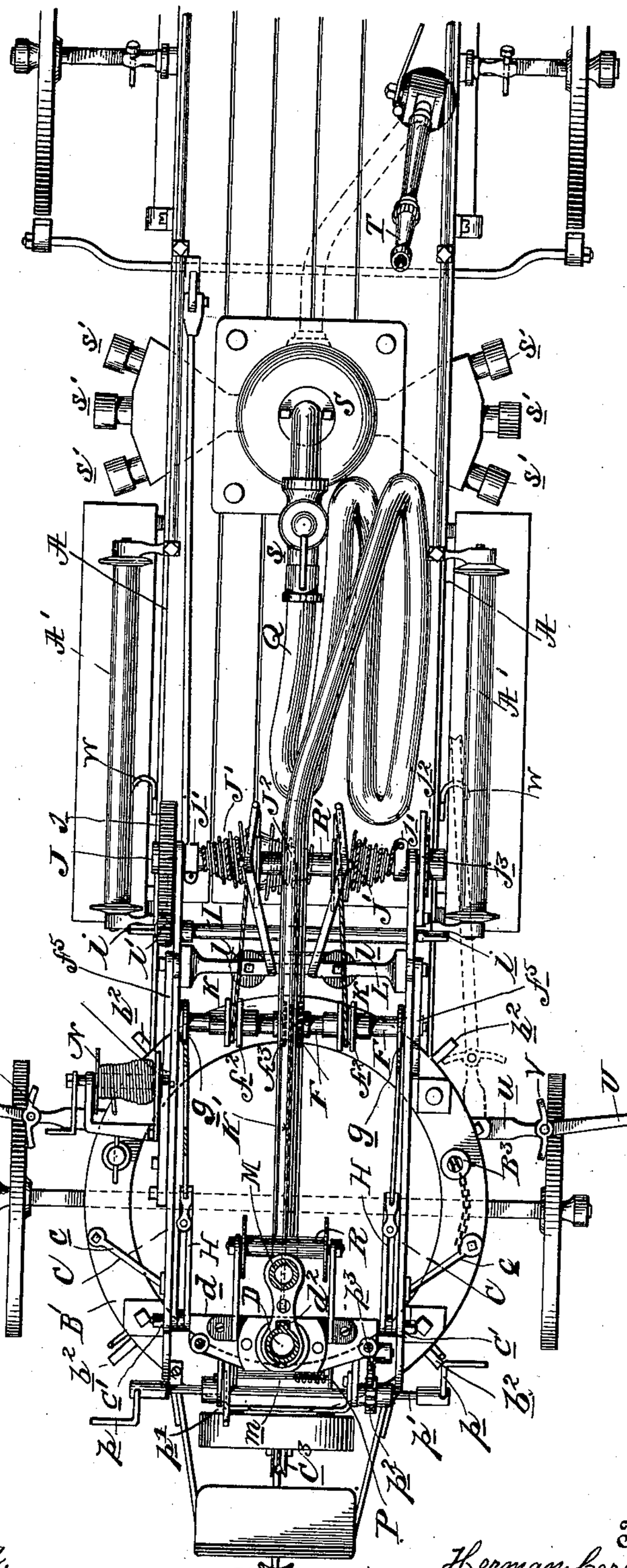

Fig. 4.

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UNITED STATES PATENT OFFICE.

HERMAN CARL SCHMIDT, OF NEW YORK, N. Y.

WATER-TOWER.

SPECIFICATION forming part of Letters Patent No. 602,244, dated April 12, 1898.

Application filed April 16, 1897. Serial No. 632,394. (No model.)

To all whom it may concern:

Be it known that I, HERMAN CARL SCHMIDT, of the city, county, and State of New York, have invented certain new and useful Improvements in Water-Towers, of which the following is a specification.

My invention relates to that class of water-towers in which an extensible discharge-pipe mounted upon a suitable truck is raised from a horizontal position to a vertical position, so that a stream of water may be directed into the upper parts of buildings in cases of fire; and my improvements are directed particularly to the mechanism for raising, lowering, and extending said discharge-pipe and for controlling and directing the stream of water discharged therefrom, details of all of which are hereinafter more fully set forth.

