H. B. WILSON.

AUTOMATIC STARTER FOR TANK FILLING APPARATUS.

APPLICATION FILED APR. 15, 1910.

1,013,713.

Patented Jan. 2, 1912.

3 SHEETS—SHEET 1.

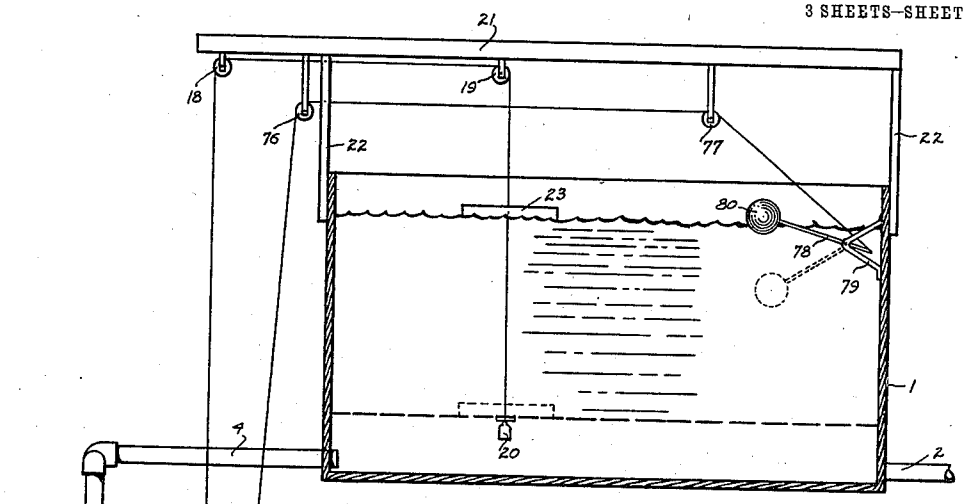
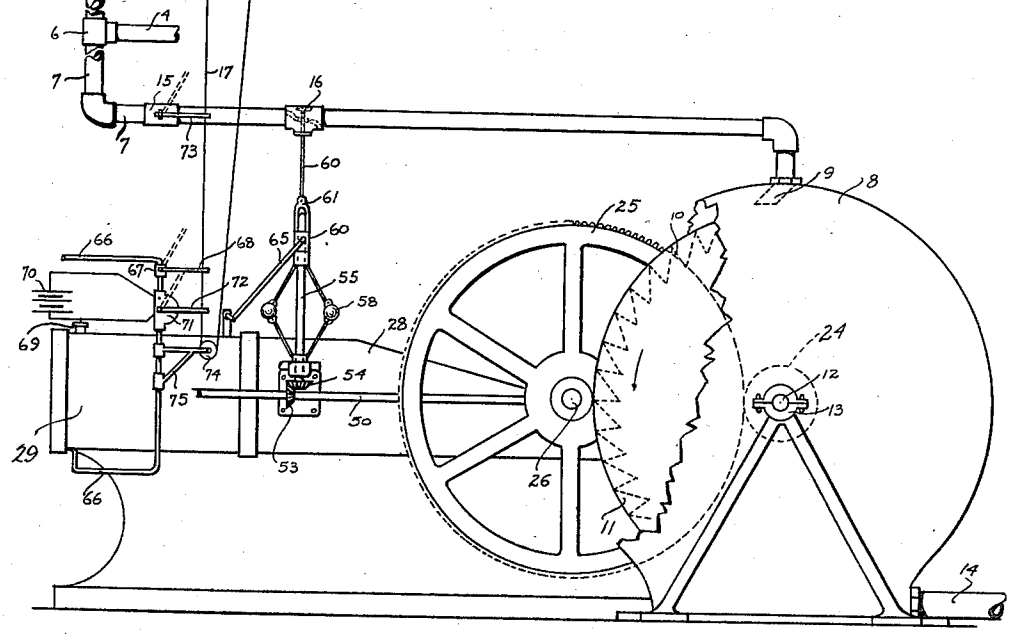


