



1911

SPECIAL EDITION

BRACKETT, SHAW & LUNT CO.

GENERAL DISTRIBUTORS

62 N. WASHINGTON ST., BOSTON, MASS.

and SOMERSWORTH, N. H.

1882---1911

"Success Breeds Success"

THE increasing demand for our LEADER-OSPRAYMO line has encouraged us to add a large fire-proof building to our plant with more than 25,000 additional square feet of floor space. This new building, with the new machinery to be installed will enable us to double the output of our factory for 1911, and our confidence in the future is not discounted by competition or the cry of the pessimist.

The most encouraging reports have been received this year, and the almost universal verdict of complete satisfaction has stimulated our entire force to still greater effort and to deserve with larger measure the confidence and patronage of the public.

Believing with implicit confidence in the permanency of this industry we are building, not simply for to-day, but for the future, and we must have "satisfied customers" or we cannot hope for larger growth.

In all of our thirty years in this line of business we have tried very earnestly to imagine ourselves in the place of the man who is buying and then to give him the treatment which we should like to receive. This has taught us the value of the "satisfied customer" and we cannot afford to have any other kind.

Hence we solicit your patronage, with our assurance that we shall continue to make your requirements our special study, and guarantee a "square deal" to all of our patrons.

Field Force Pump Co.

ELMIRA, N. Y., Dec. 15th, 1910.

Does Spraying Pay ?

This question has been answered "YES" by many thousands of fruit farmers in the past twenty years, but it is still asked by many who have not yet learned by experience the BEST methods for most satisfactory results.

Spraying has, in fact, become the chief factor in good orchard practice, and no successful fruit grower thinks of discontinuing this very important work.

There has been much written about the comparative value of the liquid spray and the "dry dusting process" and the following questions are often asked, namely: Which is the cheaper, most effective and most easily applied? These questions have been answered as follows by Prof. Chas. S. Crandall of the Agricultural Experiment Station at Urbana, Ill., after careful experiments along these lines.

Apparent Effect of the Applications.

Foliage. During the month of July differences between plats became apparent. It was particularly noted by all who visited the orchard that the foliage of the trees upon the liquid sprayed plats was of darker color and generally of more healthy appearance than the foliage of dust sprayed and check trees. This difference in appearance of the foliage was due, in the main, to apple scab, which continued to develop on the leaves of dust sprayed and check trees, while its growth had been in great part arrested or prevented on leaves of the liquid sprayed trees.

Early in August leaves began falling from dust sprayed and check trees, and by the first of September only a few scattered leaves remained upon the trees. By the first of October these trees had entirely lost their foliage and were as bare as in mid-winter. Up to the first of October very few leaves had fallen from the trees of the liquid sprayed plats. The foliage was practically intact and as green as in early

summer. Most of the foliage was still on the trees when the work of the season was completed on October 23rd.

The whole line of plats was in full view from the much traveled highway on the west side of the orchard, and the marked foliage differences attracted attention from all who passed. There was constant demand for explanation of the observed differences and information concerning the work, viewed as an illustration of direct results from two methods of treatment as compared with no treatment, became widely disseminated.

Fruit. Differences in foliage were not the only differences observable on the plats. From casual examination of the fruit upon the trees, it was at once evident that apple scab and fruit blotch had developed freely on the dust-sprayed and check trees. Apples on these trees were, almost without exception, small, deformed, roughened and cracked by the advanced development of scab, and were totally worthless. They appeared in strong contrast with the larger, smooth, clean-skinned fruit from the liquid-sprayed trees.

A total of more than 110,000 apples were produced by 72 trees. The check plats are credited with 30,000; the liquid-sprayed plats with 46,000; the dust-sprayed plats with 33,000. Regarding the division between wind-fallen and picked apples, 50 per cent. of the total number of apples produced by the check trees were picked from the trees. For the liquid-sprayed trees the percentage of picked fruit was 79, and for the dust-sprayed trees 55. The computed gain in picked fruit over the check trees is, for the dust-sprayed trees 8 per cent., and for the liquid-sprayed trees 36 per cent.

No differences could be detected between the fruit of dust-sprayed trees and that from check trees in the amount of infection from apple scab; both lots were so badly infected that they were of no value except as evaporator stock. On the other hand, the fruit from the liquid-sprayed trees was very little marked by scab and the percentage of good barreling stock was high.

The results of this last experiment were as decisive as any obtained. They were so plain that the most casual observer could read them at a glance and understand their meaning. As an actual demonstration of the relative merits of dust and liquid spray, the experiment served a most excellent purpose. It did more, it helped to impress orchard owners with the absolute necessity of combating insects and fungi and pointed out the successful way.

With regard to the effect upon foliage the results were identical in all orchards

and in all seasons. Trees sprayed with liquid Bordeaux and Paris Green retained their foliage in healthy working condition throughout the season. Dust-sprayed and check trees may be placed together because the behavior of foliage was the same in both. Leaves began falling in July, and in early September these trees were practically denuded. This loss of foliage by dust-sprayed and check trees was due to apple scab, against which disease the dust spray was entirely ineffective. The effects of this loss of foliage are very serious. The assimilatory processes of trees are active in proportion to the working leaf surface. As leaves fall these processes diminish until brought to a stop by the entire loss of foliage, long before the work of the season should normally end. The fruit is starved, does not approach normal size and buds for the next year cannot be properly developed.