In the drawings, Figure 1 is a side elevation of my improved water-tower with the discharge-pipe lowered. Fig. 2 is a view of the forward end of the truck in the same position with the tower raised. Fig. 3 is a similar view with the tower turned at right angles to the position shown in Fig. 2, with the rear of the tower toward the observer. Fig. 4 is a plan view of the truck, the tower being raised and shown in section on the lines $x\ x$ of Fig. 2; Fig. 5, a view of the nozzle and braces, taken at right angles to Fig. 2, looking from the left. Fig. 6 is a cross-sectional view of the tower, taken on the lines $y\ y$ of Fig. 2. Fig. 7 is a detail of the locking mechanism for the side braces. Fig. 8 is a longitudinal partly-sectional view of the upper part of the turn-table, the lowering cable, and connections. Fig. 9 is a top view of a pawl attached to a section of frame, showing the cam-lug on the pawl. Fig. 10 is a cross-sectional view of the same; and Fig. 11 is a front view of the brake-lever and connections, with the lever lowered.

Corresponding parts are designated by the same reference-letters in all the figures.

A is the truck-frame, which is mounted upon running-gears in the usual manner. At the forward end of this frame is mounted the turn-table B B′, which carries the tower and its attachments.

C C are brackets bolted to the top B′ of the turn-table, braced by suitable stay-rods $c\ c$, the rear extensions of these brackets supporting the hoisting-windlass and attachments, and the forward ends being provided with bearings $c'\ c'$, in which are journaled the arms of a cross-frame d, to which is attached the main tower-standard D, which is laterally braced by guy-rods $d'\ d'$.

At the top of the standard D is mounted a frame E, consisting of an upper member E′ and a lower member E^2, connected by bars $e\ e\ e'\ e'$, forming between them the slotted ways e^2.

The brackets C C have along their bases the slotted tracks $c^2\ c^2$, in which travel the ends of a transverse shaft F, said ends being provided with suitable antifriction-rollers $f\ f$. This shaft F carries the feet $g\ g$ of the trussed tower-brace G, the upper ends of which are connected by a rod g', provided with antifriction-rollers $g^2\ g^2$, which travel in the slotted ways $e^2\ e^2$ of the frame E. Links H H are pivoted to the sides of the brace G at $h\ h$ and to the arms of the cross-frame d.

I is a transverse shaft mounted in the brackets C C, (see Fig. 4,) having angular ends $i\ i$ to be grasped by the socketed heads of suitable crank-handles and being provided with a gear-wheel i', meshing with a larger gear-wheel j upon the windlass-shaft J. This shaft J has upon its other end a ratchet-wheel j^2, controlled by a pawl j^3 upon the bracket C, and it is also provided with conical grooved drums J′ J′ near either end and with a similar intermediate drum J^2.

$j'\ j'$ are eyeleted collars attached to the shaft and may be secured thereto through an intermediate pawl and ratchet to permit of their being adjusted to take up any slack in the hoisting-cable K, which, starting from one of the collars $j'\ j'$, is carried to and over a sheave f^2 on the shaft F, then around the sheaves $l\ l$ on the cross-bar L, and then is attached to the second collar j'. A second cable K′ (shown by dotted lines in Fig. 4) is fastened at one end to the shaft J in a position to be wound upon the drum J^2, from which it is carried to and around the sheave c^3 at the front of the turn-table, then back and around the sheave f^3 upon the shaft F, and then attached to the sheave-holder c^5 by being passed through the hollow shank c^4. The sheave c^3 is mounted in a forked arm c^5, the extension c^4 of which is flattened laterally to prevent rotation,

threaded, and slides through the bracket c^7 and is adjusted by lock-nuts C^6 C^6, by means of which the tension may be regulated. Phosphor-bronze cables are best adapted for this use, as they preserve their tension and are not injured by water.