FIG. 1



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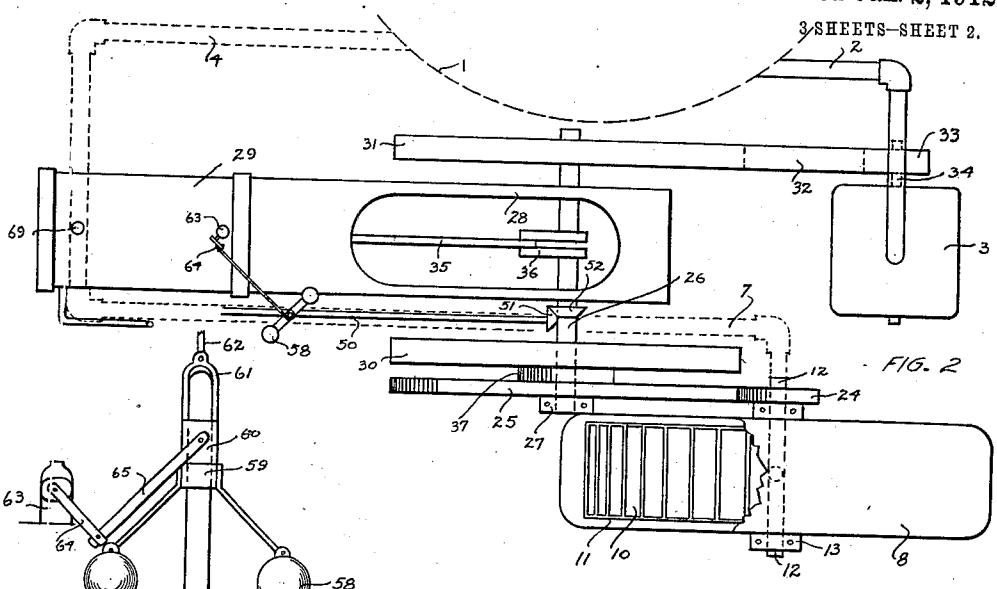

