No. 866,201. PATENTED SEPT. 17, 1907.

H. E. HOLLEY.

SPRAYER.

APPLICATION FILED JULY 30, 1906.

4 SHEETS—SHEET 1.

Fig. 1.

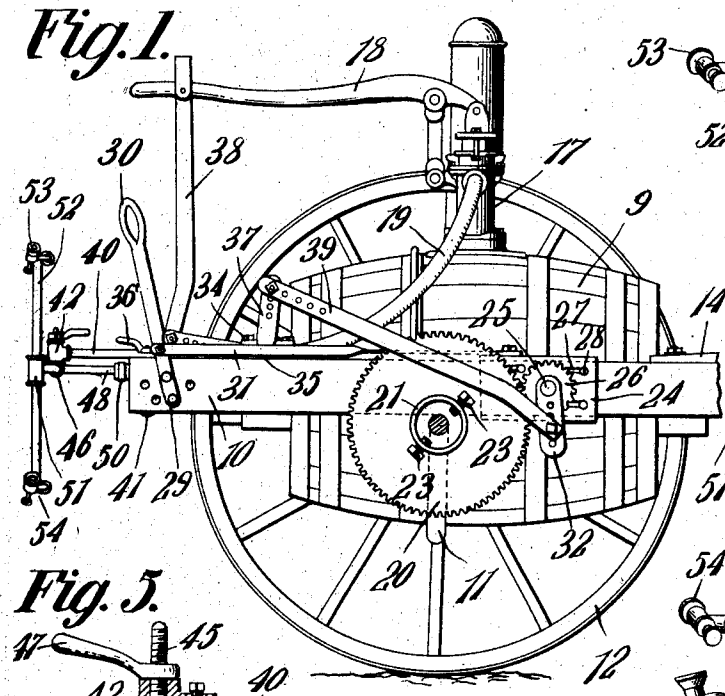


Fig. 3.

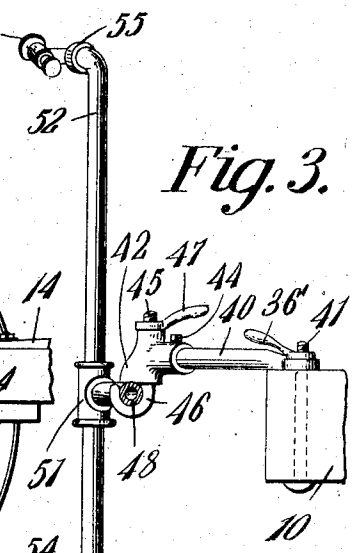


Fig. 5.

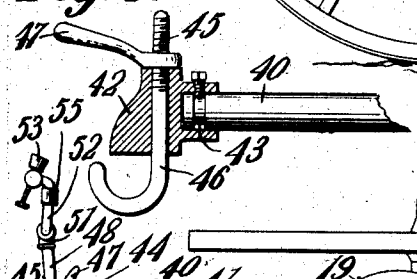


Fig. 4.