Comparing a tree which was sprayed six times with liquid Bordeaux and Paris Green with a tree which was not sprayed the difference is striking. In one case the foliage of the season is intact and doing full work; in the other, not only has the foliage of the season been lost, but in the attempt to repair the loss, buds that should have remained dormant until the next spring have been called into activity and have put forth leaves.

This extra draft upon the resources of the tree impairs vitality. The tree enters the winter in weakened condition and, while it may survive, is unprepared to bear a crop or even to make satisfactory growth the next season.

Differences in fruit were as marked as were differences in foliage. Liquid sprayed trees gave smooth fruit of good size. Dust-sprayed and check trees gave small, ill-formed fruit, badly marked by scab and of very little value even as evaporator stock.

The results of the experiments are sufficiently decisive to warrant the conclusion that dust spray is absolutely ineffective as a preventive of injury from prevailing orchard fungi, and that it is considerably less efficient as an insect remedy than is the liquid method of applying arsenites.

The effort of the orchardist may be best expended in perfecting the preparation and application of the standard Bordeaux Mixture combined with arsenites.

MAINE AGRICULTURAL EXPERIMENT STATION

BULLETIN NO. 149

DECEMBER, 1907

POTATO DISEASES IN 1907

Table showing total and net yields of potatoes per acre from the use of different fungicides.

Plot Number	Treatment	Net yield per acre (bushels)	Rot per acre (bushels)	Total yield per acre (bushels)	Per cent. of decay	Net loss in bushels per acre *	Net loss per acre at 50 cents a bushel
1	Wet Bordeaux	288	18	306	5.9		
2	Sal Bordeaux, 6 lbs	173	68	241	28.2	107	\$53 50
3	Wet Bordeaux	312	18	330	5.5		
4	Sal Bordeaux, 10 lbs.	214	57	271	21.0	66	33 00
5	Wet Bordeaux	293	28	321	8.7		
6	Check Unsprayed	112	95	207	45.9	168	84 00
7	Sodium Benzoate Bordeaux..	189	59	248	23.8	91	45 50
8	Leggett's Blight Dust, No. 2.	130	62	192	32.3	150	75 00
9	Wet Bordeaux	257	18	275	6.5		
10	Bowker's Dry Boxal	132	74	206	36.0	148	74 00
11	Wet Bordeaux	245	13	258	5.0		
12	Bowker's Boxal Paste	191	48	239	20.1	89	44 50
13	Wet Bordeaux	284	25	309	8.1		

* As compared with average net yield (280 bushels) of wet, sprayed plots 1, 3, 5, 9, 11 and 13.

By wet Bordeaux is meant properly prepared bordeaux, which consists of 50 gallons of water, 5 pounds of copper sulphate, and 5 pounds of fresh stone lime (some are using ground or hydrated lime with apparent success). The copper sulphate should be dissolved and the lime slaked in different vessels. Each solution should then be diluted with half of the water and then the *cold, dilute sulphate and milk of lime solutions quickly united and thoroughly mixed*. Never pour the concentrated solutions together as an inferior mixture is sure to result. If it is desired to increase the amount of copper sulphate used per acre, do not make a stronger mixture, but increase the number of nozzles per row or go twice over the piece in opposite directions on the rows, provided in the latter case that the nozzles are so arranged as to cover the entire width of the row at each application.

In a season like the past, 5 or even 6 treatments are necessary. More frequent and thorough spraying is necessary for early blight, and it must, as a rule, be begun quite early in the season.

Therefore, unless one has made a careful study of the different blights, and the relation of their development to weather conditions, the following rule is probably the only safe one to follow.

Begin when the tops are 6 or 8 inches high and spray every 10 days (every week if the weather is very cloudy and rainy) until the last of August or the first of September. In any event spraying must be begun some days before the average observer will detect blight on the leaves. Do not stop for rainy weather, this is just the time when spraying is most needed. Each application should be made as often as it is necessary, regardless of the weather. If the mixture is properly prepared and it once dries on the leaves, which usually takes place in an hour's time, it will withstand much more washing than is commonly supposed.

Each leaf should be covered at each spraying regardless of whether it takes 50, 100 or 150 gallons of bordeaux per acre.

On Plot 1, a measured acre produced 420 bushels of sound potatoes, and only 5 bushels of these were sorted out as below merchantable size; these were taken from one of the best spray fields in AROOSTOOK COUNTY.

Disadvantages of Dry Bordeaux.

Prof. F. C. Stewart, N. Y. Exper. Sta.

Please tell me how to make dry bordeaux to prevent potato blight, and to carry enough poison for bugs without injury to foliage. I have two to four acres, and, therefore, do not need a power sprayer. My powder gun works well.—[A. Buckingham.]