A block *m* slides upon the standard D, but is prevented by the fin d^2 (see Fig. 4) from swinging around it. This block at its other end carries the extensible pipe M, which passes up between the grooved guide-rollers e^3 e^3 in the top frame E. On the upper end of the pipe M is a section of flexible hose M′, which extends to the nozzle M^2. The hose M′ is supported laterally by the arms m' m', to which are pivoted the links m^2 m^2, the upper ends of which are pivoted to the base of the nozzle, from the front of which depends the T-brace m^3, the cross-bar of which by engaging with the links m^2 m^2 and the hose M′ limits the swing of the nozzle between the links m^2 m^2. As is well understood, when a stream of water is passing through the pipe its pressure will tend to throw the nozzle into a vertical position; but through the cord *n*, attached to the nozzle and led down through the eyeleted guy-rod m^4 to the windlass N, the nozzle may be bent forward to any desired angle, while by the knot *n*′, encountering the guy-rod m^4, the nozzle is prevented from flying over backward.

From the block *m* a cable O travels up over a sheave D′ at the top of the standard D and then down to a windlass P, carried by extensions of the frame *d* and which is driven, by means of the cranks *p p*, upon the shaft *p*′, carrying the gear-wheel p^2, meshing with the gear-wheel p^3 upon the windlass-shaft. A pawl p^4 controls a ratchet-wheel upon the shaft *p*′ to prevent the unwinding of the cable except when desired. From the pipe M a hose Q is led back over guide-rollers R R′ (additional guide-rollers may be inserted, if desired) and is connected with the discharge-pipes of the air-chamber S, which is mounted in the body of the truck and which is provided with the usual inlets *s*′ *s*′ *s*′ and which is also connected by a discharge-pipe *t* with the swiveled nozzle T.

At either side of the truck-frame are mounted braces U U, which are pivoted in blocks *u u*, hinged in brackets *u*′ *u*′ upon the frame A. The lower extensions of these brackets *u*′ *u*′ are split or forked, and when the braces U U are swung out at right angles, or nearly so, to the frame they fall between the forks until their lower ends reach the ground. In this position they are firmly locked by means of the hand-screws V V, threaded through the outer ends of the blocks *u*, so that a rigid brace is provided on each side of the truck, which is of great importance when the tower is in operation. The effectiveness of these braces is increased by providing the lower ends with claws u^2, which prevent the ends from slipping upon the pavement. When not in use, the braces U U are swung up into carrying-hooks W W, in which position they may also be locked, if desired, by means of the hand-screws V V.

At either side of the truck are placed rollers A′ A′ for the hose to render over when the tower is revolved on its turn-table, and as in case of a half-revolution the rear ends of the brackets would encounter the brake-lever B^2, I hinge the brake-lever at *b* and secure the sections together by a set-screw *b*′, by loosening which the front end of the lever will be permitted to drop down, as shown by the dotted lines in Figs. 3 and 11.

In order to readily hold the various detents in their positions out of engagement, I prefer to make them with projecting cam-lugs, as shown at j^5, Figs. 9 and 10, which by jamming against the adjacent frame when the detents are raised and thrown over backward will hold the detents out of engagement until they are again thrown over and down by hand.