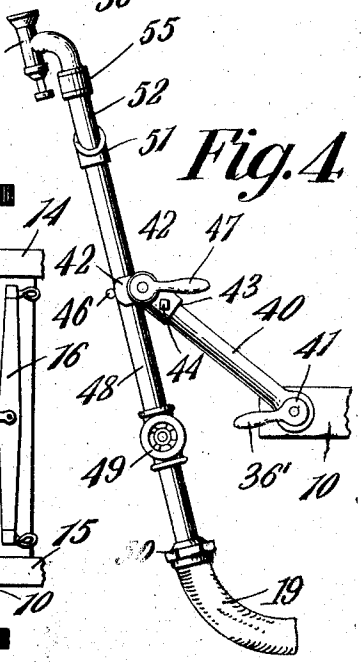
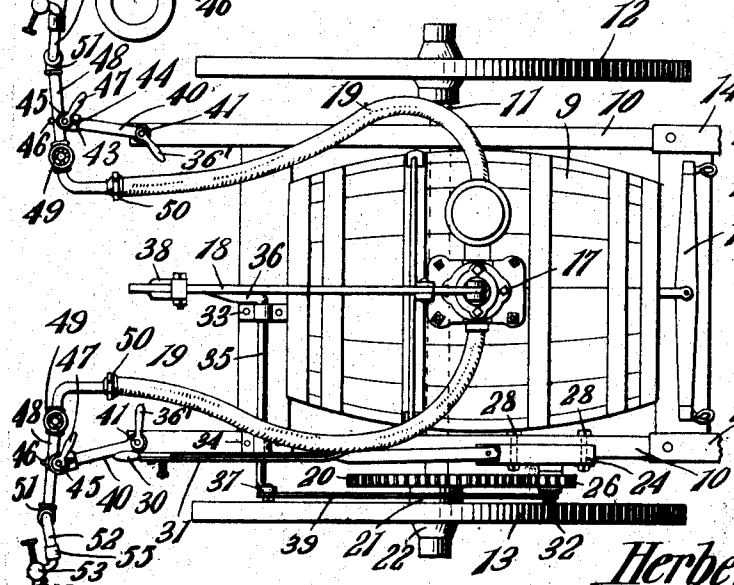


Fig. 2.



WITNESSES:

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4 SHEETS—SHEET 2.

Fig. 6.

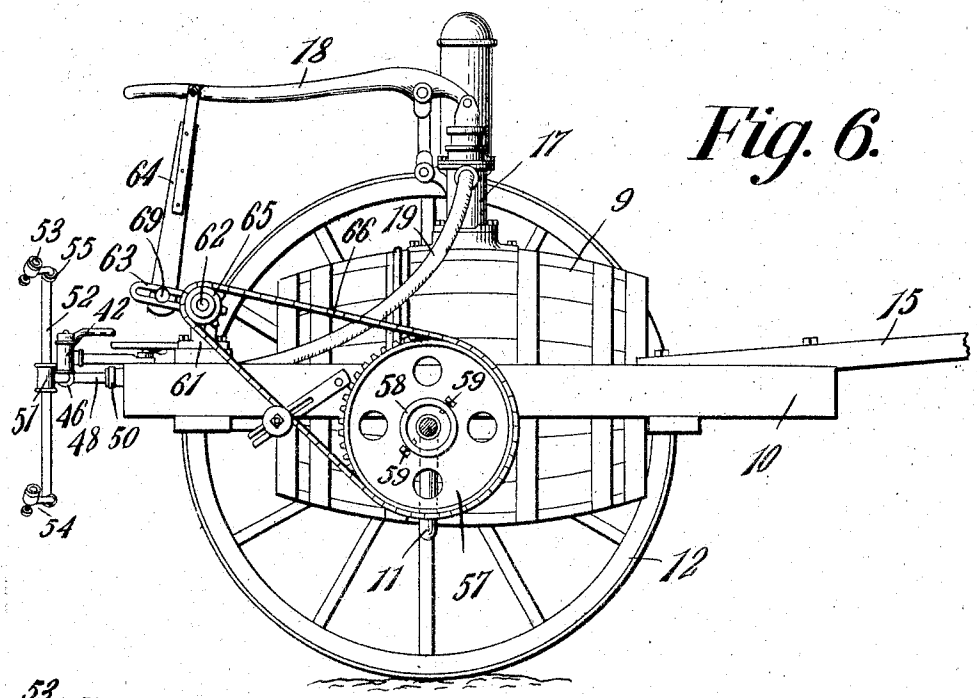
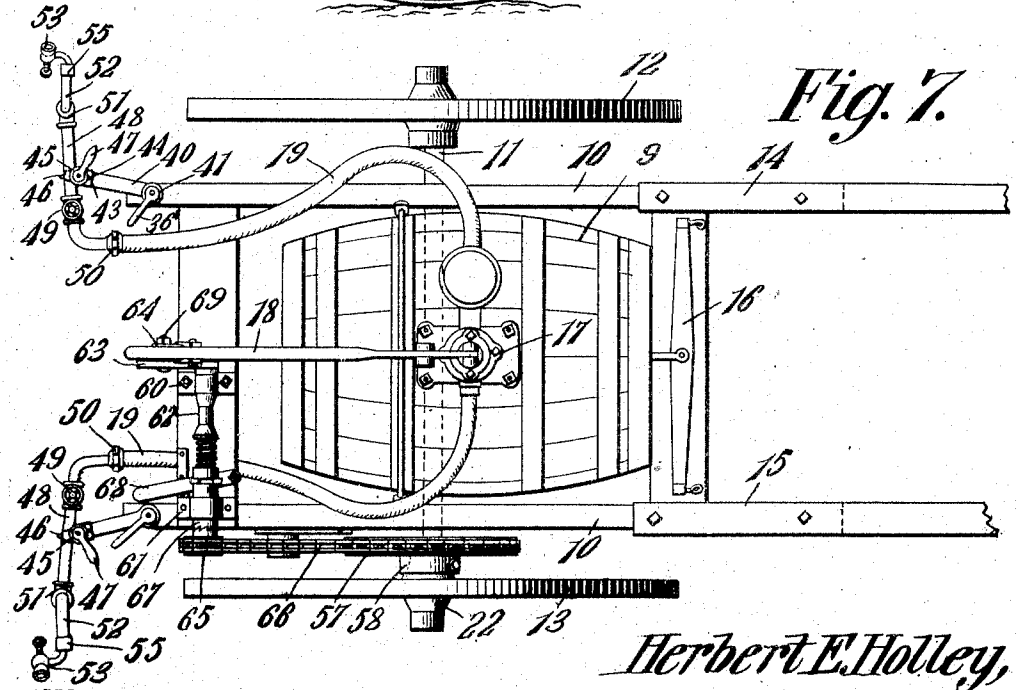