No farmer growing two to four acres of potatoes each year can afford to use dry bordeaux. Except where water is difficult to obtain, dry bordeaux has no place in potato culture. It is of but little value as a prevention of blight (see Maine station bulletin No. 149). Even with so little as four acres of potatoes a \$60 horse power sprayer will pay for itself every year on the average. If a cheaper outfit is desired I would advise a barrel spray pump mounted on a one-horse, home-made, two-wheeled cart. The nozzles may be arranged at the rear of the cart, so as to cover two to four rows at each passage; or they may be attached at the ends of two long leads of hose and directed by two men walking, while a third man pumps and drives. The latter method is expensive, but it will surely pay well.

Commence to spray when the plants are 6 to 8 inches high, and repeat every 10 to 14 days through the season, making five to seven applications in all.

IT PAYS TO SPRAY.

"In general, it has been found exceedingly profitable in any part of the State of New York to spray potatoes with Bordeaux Mixture as a preventive of blight.

A series of experiments carried on by the Geneva Agricultural Experiment Station in co-operation with numerous farmers scattered over the State, showed an average gain of 50.1-3 bushels to the acre for spraying. The average net profit from a series of five years of business experiments carried on by the Geneva station in co-operation with numerous farmers was \$19.86 per acre. The average gain in yield for six years in experiments with spraying every two weeks carried on at the Geneva station was 121.2-3 bushels. A similar series of experiments carried on by the sub-station on Long Island under drier climatic conditions showed an average gain of 60½ bushels.

This seems to be conclusive proof that the use of Bordeaux spray in preventing loss from blight is a thoroughly profitable proposition in a climate either like that of Central New York or of Long Island, where less rain prevails."

From Elmira Star-Gazette, Nov. 12, '09.

Automatic Agitators for Spray Pumps.

A volume might be written on this subject. A few words will explain their use and value.

Paris Green, London Purple, or other arsenical poisons are not soluble in water, and being much heavier, settle quickly to the bottom of the tank, and unless the spray pump is provided with an agitator, the work of spraying can be but imperfectly performed. In 1883 we conceived the idea of discharging a stream from the pump back into the tank for the purpose of agitation, and this plan was immediately adopted by other pump manufacturers, and is extensively recommended to this day. While the plan did not give entire satisfaction, it served the purpose very well until the use of Bordeaux Mixture became so generally adopted, then it was found that the lime used with the Bordeaux would settle and harden, and that a return stream discharged from the pump could not raise it from the bottom of the tank. Hence a more perfect and satisfactory means of agitation was necessary. This demand resulted in the invention of Our Automatic Mechanical Agitator, shown and described in the following pages, in connection with our Empire Queen (Fig. 62), Empire King (Fig. 63), and all power sprayers.

This invention is patented, and the patent owned by this Company. We charge nothing extra to our customers for the right to use this agitator, but no pumps except those made by this Company can be furnished with it; any others embracing this idea would be an infringement of our rights, and any persons using it liable for damages.

The above was written in 1892, when this Company was the first to introduce any form of a mechanical agitator, either on a barrel or Knapsack sprayer. The Agitator covered by our patent is perfect in its action and still leads all other forms of agitation for barrels in an upright position; it is, however, not practical for use with Knapsack Sprayers, hence we send with our Garfield Knapsack and Cornell Knapsack Sprayers, the churn dasher style of agitator which we have used with the Garfield for several years. One of the most important improvements since the invention of our Automatic Agitator, is our more recent addition of a brush which is fastened to the Agitator arm, and with every movement of the pump lever, this brush swings under the suction strainer and keeps it free from leaves or sediment, and prevents clogging the pump. This brush will hereafter be furnished with all of our Queen and King Pumps and with our Power Sprayers; it is also our exclusive patent and can be used with no other Line of Spray Pumps. Any agitator working a brush or other strainer cleaner in connection with the Pump Handle is an infringement of our patent, so be on your guard.

The Spraying Pump is now regarded as a necessary adjunct to the farm equipment. Successful fruit or potato culture is impossible without it. Like other lines of trade the manufacturers have to meet competition; hundreds of cheap, imperfect and useless pumps are offered as spray pumps. But the wise purchaser will invest only in an implement that can be depended upon to do good, efficient, satisfactory service.

We do not undertake to compete with the cheaper grade of spray pumps.

We do furnish first-class, high grade, durable pumps that are guaranteed satisfactory in every respect, and twenty-eight years experience is our warrant for seeking your patronage.

Remember, that True Economy is to Buy the Best.

Don't wait until the pump is needed before sending in your order.

Delays are dangerous, and freights are sometimes slow. Order early. It is the early spray that kills the worm, prevents fungus and destroys the scale.

HOW TO SEND MONEY.

Remittances may be made with perfect safety by Express Money Order, which can be obtained at any office of the American, Wells-Fargo & Co., Adams or United States Express Co. When these companies have no office, remit by Bank Draft on New York. Post-office Order or Registered Letters payable to us. Goods sent C. O. D. only when one fourth of the amount is sent with the order; this is simply to guarantee good faith and payment of Express charges. Do not send silver or bills except at your own risk, if lost or stolen.

The "Little Gem" Spraying Pump

IT DISCHARGES A STREAM IN THE PAIL AND KEEPS THE POISON STIRRED UP.