The operation of my invention is as follows: The tower, being lowered, is drawn upon the truck to the desired position. The braces U U are unhooked from the supports W W and swung out and set in the position shown in Figs. 2, 3, and 4 to brace the truck laterally. Crank-handles are then slipped upon the ends of the shaft I, and the shaft I is revolved, and through the gears *i*′ *j*′ it revolves the windlass J, winding the cable K upon the conical spiral drums J′ J′, and thereby drawing the shaft F and the foot of the tower-brace G back toward the windlass, the roller-borne ends of the shaft F traveling in the slotted ways C^2 C^2; but the tower-brace G, being linked to the frame *d* by the links H H, is, by the movement already described, swung upon the link-pivots, and its outer end or top is gradually thrown up, carrying with it the main standard D and its attachments, the rollers g^2 g^2 traveling downward in the slotted ways as the brace and standard are raised. This movement is continued until the standard has been raised to a vertical position, the cross-rod *g*′ passing down past the spring-dog e^4, which then flys forward and hooks over the rod, thus locking the brace and standard together. At the same time the ends of the shaft F pass back under the hooked detents f^5 f^5, which then drop down, hooking the foot of the brace securely in position. It will be seen that the greatest resistance is encountered at the first movement in raising the brace G, and at this point by having the cable K wound about the smallest part of the conical drums J′ J′, I secure the greatest power, the resistance being equalized as the hoisting proceeds by winding the cable gradually about the greater diameter of the drums, which also increases the speed with which the brace rises. The same rotation which winds the cable K upon the drums J′ J′ unwinds the cable K′ from the drum J^2, permitting the drawing back of the shaft F, as described.

By the arrangement described I am en-

abled to apply the raising power at the end of the standard D, which is thus pushed and lifted, without subjecting its base or other portions to any such strain or force as must exist when the lifting power is applied near the pivotal point of the standard. This saves wear and tear in the operation of the tower and increases the safety and facility of its use. By turning the crank-handles p p and the shaft p' and gears p^2 and p^3 the windlass P is revolved, winding up the cable O and drawing up the discharge-pipe M and its nozzle M^2 to the desired height. The stream of water may be now turned into the air-chamber S and from thence discharged through the hose Q, pipe M, and nozzle M^2.

In water-towers of this general class there is a considerable tendency to vibration, owing to the height of the structure, the narrowness of its supporting-base, the weight of the structure itself and of the moving stream of water, and this vibration is materially increased by the motion of the stream and the pulsations produced in the stream by the pumping of the engines. To reduce pulsation and lessen the consequent vibration of the tower, I make use of the air-chamber S, into which the streams from the engines are directed and by means of which the pressure is equalized, so that the stream will be discharged into the hose Q with a steady even flow and the trembling or vibrating of the tower will be in a large measure avoided. The vertical angle at which the stream is discharged may be regulated by means of the cord n, which can be wound or unwound upon the windlass N, and the lateral angle of the stream is regulated by turning the tower upon its table by means of socketed capstan-bars slipped over the pins b^2 b^2 (see Fig. 4) upon the upper member B′ of the turn-table. A lock-pin B^3 passes through both members of the turn-table and prevents rotation until the pin is removed.

To lower the tower, the water is first shut off. The pipe M is then lowered, the hose being drawn back and looped upon the floor of the truck. The detents f^5 f^5 are then raised, freeing the ends of the shaft F. The dog e^4 is then pulled back off the rod g' by means of the hand-line g^6. The tower-brace is now unlocked. The pawl j^3 is freed from the ratchet-wheel j^2, and by reversing the windlass J the cable K′ will be rewound upon the drum J^2, pulling the foot of the brace forward and causing the brace to descend into its folded position. At the same time the cable K is paid off of the drums J′ J′, so as to permit the described movement of the tower-brace. In this way the tower is lowered into its horizontal position. The braces U U are then unlocked and swung into their supporting-hooks, and the tower and truck are ready for removal.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in contact with said main standard and its foot in sliding connection with said base-frame, intermediate link connections between the tower-brace and the base-frame, a cable for hoisting said tower-brace and a cable for lowering the same, substantially as described.

2. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in sliding contact with said main standard and its foot in sliding connection with said base-frame, intermediate link connections between the tower-brace and the base-frame, a cable for hoisting said tower-brace and a cable for lowering the same, substantially as described.

3. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in contact with said main standard and its foot in sliding connection with said base-frame, intermediate link connections between the tower-brace and the base-frame, a windlass-shaft provided with a hoisting-drum and a lowering-drum, a cable for hoisting said tower-brace and cable for lowering the same, substantially as described.

4. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in contact with said main standard and its foot in sliding connection with said base-frame, intermediate link connections between the tower-brace and the base-frame, a windlass-shaft provided with a pair of conical, spirally-grooved hoisting-drums, and a similar lowering-drum with relatively-reversed groove, a cable for hoisting said tower-brace and a cable for lowering the same, substantially as described.

5. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in contact with said main standard and its foot in sliding connection with said base-frame, intermediate link connections between the tower-brace and the base-frame, a cable for hoisting said tower-brace and a cable for lowering the same, both of said cables operating upon the foot of the tower-brace, substantially as described.

6. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in contact with said main standard and its foot in sliding connection with said base-frame, intermediate link connections between the tower-brace and the base-frame, a windlass-shaft provided with a pair of conical spirally-grooved hoisting-drums, and a similar lowering-drum with relatively-reversed groove, a cable for hoisting said tower-brace and a cable for lowering the same, both of said cables operating upon the foot of the tower-brace, substantially as described.

7. In a water-tower, the combination of a base-frame, a main standard pivoted therein,

a tower-brace having its top in sliding contact with said main standard and its foot in sliding connection with said base-frame, a cable for hoisting said tower-brace and a cable for lowering the same, substantially as described.

8. In a water-tower, the combination of a base-frame provided with slotted tracks, a main standard pivoted therein, a tower-brace having its top in sliding contact with said main standard and its foot mounted upon a transverse shaft, provided with antifriction-rollers traveling in the slotted tracks of said base-frame and held thereby in sliding connection with said base-frame, a cable for hoisting said tower-brace and a cable for lowering the same, substantially as described.

9. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in contact with said main standard and its foot in sliding connection with said base-frame, hoisting-cable sheaves traveling with the foot of said tower-brace, a lowering-cable, a windlass-shaft provided with two hoisting-drums and a lowering-drum, a hoisting-cable traveling over said hoisting-cable sheaves and having one end attached to each of said hoisting-drums, and a lowering-cable traveling over said lowering-cable sheaves and having one end attached to said lowering-drum, substantially as described.

10. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in contact with said main standard and its foot in sliding contact with said base-frame, hoisting-cable sheaves traveling with the foot of said tower-brace, intermediate hoisting-cable sheaves, a lowering-cable sheave attached to said base-frame, an intermediate lowering-cable sheave, a windlass-shaft provided with two hoisting-drums and a lowering-drum, a hoisting-cable traveling over said hoisting-cable sheaves and having one end attached to each of said hoisting-drums, and a lowering-cable traveling over said lowering-cable sheaves and having one end attached to said lowering-drum, substantially as described.

11. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in sliding contact with said main standard and its foot in sliding connection with said base-frame, a detent to lock the top of said tower-brace to said main standard, and a detent to lock the foot of said tower-brace to said base-frame, said detents operating when the main standard has been brought into an elevated position, substantially as described.

12. In a water-tower, the combination of a base-frame, a main standard pivoted therein, a tower-brace having its top in contact with said main standard and its foot in sliding connection with said base-frame, and a detent to lock the foot of said tower-brace to said base-frame, said detent operating when the main standard has been brought into an elevated position, substantially as described.

13. The combination, with the tower raising and lowering mechanism of a water-tower, of a windlass-shaft provided with both a hoisting-cable drum and a lowering-cable drum, a hoisting-cable sheave and lowering-cable sheave carried upon a common shaft, a hoisting-cable winding upon said hoisting-cable drum and traveling over said hoisting-cable sheave, and a lowering-cable winding reversely upon said lowering-cable drum and traveling over said lowering-cable sheave, whereby reverse movements are communicated to said common shaft by reversing the revolutions of said windlass-shaft, substantially as described.

14. The combination, with the tower raising and lowering mechanism of a water-tower, of a windlass-shaft provided with both a hoisting-cable drum and a lowering-cable drum, a hoisting-cable sheave and lowering-cable sheave carried loosely upon a common shaft, a hoisting-cable winding upon said hoisting-cable drum and traveling over said hoisting-cable sheave, and a lowering-cable winding reversely upon said lowering-cable drum and traveling over said lowering-cable sheave, whereby reverse lateral movements are communicated to said common shaft by reversing the revolutions of said windlass-shaft, substantially as described.