Fig. 7.



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No. 866,201. PATENTED SEPT. 17, 1907.

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4 SHEETS—SHEET 3

Fig. 8.

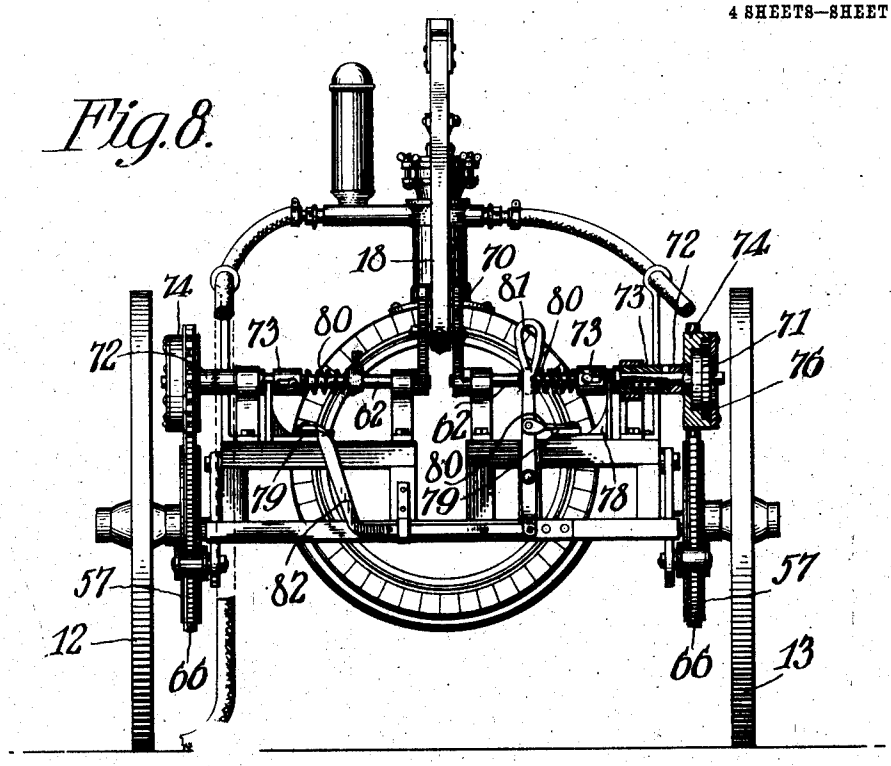


Fig. 9.