FIG. 2

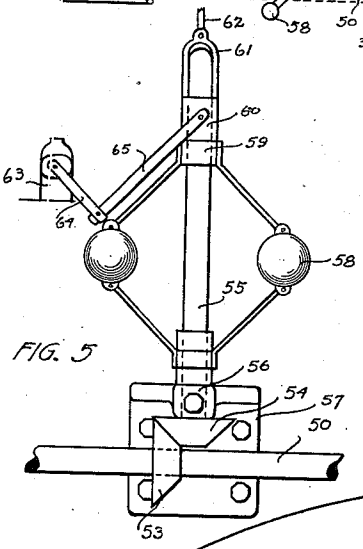

FIG. 5

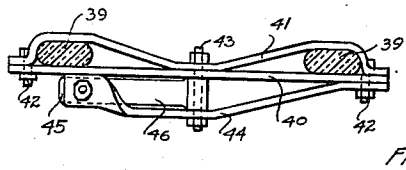

FIG. 4

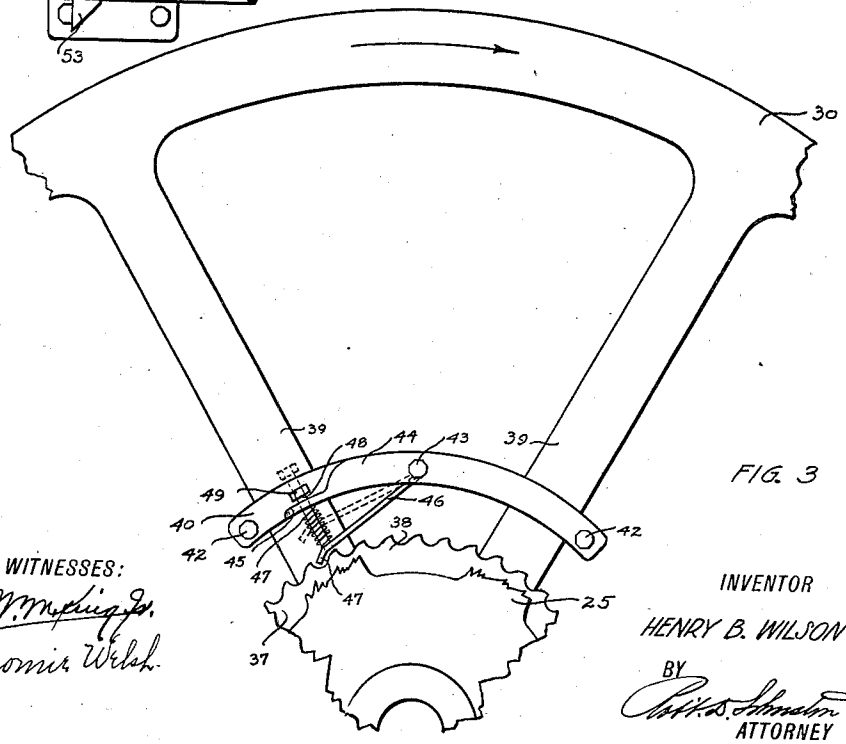

FIG. 3

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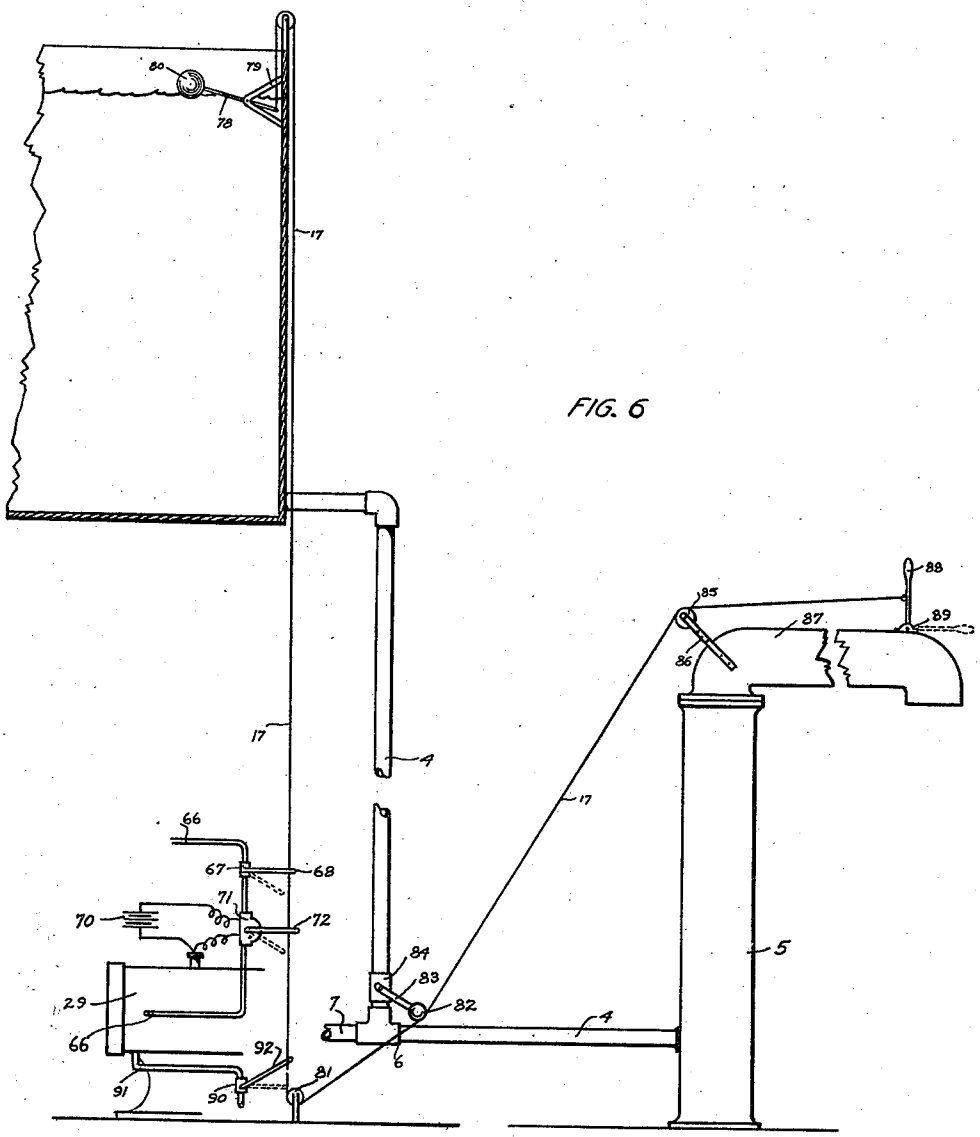