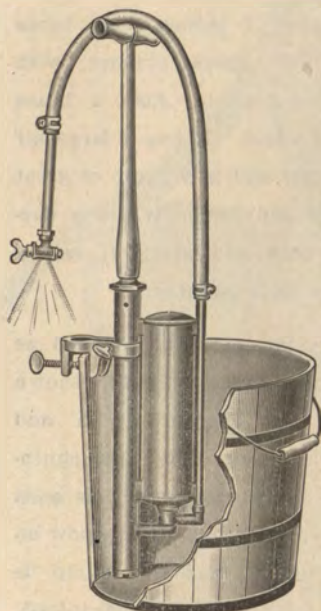


Fig. 53.

This pump is made entirely of brass, including the working parts, discharge and connecting tubes, plungers, rods and air chamber; so that all working parts that come in contact with the fluid are of brass, making it practical for using any of the insecticides, emulsions, arsenites, fungicides, or other mixtures now in common use for saving fruit, foliage and flowers from destruction by insects and fungus. It is supplied with our "Niagara Nozzle," which throws a fine, misty spray, using only a small amount of liquid to cover a large space. It has two feet of vulcanized rubber hose, to which is attached a metal hand tube, and to this the "Niagara Nozzle" is screwed. This nozzle is nicely graduated by means of a small handle, and will throw a spray of any degree of fineness.

The large capacity of the air chamber and the length of cylinder, together with the power of the inflating valves, enables it to throw a continuous stream forty feet, or a steady spray for thirty seconds or more after the operator stops pumping.

This pump is fitted with a malleable iron clamp, adjustable on the pump for pails of different heights, and is securely fastened to the pail by means of a thumb screw with a swivel washer.

This pump is neat in design, very compact, strong and durable—nothing liable to get out of repair or wear out. The entire weight of the pump complete, boxed for shipment, is 7 pounds.

PRICE, including Nozzle and two feet of hose, - - \$4.00
Additional 3-ply hose at 15c per foot.

THIS PUMP IS FITTED WITH BRASS VALVES.

There is no pail pump on the market equal to the "Little Gem." It will do more and better work than any \$6.00 pump of similar design in the United States.

SPRAYING APPARATUS.

He who attempts to grow fruits nowadays without a spraying outfit, goes into the work handicapped. Blight and bugs, rot and rust, mold and mildew all conspire to damage the crop, and in all cases succeed to a greater or less extent if the horticulturist does not spray. The very best goods in this line are made by the Field Force Pump Co., of Elmira, N. Y. Pamphlets giving formulas for all the best spraying compounds sent by them on application. Rural N. Yorker.

I have been using one of your small spraying pumps called the LITTLE GEM. This pump can't be beat for white-washing and spraying.

St. Louis, Mo., Nov. 1, '08.

Yours truly,

EDWARD BECKER.

Waterville, Dec. 27, 1901.

Field Force Pump Co.:

Gentlemen:—There is an old proverb which reads: "He that makes two blades of grass grow where but one grew before is a benefactor to mankind," therefore as you make two apples grow where but one grew before I think you should be called a benefactor to the fruit grower, as by spraying, two apples can be made to grow where only one grew before. Hoping that the coming years may be prosperous ones for you, I remain,

Very truly,

M. J. WEST.

JUNIOR EMPIRE SPRAYING PUMP



Fig. 61.

Weight, without barrel, 32 lbs. With barrel, 87 lbs.

FIG. 61, PRICES, ETC.

Pump and Out- fit A	Junior Empire Pump with single Brass Spout, with suction pipe and strainer, also with churn dash agitator for stirring liquid, no hose, nozzle or barrel.....	\$ 7.50
Pump and Out- fit B	Junior Empire Pump with Brass Spout, and with one 10 ft. lead of hose, one Niagara nozzle also with churn dash agitator for stirring liquid, no barrel.....	\$ 9.50
Pump and Out- fit C	Junior Empire Pump with Brass "Y" Spout, and 10 ft. leads of hose and two Niagara nozzles, also with churn dash agitator for stirring the liquid, no barrel....	\$ 12.50
For Shut-off Cock at Spout, add \$1.00.		
Additional 3-ply hose at 15c per foot.		

For price of casks, see page 13. For price of extension pipes, see page 14.

Port Chester, N. Y., 3-22-'10.

I have one of your Junior Empire pumps that has been used constantly for four years and it is in as good order and does as good work to-day as when I got it.

I have also used your Empire King pump which has likewise proven entirely satisfactory.

Yours respectfully,

W. M. THATCHER.

The Empire Queen Spraying Pump

WITH AUTOMATIC MECHANICAL AGITATOR.



Patented July 19, 1892, and April 17, 1900.

FIG. 62, PRICES, ETC.

**Pump and Out-
fit "A"**

Empire Queen Pump, with brass screw spout, and agitator complete, also with suction pipe and brass strainer, no hose or nozzle, no barrel

\$10.00

**Pump and Out-
fit "B"**

Empire Queen Pump with brass screw spout and agitator complete, also with ten feet best 3-ply hose and with Niagara spray nozzle and couplings, no barrel

\$12.50

For Shut-off Cock at Spout add \$1.00. For Price of Casks, see page 13.

Additional 3-ply hose at 15 cents per foot. For prices of extension pipes see page 14. These can be furnished in brass with bamboo pole, also in galvanized iron.