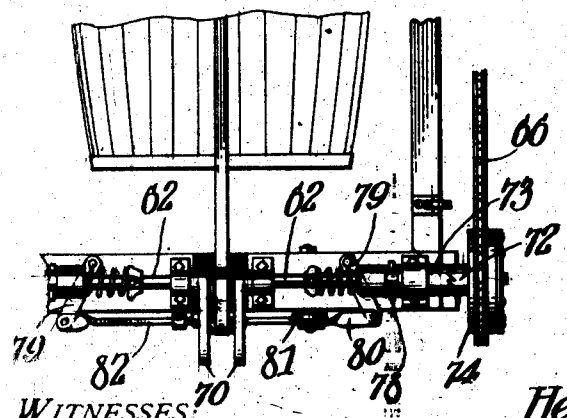
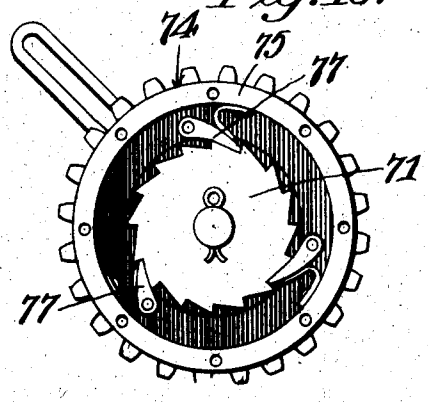


Fig. 10.



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ATTORNEYS

No. 866,201. PATENTED SEPT. 17, 1907.

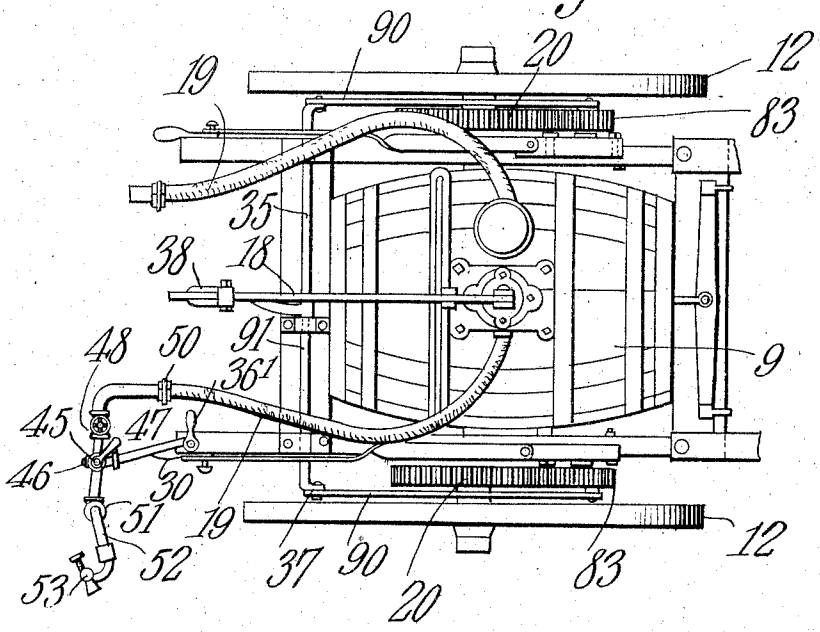
H. E. HOLLEY.

SPRAYER.

APPLICATION FILED JULY 30, 1906.

4 SHEETS—SHEET 4.

Fig. 11.



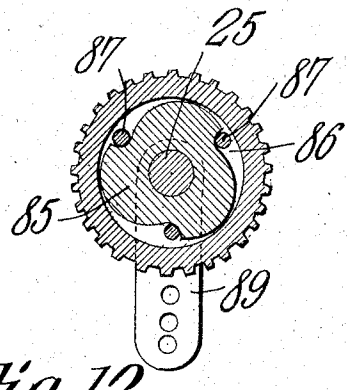


Fig. 12.