FIG. 6

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AUTOMATIC STARTER FOR TANK-FILLING APPARATUS.

1,013,713. Specification of Letters Patent. Patented Jan. 2, 1912.

Application filed April 15, 1910. Serial No. 555,609.

To all whom it may concern:

Be it known that I, HENRY B. WILSON, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented new and useful Improvements in an Automatic Starter for Tank-Filling Apparatus, of which the following is a specification.

My invention relates to tank filling mechanism particularly designed for use in connection with railroad tanks and has for its object to provide a starting means for a gasolene or like motor which drives the feed pump for the tank so that the motor will be started as water is drawn from the tank and will be automatically stopped after the tank has been pumped full again.

More particularly my invention involves first the provision of a water motor preferably driven by a jet of water from the tank and suitably connected up to the gasolene engine so as to automatically start the same when water is admitted to the water wheel.

A further object of my invention is to provide a novel clutch mechanism by means of which the water wheel is automatically disconnected from the motor after the latter comes to speed under its own power.

A further object of my invention has for its view to prevent the needless waste of water in the water motor and to this end I provide a cut off valve in the supply pipe to the water motor which interrupts the flow of water to that motor as soon as the gasolene engine starts up under its own power.

A further object is to make the starting up of the gasolene motor easier by reducing the compression in the cylinder until the motor starts.

In order to simplify the entire mechanism, I connect up the gasolene valve, the switch, controlling the electric sparking circuit, and the supply valve to the water motor, and provide a float in the tank which automatically pulls said valves and switch to a closed position and stops the power mechanism after the tank is filled. I may use a second float to pull these same parts, as the water level drops in the tank, to start the motor, or these parts may be pulled open by hand when water is drawn from the tank.

My invention further consists in the features of construction and novel arrangement of parts hereinafter described and more particularly pointed out in the claims, reference being had to the accompanying drawings in which similar reference numerals refer to similar parts, and in which:—

Figure 1 is a side elevation of the gasolene and water motors with the tank shown in section. Fig. 2 is a top plan view of the power apparatus. Fig. 3 is an enlarged detail view of the automatic clutch shown with the gear wheel broken away. Fig. 4 is a detail view of the clutch. Fig. 5 is a detail view of the governor for automatically shutting off the water to the water turbine and also for controlling the compression in the cylinder. Fig. 6 is a view of the modified form of my invention in which the water motor and gasolene motor are started manually and are cut off automatically, the power mechanism being omitted from this figure.

The tank 1 may be of any suitable construction and is provided with an inlet pipe 2 leading from the pump 3, and an outlet pipe 4 leading to a stand pipe 5 beside the track. A suitable coupling 6 is interposed in the pipe 4 and a branch pipe 7 leads therefrom to a water turbine 8. The pipe 7 connects with a nozzle 9 which discharges the water in a jet against the brackets 10 of the water wheel 11, which is suitably mounted upon a shaft 12 supported in bearings 13 carried by the turbine shell. A discharge pipe 14 carries off the water from the turbine. I provide two valves 15 and 16 in the pipe 7, the valve 15 being between the valve 16 and the tank and being connected to a cord or chain 17 which passes up over pulleys 18 and 19 and is connected at its end to a weight 20 which hangs down in the water in the tank. The pulleys 18 and 19 are connected to a cross piece 21 supported above the tank by the bars 22. A float 23 slides up and down the cord 17 and when the water level drops sufficiently for the float to engage the weight 20 it will pull the water valve 15 open and admit water to the turbine, the valve 16 standing open when the power apparatus is not in service.