I bought an Empire Queen Spray Pump from you in 1906. The pump gives perfect satisfaction. I have almost destroyed the San Jose scale, and I think that if I spray once more this spring with the "lime-sulphur wash," that it will be entirely gone.

East Berlin, Pa., Mar. 30, '08.

H. B. JACOBS.

The Truck and Barrel Sprayer



Fig. 75.

This Machine consists of our Empire Queen pump, Fig 62, mounted on a barrel having a capacity of 32 gallons, together with the cart. The cart has strong iron wheels, 34 inches in diameter, and 37 inches from outside to outside of hubs, with tires $2\frac{1}{2}$ inches wide; it has strong, iron handles, and is a very convenient machine for use in small orchards or gardens, where it is impractical to drive a horse. Weight, complete as above, 175 lbs.

Pump has brass cylinder, plunger and rod, also the automatic mechanical agitator and a brush for cleaning strainer.

THE EMPIRE KING PUMP CAN BE SUBSTITUTED IN PLACE OF THE QUEEN, ADDING \$3.50 TO THE LIST PRICES.

FIG. 75. PRICES, ETC.

Pump and Out fit "A"	Truck and Barrel Sprayer, including truck cart, 32 gallon cask with Empire Queen Pump and Agitator, no hose or nozzle	\$ 21.50
Pump and Out-fit "B"	Truck and Barrel Sprayer, including truck cart, 32 gallon cask with Empire Queen Pump, with Agitator, also with ten feet of heavy hose and Niagara Spray Nozzle	\$ 24.00
Pump and Out-fit "D"	Truck and Barrel Sprayer, including truck cart, 32 gallon cask with EMPIRE KING Pump, with Agitator, and with ten feet of best three-ply hose and Niagara Nozzle	\$ 27.50

For Shut-off Cock at Spout, add \$1.00. Additional 3-ply hose at 15 cents per foot. For prices of extension pipes, see page 14.

Beach City, Ohio, May 9, '10.

I am in receipt of your catalog and prices for 1910 and thank you for same. I am still using the old iron pump that I bought of you in 1888, but this spring my renter bought an Empire King pump at a sale on my recommendation and we used it to spray our fruit trees and it works better than the one I had. I think mainly because of the agitator and strainer. At any rate I have never sprayed with so much satisfaction before. I sold one of your Watson High Pressure Sprayers last week. I think that if I had had prices sooner I would have had at least another sale to report.

Very truly yours,

M. R. WOODLING.

The "Empire King" Spraying Pump

Has AUTOMATIC MECHANICAL AGITATOR, which insures the perfect mixing of the poison and water, and an AUTOMATIC BRUSH for keeping strainer clean.

YOU CANNOT SCORCH THE FOLIAGE WITH THIS PUMP. Has a Seamless Brass Cylinder, 2½ inches inside diameter, 8 inches long, with solid brass plunger and rod, brass valves without leather or rubber, and brass screw spout with stop cock.



Fig. 63—Patented April 17, 1900.

This Agitator works in connection with cogs from the lever, connecting with a companion gear at the upper end of the steel shaft; at the lower end of the shaft is a horizontal wooden bar, to which are attached two upright paddles. Thus when the lever is moved upward or downward these paddles travel in a semi-circle in bottom of cask and prevents the poison from settling.

The Pump has a fine brass strainer at bottom of suction pipe. It also has a Brush on the agitator arm which swings under the suction strainer and keeps it clean. Hence no clogging of pump or nozzles.

This pump has a long lever, works easily and is guaranteed in every respect.

The air chamber is large, which insures an even flow, and the stop-cock on the spout is a valuable feature of this pump.

See That Brush—It Keeps The Strainer Clean.

When not wanted for spraying, the agitator may be disconnected and this pump can be used for any purpose about the farm. It will pump acid, oil or water.

See Those Paddles—They Stir and Thoroughly Mix the Poisons and Water.

Remember every King Pump (Fig. 63) is furnished with a shut-off cock and our complete Agitator and Brush, without extra charge.

Directions for mounting are furnished with each pump.

A tight cap is furnished to close one opening of the double spout, and the two leads of hose have couplings for joining them together, making one hose twenty feet long.

Weight, without barrel, 55 lbs.

With barrel, 115 lbs.

FIGURE 63, PRICES, ETC.

Pump and Out-fit "A"	Empire King Pump with single Brass Spout and Shut-off Cock; also with galvanized Suction Pipe and Brass Strainer, no hose or nozzle, no barrel.....	\$13.50
Pump and Out-fit "B"	Empire King Pump with single Brass Spout and Shut-off Cock, also with galvanized Suction and Strainer, and with one 10 ft. lead of heavy hose and one Niagara nozzle, no barrel.....	\$16.00
Pump and Out-fit "C"	Empire King Pump with double Brass Spout and Shut-off Cock, also with galvanized Suction and Strainer, also with two 10 ft. leads of hose and with two Niagara nozzles, no barrel.....	\$18.50

Additional 3-ply hose at 15 cents per foot. For prices of barrels and casks, see page 13.

Brackett, Shaw & Lunt Co.,
Boston, Mass.