15. The combination, with the tower raising and lowering mechanism of a water-tower, of a windlass-shaft provided with both a hoisting-cable drum and a lowering-cable drum, a hoisting-cable sheave and lowering-cable sheave carried upon a common shaft, a hoisting-cable winding upon said hoisting-cable drum and traveling over said hoisting-cable sheave, and a lowering-cable winding reversely upon said lowering-cable drum and traveling over said lowering-cable sheave, whereby reverse movements are communicated to said common shaft by reversing the revolutions of said windlass-shaft, and an intermediate adjustable sheave for regulating the tension in said cables, substantially as described.

16. A water-tower adapted to be brought into an erect position, a cable for drawing the tower into such position, a cable for lowering the tower, an adjustable sheave over which the lowering-cable runs, said sheave being provided with a hollow, exteriorly-threaded shank within which one end of the lowering-cable is secured, and which shank is provided exteriorly with lock-nuts for adjusting said sheave and thereby regulating the tension in said cable, substantially as described.

17. A water-tower adapted to be brought into an erect position, a cable for drawing the tower into such position, a cable for lowering the tower, an adjustable sheave carrying said lowering-cable, said sheave being

provided with a hollow, exteriorly-threaded shank within which one end of the lowering-cable is secured, a guide-block through which said shank extends, lock-nuts for adjusting said shank and thereby regulating the tension of said cable, and a windlass, provided with a plurality of conical, spirally-grooved drums, for operating said cables, substantially as described.

18. In a water-tower, the combination, with the running-gears and frame of a truck, of a tower-supporting frame, a main standard having its base secured in said frame, and provided at its opposite end with slotted guideways, a tower-brace supported in said frame and in sliding connection therewith, its upper end engaging in the slotted guideways, aforesaid, and means for sliding out the foot of the brace and thereby erecting the standard, substantially as described.

19. The combination, in a water-tower, of a main standard, provided with a vertical fin and with a head-block carrying two hour-glass guide-rollers, a discharge-pipe passing between said guide-rollers, a base-block, for supporting the end of said discharge-pipe sliding upon said standard and provided with a recess corresponding to said fin, a cable attached to said block and traveling over a sheave mounted upon said standard, and a windlass for operating said cable and thereby raising and lowering said pipe, substantially as described.

20. The combination, with the outlet of the discharge-pipe of a water-tower, of a section of hose extending to the nozzle, a pair of arms projecting beyond the end of said discharge-pipe, a pair of pivoted links extending from said arms to the base of the nozzle and pivoted thereto preventing lateral bending of the nozzle, a T-stop depending from the nozzle-base and its cross-bar engaging said links and hose, and a nozzle-line for depressing said nozzle, substantially as described.

21. In a water-tower, the combination with the running-gears and frame of a truck, of a supporting-table mounted thereupon, a base-frame provided with slotted tracks carried by said table, a main standard having its foot pivoted in said base-frame, a tower-brace, having its top in sliding contact with said main standard, and carried upon a transverse shaft provided with antifriction-rollers traveling in said slotted tracks of said base-frame, and also provided with two hoisting-cable sheaves and a centrally-disposed lowering-cable sheave, a pair of arms linking the tower-brace to said base-frame above said slotted tracks, a pair of intermediate hoisting-cable sheaves carried by said base-frame, a windlass-shaft provided with a conical, spirally-grooved drum upon each end, a cable passing around all of said hoisting-cable sheaves and having one of its ends secured to each of said drums, a third conical drum, with relatively-reversed spiral grooves, mounted centrally upon said windlass-shaft, an adjustable lowering-cable sheave mounted upon said base-frame, a lowering-cable, having one end secured to said last-mentioned drum and the other end to the shank of said adjustable sheave, and passing around the said adjustable sheave, and said centrally-disposed lowering-cable sheave, substantially as described.

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