When the water jet strikes the water wheel 11 it revolves it in the direction of the arrow, turning with it a gear wheel 24 keyed on the shaft and meshing with a large gear wheel 25 mounted loosely upon a crank shaft 26 mounted in an outboard bearing 27 and also supported in bearings in the main

bed plate 28 of the gasolene motor 29. This crank shaft 26 carries a fly-wheel 30 spaced inwardly from the gear wheel 25 and between it and the bed plate 28. On the other side of the bed plate a fly-wheel pulley 31 is connected to the shaft 26 and by means of a belt 32 and a pulley 33 it transmits motion to the shaft 34 of the pump 3. The piston rod 35 of the gasolene motor is connected to the crank 36 of the shaft 26. Between the fly-wheel 30 and the gear wheel 25 is interposed a small gear wheel 37 which is integral with or rigidly connected to the gear wheel 25 and rides loosely upon the shaft 26. This gear wheel 37, as seen in Fig. 3, has teeth 38 having abrupt faces disposed to the right, or in the direction of its rotation, and sloping faces disposed to the left. This gear wheel 37 forms part of a centrifugal clutch mechanism which is constructed as follows: Upon two adjacent spokes 39 of the fly-wheel 30 I clamp two metal bars 40 and 41, the bars being preferably arcuate in side elevation and the bar 41 being bowed in at the center and bent around the spokes at each end and the two bars being bolted together at their ends by the bolts 42 and at the center by a bolt 43 so as to tightly clamp the interposed spokes 39. The bolt 43 extends on through a third bar 44 which is connected to the other bars by the right hand bolt 42, from which point it is bent outwardly at an angle toward the gear wheel 25 to a point near where the bolt 43 passes through it, from which point the bar 44 extends parallel to the bar 40 and is then twisted so that its end 45 stands in a horizontal plane. A dog 46 is pivotally mounted on the bolt 43 and interposed between the bars 40 and 44. It has its end bent downwardly at 47 to engage the teeth 38 or the gear 37, being normally pressed into engagement with said teeth by a coiled spring 47 which surrounds a pin 48 connected to the upper end of the dog 46 and passing upwardly through a suitable aperture in the end 45 of the plate 44. A nut 49 serves as an adjustable stop to limit the inward movement of the dog 46. This dog hangs at an angle and the slot in the pin 48 is sufficiently large so that when the speed of the fly-wheel reaches a certain predetermined point, centrifugal force will cause the dog to fly outwardly, thereby disengaging itself from the gear wheel and assuming the position shown in dotted lines in Fig. 3, when the water wheel or turbine is completely disconnected from the power driven pumping apparatus. I prefer to have this clutch automatically disengage the water turbine from the gasolent motor as soon as the latter gets into operation under its own power. While this is my preferred means for effecting an automatic disengagement between the starting mechanism and the power driven machinery, I nevertheless want it understood that I do not desire to be limited to this particular form of mechanism as the end desired may be obtained by various modified or analogous constructions.

To economize the water consumption in the starting mechanism, I provide a shaft 50 mounted in suitable bearings (not shown) alongside of the gasolene motor and connect to one end of it a gear wheel 51 which meshes with a gear 52 on the shaft 26. This shaft 50 carries a second beveled gear 53 (Fig. 5) which meshes with a beveled gear 54 connected to the lower end of a shaft 55 mounted in bearings 56 on a plate 57 bolted to the motor frame 28. A suitable governor mechanism is driven by the shaft 55 comprising weights 58 and the upper sliding sleeve 59, which transmits motion to a collar 60 which is connected through a yoke 61 and rod 62 to the valve 16. It follows that as the gasolene engine speeds up the governor weights will draw together and will move the valve 16 to a closed position, holding it closed so long as the motor is running, thereby preventing useless waste of water.