Pepperell, Mass., 5-9-10,

Gentlemen:—

The Empire King Pump bought of you in April works far better than I expected. We have sprayed 250 large apple trees and find that the pump is capable of handling four nozzles nearly as easy as two. The agitator is certainly a HUMMER and does its work far superior to anything I have seen. Yours,

P. O. RICHARDSON.

EMPIRE KING SPRAYING PUMP.

MOUNTED ON A ONE HUNDRED GALLON TANK.

Pump is Fully Described on Page 11.

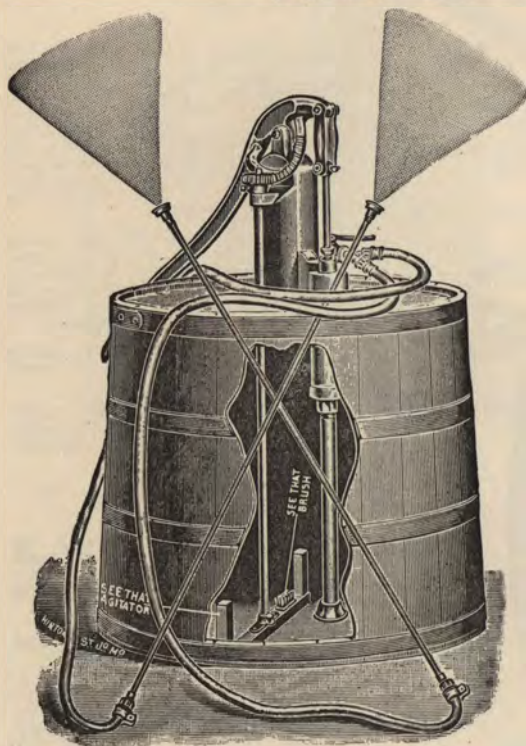


Fig. 118.

Fig. 118 "A"
Outfit

EMPIRE KING—No hose or nozzles on 100 gallon tank....

\$25.50

Fig. 118 "B"
Outfit

EMPIRE KING—With 10 ft. hose, 8 ft. bamboo brass-lined extension pipe and Tiger nozzle, on 100 gallon tank....

\$28.50

Fig. 118 "C"
Outfit

EMPIRE KING—With two 10 ft. leads of hose, two 8 ft. bamboo brass-lined extension pipes and two Tiger nozzles, on 100 gallon tank.....

\$33.00

Additional 3-ply hose at 15 cents per foot.

When several acres of orchard are to be sprayed we advise a tank holding not less than 100 gallons—it saves time in refilling the tank, and having a larger, broader bottom, it rides more steadily in the wagon. This pump has a longer lever and longer agitator arm, otherwise it is the same as described on page 11.

The following prices include the Agitator and Brush complete, also the Shut-off Cock and Spout, and the Pump will be mounted upon the tank ready for immediate use on arrival.

Weight, including tank, 170 lbs.

I expected to get a new Empire King pump long before this time but I guess with a few repairs it will be O. K.

Most any pump will spray, but the pump that will use lime, sulphur and salt for years and still work as good as when new must be good.

Our Empire King pump has been a dandy. We spray between 2,000 and 3,000 trees a year. I have never used the new cylinder, etc., I got of you three or four years ago.

Thanking you for a good pump, I remain,

Respectfully yours,

D. J. REGER.

Woonsocket, R. I., Feb. 4, '10.

The Empire King pump that we bought of you Feb. 15th, 1898, works fine and we have of late had several calls for them.

Very truly yours,

C. M. HOLLAND & CO.

Staunton, Va., June 8, '09.

I received yours of June 1st and desire to say that all of the pumps that I have sold are giving entire satisfaction and I think that the "Empire King" is superior to any pump sold in this section.

Respectfully,

J. A. FAUVER.

THE EMPIRE KING

IS HERE SHOWN MOUNTED ON A 100-GALLON NEW CASK WITH GALVANIZED PIPES AND TIGER NOZZLES FOR SPRAYING FOUR ROWS OF POTATOES.

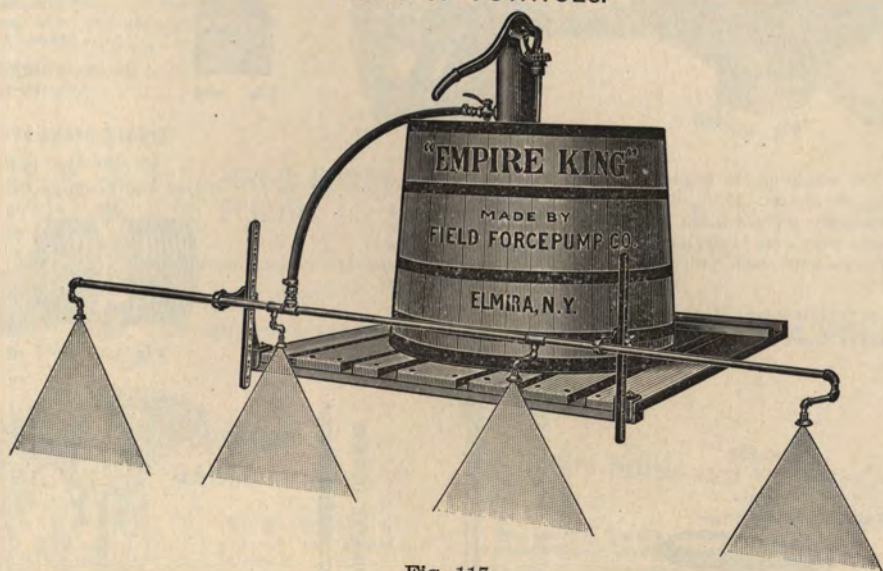


Fig. 117.