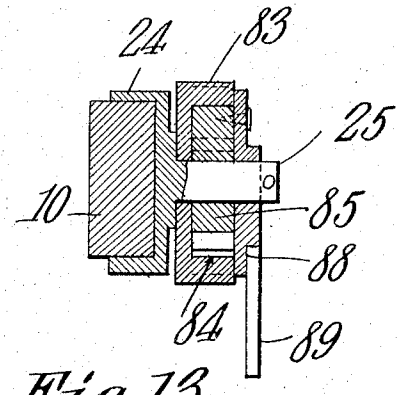


Fig. 13.

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Herbert D. Lawson.

By C. A. Snow & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

HERBERT E. HOLLEY, OF PULTENEY, NEW YORK.

SPRAYER.

No. 866,201. Specification of Letters Patent. Patented Sept. 17, 1907.

Application filed July 30, 1906. Serial No. 328,426.

To all whom it may concern:

Be it known that I, HERBERT E. HOLLEY, a citizen of the United States, residing at Pulteney, in the county of Steuben and State of New York, have invented a new and useful Sprayer, of which the following is a specification.

This invention relates to apparatus for spraying trees, shrubs and growing plants of various kinds, and has for its object to improve the construction and increase the efficiency of devices of this character.

With these and other objects in view, which will appear as the nature of the invention is better understood, the invention consists in certain novel features of construction as hereinafter fully described and claimed.

In the accompanying drawings forming a part of this specification and in which corresponding parts are denoted by like designating characters, is illustrated the preferred form of the embodiment of the invention capable of carrying the same into practical operation, it being understood that various changes in the form, proportion and minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention within the scope of the appended claims.

In the drawings:—Figure 1 is a side elevation with one of the ground wheels removed and the axle in transverse section. Fig. 2 is a plan view. Fig. 3 is an enlarged detail elevation, partly in section, of one of the spray nozzle devices and its adjusting mechanism. Fig. 4 is a plan view of the parts shown in Fig. 3. Fig. 5 is an enlarged sectional detail of a part of the sprayer adjustment. Figs. 6 and 7 are views similar to Figs. 1 and 2, illustrating modifications in some of the parts. Fig. 8 is a rear elevation showing another modified form of machine, parts thereof being shown in section; Fig. 9 is a plan view of a portion of the rear end of said machine; Fig. 10 is an enlarged side elevation of one of the sprockets with its cap removed; Fig. 11 is a plan view of a machine similar to that disclosed in Fig. 1, the same being shown provided with mechanism for driving the pump from both supporting wheels; Fig. 12 is an enlarged section through the clutch of one of the gears of the driving mechanism; Fig. 13 is a transverse section through said gear and the clutch therein.

The improved device comprises a supporting frame 10 having a depending axle 11 carrying ground wheels 12—13, and provided with means such as thills 14—15 and whiffletree 16 for the draft animal. Supported within the frame 10 and within the bend of the axle is a receptacle 9 for the spraying liquid, the receptacle preferably being in barrel or cask form as shown. A pump 17 of suitable construction is mounted upon the receptacle and provided with an operating lever 18 and with one or more discharge members, preferably in the form of flexible hose, as shown at 19. The pump is designed to be operated from the ground wheels and the operating means may be coupled to one or both of the wheels, but for the purpose of illustration is shown connected to one wheel only and embraces in its simple form a relatively large gear wheel 20 connected in any suitable manner to the ground wheel 13, as, for instance, by means of a collar 21 for bearing over the hub 22 and secured in position by set screws 23. Slidably disposed upon the frame 10 is a base plate 24 having a stub shaft 25 for receiving a smaller gear 26 adapted to engage the large gear 20 when the plate 24 is in one position and be disconnected therefrom when the plate is disposed in its other position. The base plate 24 is provided with spaced slots 27 through which cap bolts 28 extend into the frame 10, and thus provide efficient means for supporting the plate in position adjustably. Pivoted at 29 upon the frame 10 is a lever 30, and connecting this lever with the plate 24 is a rod 31, so that the plate together with the gear 26 carried thereby may be operated. A crank arm 32 is connected to the stub shaft 25, and mounted in bearings 33—34 on the frame 10 is a counter shaft 35, the latter having crank arms 36—37 at its ends. The crank arm 36 is connected to the pump lever 18 by a rod 38 and the crank arm 37 is connected to the crank arm 32 by a rod 39. The crank arm 32 is comparatively short and the crank arms 36—37 comparatively long, so that the shorter crank arm in making a complete revolution, only vibrates the longer crank arms and imparts the requisite movement to the pump lever. All of the crank arms are provided with graduated apertures, so that the rods 38—39 may be adjusted to regulate the throw of the pump handle, and thus correspondingly control the strength of the discharge from the nozzles. By this means the pump will be operated as the frame 10 with its attachments is drawn over the ground.