To facilitate starting, I provide a pet-cock 63 which controls the compression in the cylinder and I provide a crank arm 64 connected to said pet-cock and at its outer end swivelly connected by a link 65 to the sleeve 60 of the governor. When the motor is ready to be started up and the parts are in the position shown in Fig. 5, the pet-cock is slightly opened to reduce the compression in the cylinder. As soon as the motor starts up the governor lifts the link 65 and closes the pet-cock, thus restoring the full compression. The pet-cock is adjusted to open sufficiently to make the starting easy without interfering with the proper suction effect of the piston in drawing in an explosive charge. Gasolene is supplied to the engine through a pipe 66 under control of a valve 67 of any desired construction having a crank arm 68. Electric current for the spark plug 69 is supplied by a battery 70 under control of a switch block 71 and a switch arm 72.

In the construction shown in Fig. 1, where the entire apparatus is made automatic, I continue the cord 17, after connection to the crank 73 for operating the valve 15, to connect with the crank 68 and arm 72, and after passing around a pulley 74, journaled in a bracket 75 mounted on the gasolene pipe, said cord passes back up to the top of the tank and around pulleys 76 and 77 and connected to the outer end of a float stem 78, which is journaled at an intermediate point in a bracket 79, suitably connected to the side walls of the tank near the normal water level, and carries at its free or inner end a float 80.

In operation, when water is drawn off

through pipe 4, the water level falls until the float 80 releases its tension on the cord 17. The float 23 follows the water level until at a predetermined point, which may be varied to suit conditions, it engages the weight 20 and pulls the cord 17 up, raising the crank arms 68 and 73 and switch arm 72 to the position shown in dotted lines (Fig. 1), when the valve 15 is opened to admit water to the turbine, the valve 67 is opened to admit gasolene to the engine, and the switch arm 72 is moved to close the sparking circuit. The jet of water will rotate the turbine and transmit motion through the gears 24 and 25 to the gear 37, which in turn through the dog 46 will cause the fly-wheel 30 to rotate until the engine starts up. As the water rises in the tank, the float 80 will rise until at a predetermined point it exerts a pull on the cord 17 which moves the valves 15 and 67 into their closed positions and opens the sparking circuit.

In Fig. 6 instead of having the mechanism started up by the float 23, I extend the cord 17 down around a pulley 81 and then up to connect to a weight 82 provided at the outer end of a crank 83 for a valve 84 in the pipe 4, which here controls the flow of water to both turbine and stand pipe. From the weight 82 the cord 17 extends up and over a pulley 85 journaled in brackets 86 connected to the discharge spout 87 of the stand pipe 5. After passing over the pulley 85 the cord 17 is connected to a lever 88, pivoted to the bracket 89 fastened near the end of the discharge spout.

In practice, when the spout is in position to discharge water into the tank of the locomotive, the lever 88 is pulled lifting the weight 82, opening the valve 84 and pulling the switch arm 72 and crank 68 downwardly (the valve 67 and switch box 71 being in this view inverted from their position in Fig. 1), thereby opening the gasolene valve and closing the sparking circuit. As soon as sufficient water has been drawn from the spout the lever 88 is released when the weight 82 immediately drops pulling the valve 84 closed but leaving the valve 67 and the switch 71 in unchanged positions and the gasolene motor running. When the tank has filled, the float 80, through the mechanism described, pulls the parts to the full line position shown and cuts the motor out of service. If desired a valve 90 may be interposed in the water circulation pipe 91 for the motor and controlled by a crank arm 92, which is also connected to the cord 17 so that the water circulation to the motor may also be automatically cut off along with the gasolene supply.