For a complete description of this Pump, see page 11.

It is shown here for the purpose of illustrating the arrangement of the nozzles for spraying potatoes, and showing also the Up-and-Down Attachments for adjusting the pipes to the growth of the vines. These fittings provide for a variation of eighteen inches up and down, and the nozzles are adjustable for rows $2\frac{1}{2}$ to 3 feet apart. See pages 11 and 12.

OUTFIT A. NO PUMP.

Price of Pipes, and four (4) Tiger Nozzles with guide attachments, brass nipple and five feet of $\frac{3}{4}$ in. hose, no pump no cask. Weight, 28 lbs.....\$ 8 00

PUMP AND OUTFIT B.

Price of Empire King with hose, nozzles and pipes as shown, (no cask); weight, 82 lbs..... 20 00

PUMP AND OUTFIT C.

Price of Empire King with hose, nozzles and pipes as shown, mounted on 50 gallon barrel; weight 150 lbs..... 24 00

PUMP AND OUTFIT D.

Price of Empire King Pump with hose, nozzles and pipes as shown, including 100-gallon cask; weight, 170 lbs..... 32 00

PRICES OF CASKS.

WE CAN FURNISH CASKS AT FOLLOWING PRICES:

50 Gallon Alcohol Barrel (not new), repainted, clean, and in good order, weight, 55 lbs.	\$ 4 00
60 Gallon Cask, new; weight 60 lbs.	8 00
100 Gallon Cask, new; weight 80 lbs.	12 00
150 Gallon Cask, new; weight 115 lbs.	16 00
200 Gallon Cask, new; weight 160 lbs.	20 00

For prices of half-round tanks, see page 29.

These casks are nicely painted and prices include expense of mounting pumps and adjusting agitator. Our Queen or King can be mounted on any of the above casks. If the water supply is a long distance from the orchard it will be economy of time to use a large cask.

FUNNEL STRAINER



Fig. 163

For straining the mixtures into the barrel. 12 in. diameter at the top x 6 in. at bottom; with cone shape center of brass wire cloth. Will not clog.

Price

Heavy Galvanized Steel \$1.85

Heavy Sheet Brass - 3.25

SHIELD For Extension Pipes.



Fig. 90.

Protects the hand and arm from the liquids which drain back down the pipe.

Galvanized

PRICE

for 1/4 inch,

20c.

If sent by mail add 5 cts. for postage.



Fig. 134

3/4 BRASS Y SPOUT

WITH CAP

For TWO Leads of Hose

Has two hose threads and one gas pipe taper thread.

PRICE,
with cap, 75c

SINGLE BRASS SPOUT.

For ONE Lead of Hose.

One end machine thread for pump; one end hose thread.



Fig. 119

Price, 40c.

Postage
5 cents.

LEAKLESS SHUT-OFF COCK All Brass.

For Extension Pipes.



Fig. 149.

1/4 inch, Price - \$.75

Postage 15 cents.



Fig. 69.

HOSE NIP

For attaching 1/4 Nozzles to Hose Couplings.

PRICE

20c.

Brass,

Postage 5 cents.

A Leakless Shut-off Cock can be furnished at the lower end of these extension pipes and is a valuable addition to the equipment. See Fig. 149 on this page for price.

GALVANIZED IRON EXTENSION PIPE. 5 ft., 50c; 8 ft., \$80c; 10 ft., \$1.00; 15 ft., \$1.50.



Fig. 121

BAMBOO EXTENSION PIPE, with brass tube. 5 ft., \$1.25; 8 ft., \$2.00; 10 ft., \$2.50; 14 ft., \$3.75.



Fig. 122



EXTRA LEAD COMPLETE.

10 ft. hose, 8 ft. galvanized iron extension pipe, double Vermorel nozzle and hand chemical shield and couplings. Price, \$5.00.

Fig. 120

CALL SPRAY NOZZLE

It has a slide as shown, and can be adjusted for fine or coarse spray, or solid stream. The spray produced is flat, fan-shaped. PRICE, $\frac{3}{4}$ -inch, 75 cts. Postage 6 cts. The nozzle screws on to a $\frac{3}{4}$ standard hose coupling.

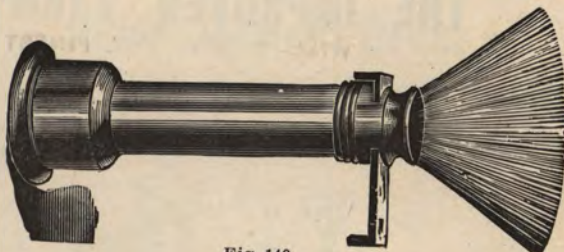


Fig. 140

BRASS M. & F. $\frac{1}{4}$ -INCH FORTY-FIVE DEGREE ELBOW



Fig. 152.