The frame 10 extends rearwardly of the pump operating mechanism and upon this extended portion of the frame the spraying devices are supported. Any required number of these spraying devices may be employed, but for the purpose of illustration two of such devices are shown, but as they are precisely alike, the description of one will suffice for both. The sprayer supporting means consists of an arm 40 swinging from the frame 10 and adapted to be clamped in any desired position by bolt 41 having a lever nut 36′, and with a head 42 swiveled as at 43 upon the arm and adapted to be locked in any desired position relative thereto as by a set screw 44. Extending through the head 42 is a bolt 45 having a hook or clip 46 at one end and a clamp lever nut 47 at the other end. The hooked clip 46 is designed to receive a tubular section 48 provided with a controlling valve 49 and to which one of the hose members 19 is cou-

pled as at 50. Connected at 51 to the outer end of the tubular member 48 is a vertical branch 52, to the opposite ends of which spray nozzles 53—54 are connected by swivel joints as at 55—56. By this arrangement the nozzles can be directed to project the spraying liquid in any desired direction, and at any angle relative to the frame 10, as will be obvious.

The arms 40 being adjustable horizontally upon the frame 10, the heads 51 being rotatively adjustable upon the arms, the tubular members 48 being adjustable both longitudinally and rotatively upon the heads, and the nozzles being rotative upon the tubular members, the nozzles can be adjusted to any desired point within the range of the parts, to direct the spray in any required direction and thus adapt the apparatus to any size or species of plant.

The apparatus is designed more particularly for use in vineyards, but is equally as efficient for spraying potatoes or like vegetation, trees, shrubs, bushes and the like.

In Figs. 6 and 7 a modified construction of the driving mechanism is shown consisting in a chain driven mechanism in place of the gear driven mechanism shown in Figs. 1 and 2. The modified construction consists of a chain wheel 57 connected in any suitable manner to the ground wheel 13 as by a sleeve or shell 58 bearing over the hub 22 and connected thereto by set screws 59. Mounted for rotation in bearings 60—61 upon the frame 10 is a counter shaft 62 having a crank arm 63 at one end and connected by a rod 64 to the pump handle 18 and with a chain wheel 65 at the other end to receive a chain 66 from the chain wheel 57. A clutch 67 of suitable construction is arranged upon the shaft 62 and operated by a shipper lever 68, to connect and disconnect the chain wheel 57. The crank 63 is slotted longitudinally to enable the clamp bolt 69 of the connecting rod 64 to be adjusted to control the throw of the pump lever 18, and thus regulate the force of the stream discharged from the pump.