In the foregoing specifications I have described several preferred forms of my improved mechanism for accomplishing the objects I have in view, but I do not desire to be limited to the detail construction of the mechanism shown as many changes may be made without departing from the spirit of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In an apparatus for maintaining water in tanks, the combination of an explosive engine driven pumping outfit, and a starting mechanism for the explosive engine comprising a water wheel, means to deliver a stream of water thereto, means to transmit motion from said water wheel to said explosive engine to start same, centrifugal clutch means to automatically disconnect the water wheel from said engine as the latter speeds up under its own power, and means to automatically cut off the flow of water to said water wheel as soon as said engine has started up.

2. In an apparatus of the character described, an explosive engine, a water motor for starting said engine, power transmission means whereby said motor will impart motion to said engine to start it up, and a clutch mechanism interposed in said transmission means between motor and engine and comprising a revolving element which, responsive to a predetermined centrifugal strain, will move to open the clutch and disconnect the motor and engine, substantially as described.

3. In an apparatus of the character described, an explosive engine having a crank shaft, a water motor for starting said engine, power transmission means whereby said motor will turn the crank shaft of said engine to start it up, and a clutch mechanism interposed in said transmission means and comprising a revolving element which, responsive to a predetermined centrifugal strain, will move to open the clutch and disconnect the motor and engine, substantially as described.

4. In an apparatus of the character described, the combination of an explosive engine for driving a pump, a water motor for starting said engine, speed responsive means to reduce the compression in the engine when it is being started up and to automatically restore said compression after the engine has started, and means to automatically disconnect said starting motor and engine only when the latter is running under its own power.

5. In an apparatus of the character described, the combination with a water tank, a pump and pipe leading therefrom to supply water to the tank, a pipe leading from the tank to a point of use, a water motor, a pipe leading to said tank and supplying water to said motor, a float for said tank, a valve in the water motor supply pipe, means to transmit motion from said float to open

said valve as the water level in the tank falls, an explosive engine for driving said pump, means also controlled by said float to admit the explosive mixture to said explosive engine, a speed governor driven by said engine, a valve controlled thereby to shut off the supply of water to the water motor only when the explosive engine has been started and is running under its own power, and means to automatically cut off the gasolene supply of said motor after the tank is filled.

6. In an apparatus of the character described, the combination with a water tank, a pump and pipe leading therefrom to supply water to the tank, a pipe leading from the tank to a point of use, a water motor, a pipe leading to said tank and supplying water to said motor, a float for said tank, a valve in the water motor supply pipe, means to transmit motion from said float to open said valve as the water level in the tank falls, an explosive engine for driving said pump, means also controlled by said float to admit the explosive mixture to said explosive engine, a speed governor driven by said engine, a valve controlled thereby to shut off the supply of water to the water motor only after the explosive engine has been started and is running under its own power, and a second float operatively connected to said water valve and said admission means for the explosive mixture to cut said explosive motor and engine out of service when the tank is filled.

7. In an apparatus of the character described, a water tank, a discharge pipe connected with said tank, a water motor also connected with said tank, a valve controlling the supply of water from the tank to said motor and discharge pipe, means tending to hold said water valve closed, an explosive engine, a pipe conveying explosive mixture to said engine, a valve therein, a float in said tank, and a cord connecting said float to said latter valve and to said water valve, and a connection from said water valve to a point near said discharge pipe by means of which said water valve and valve in the supply pipe for the engine may be pulled open by hand, said water valve automatically closing itself when not held open by said means, and said float automatically closing said valve in the supply pipe for the engine when the tank is filled, substantially as described.

8. The combination with a water tank, of a stand pipe, a water turbine, a pipe leading from said tank to said turbine and stand pipe, a self closing valve in said pipe, a gasolene engine and a pump driven thereby for filling the tank, a valve in the gasolene supply pipe for the explosive engine, a valve in said water pipe, a float in said tank, and a pull rope leading from said stand pipe to said water valve and gasolene valve and connected at the other end to said float, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

HENRY B. WILSON.

Witnesses:
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ANNIE L. PEACE.