In Figs. 8 and 9 is shown another modification which is somewhat similar to that shown in Figs. 6 and 7 with the exception that the drive mechanism is duplicated. It will be noticed that two shafts 62 are provided, the same extending in opposite directions from the crank arms 70 arranged at opposite sides of the lever 18 and pivotally connected to it. A ratchet wheel 71 is arranged at the outer end of each shaft 62 upon a sleeve 72. Each sleeve is adapted to be engaged by a clutch 73 mounted on the shaft 62 in the manner shown and described in connection with the construction set forth in Figs. 6 and 7. A sprocket 74 is loosely mounted on each sleeve 72 and has a circular flange 75 extending therefrom and across the toothed face of the ratchet wheel 71. A ring 76 is secured to the flange 75 so as to overlap the teeth of the ratchet wheel. Spring pressed pawls 77 are pivoted within the gear and normally engage the ratchet wheel so that when the sprocket is rotated in one direction the sleeve is caused to revolve therewith, but when rotated in the opposite direction the pawls will slip over the ratchet and the sleeve will remain stationary. The sprockets 74 are driven from the sprockets 67 by chains 66. By providing this particular connection between the sprockets 74 and the shafts 62 the power for driving the pump lever may be derived from both wheels 12 and 13 or either of them if the machine is being turned and one of the wheels therefore rendered practically stationary. In order that both sprockets 74 may be simultaneously thrown into or out of engagement with their shafts, I provide slides 78 which engage the clutches 73 and are connected to pivoted levers 79. One of these levers is connected by means of a link 80 with an operating lever 81, while an angular arm 82 connects the other lever 79 with said lever 81, as shown in Fig. 8. It will therefore be obvious that by swinging the lever in one direction both clutches will be moved into engagement with the sleeves 72, and by moving the lever in the other direction the sleeves will be simultaneously disengaged.

It will be understood that the pawl and ratchet mechanism shown in Figs. 8 and 10 is not essential to the operation of the machine for the reason that the clutch members will slip should one of the wheels 12 and 13 rotate faster than the other. Should the drive mechanism shown in Fig. 1 be duplicated it would be necessary to provide some form of ratchet mechanism within the gear 26 and said mechanism may be similar to that shown in Figs. 8 and 10 but is preferably made up of roller ratchets adapted to bind upon the gear 26 and cause it to rotate the shaft 25 in one direction but to leave the shaft 25 free when gear 26 is rotated in the other direction. This modified construction has been illustrated in Figs. 11, 12 and 13, wherein the small gear 83 of the driving mechanism is shown provided with a circular recess 84 in one face and in which is revolubly mounted a disk 85 provided within its periphery with depressions 86, one wall of each depression being convex and merging gradually into the periphery of the disk. These depressions are designed to receive movable clutch elements such as rollers 87, and a plate 88 disposed upon the open face of the gear and designed to retain the rollers in position, said plate being secured to the disk. An arm 89 corresponding with the arm 32 extends from this plate. Obviously when the gear 83 is rotated in one direction it will cause the rollers 87 to ride upon the convex walls of the depressions so as to bind upon the disk and cause both the disk and the gear to rotate in unison thereby revolving the arm 89. When, however, the gears rotate in the opposite direction as when the machine is being backed or turned the rollers will move into the deepest portions of the depressions, and while the gear will rotate, the disk therein and the arm connected thereto will remain stationary. In this modified construction the gearing is duplicated at both sides of the machine and each of the arms 89 is connected to a pitman 90 connected to and designed to rock a shaft 91 corresponding with the shaft 35 hereinbefore referred to.

Having thus described the invention, what is claimed is:

1. In a spraying apparatus of the character described the combination with a receptacle, a pump communicating therewith, and means for actuating the pump; of a pivotally supported arm, means for securing said arm against movement, a head swiveled upon the arm, a clamping hook adjustably secured to the head, a longitudinally and rotatably adjustable valved tube engaged by said hook, a flexible tubular connection between the valved tube and the pump, a branch tube connected intermediate its ends with the outer end of the valved tube, and a nozzle swiveled to the free ends of the branch tube.

2. In a device of the character described the combina-

tion with supporting wheels, a frame carried thereby, a tank, a pump communicating with the tank, and independently operated mechanism for transmitting motion from either wheel to the pump when said wheel is moved in one direction only; of a pivotally supported arm, means for securing said arm against movement, a head swiveled on the arm, a clamping hook secured to the head, a valved tube engaged by the hook, a flexible tubular connection between said tube and the pump, a branch tube connected intermediate its ends with the outer end of the valved tube, and a nozzle movably connected to the free ends of the branch tube.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HERBERT E. HOLLEY.

Witnesses:
WILLARD A. PRENTISS,
FRANK G. HATHAWAY.