For throwing spray into tops of trees at an angle.

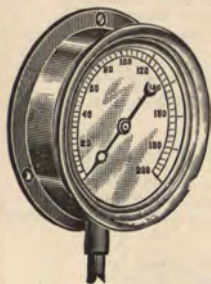
Price 30c; Postage 5c.

NINETY DEGREE M. & F. $\frac{1}{4}$ -INCH ELBOW.



Fig. 151.

Price: Iron, 15c; Brass, 30c. Postage, 5c.



PRESSURE GAUGE

Can be attached to any of our Power Sprayers.

Price, 200 lb., \$3.00.
300 lb., \$4.00.

Fig. 150.

The Dewey Nozzle

Fig. 89.

This nozzle throws a fine rotary spray, has two caps, one of which has a larger opening for orchard spraying. This is a very economical nozzle in the use of liquids. Special attention is invited to the form of construction, it having no projections to catch on the limbs.

Price: $\frac{1}{4}$ -inch, 60 cents.

Postage 6 cents.



Fig. 89.

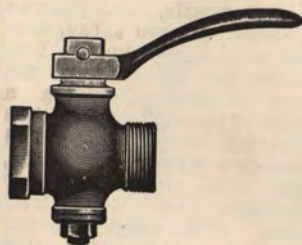


Fig. 138

$\frac{3}{4}$ BRASS

MALE AND
FEMALE

SHUT-OFF COCK

Price - \$1.00

THE TRIPLE VAPOR MIST NOZZLE

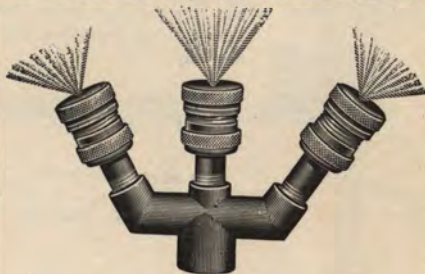


Fig. 153.

Throws three times the amount of liquid of the Single Vapor Mist Nozzle and works on the telescope principle to prevent clogging. Has no projections to catch on limbs. A splendid nozzle for rapid orchard work. Fits $\frac{1}{4}$ in. extension pipes or hose nips. Has double sets of discharge caps with large and small holes. Price, \$2.00. Postage, 10c.



Fig. 139.

The VAPOR-MIST NOZZLE

Fig. 139.

Produces a fine vapor spray by rotary motion, has no projections to catch on limbs, works on telescope principle to prevent clogging, and has TWO SETS OF CAPS with larger and smaller holes for fine and coarse spray. Can be substituted in place of any single nozzle.

PRICE: $\frac{1}{4}$ -inch, 70 cents.

Postage 5 cents.

THE IMPROVED VERMOREL NOZZLE.

WILL THROW THE FINEST MISTY SPRAY.



Fig. 116
Triple Vermorel

PRICE, \$1.75 each
Postage 15 cts.

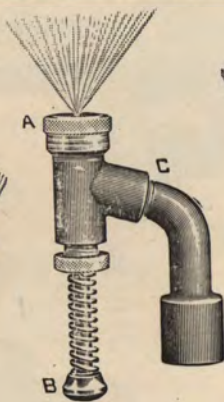


Fig. 60
Single Vermorel

PRICE: $\frac{1}{4}$ -inch with two
Caps. A, having different
size holes, 80 cts. Post-
age 6 cts. extra.

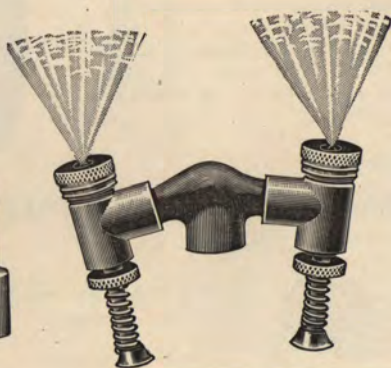


Fig. 72
Double Vermorel

This is becoming a very popular
nozzle. Specially Recommended.
PRICE: $\frac{1}{4}$ -inch, all Brass, \$1.50.
Postage 10 cts. extra.

(We are Licensed Manufacturers of these Nozzles.)

We also have Quadruple Vermorel Nozzles for \$3.00 each. Postage 20c extra.
There are two sets caps—Fine and Coarse Spray—with all Vermorel Nozzles.
[Extra Caps for Nozzles at 15c each.

This Vermorel has several important improvements. The spindle is provided with a spring, which keeps the needle point from passing into the aperture A except when the thumb is pressed upon the Broadhead B, which is done for the purpose of freeing the hole of any obstruction. This small spindle also divides and spreads the liquid to use it with the greatest economy, and at the same time produces the finest vapor spray. At C we have provided a screw joint for cleaning the nozzle should it clog. Simply unscrew and run a wire through this opening.

TIGER NOZZLE

Special Single Vermorel

Fig. 164

This is a standard single Vermorel nozzle, but with a STRAIGHT $\frac{1}{4}$ in. side outlet for use on our Hand and Power Potato Spraying Outfits only.

Price, 50 cts.

Postage 5 cts.

Be sure and specify
whether Fig. 60 or
Fig. 164, is wanted.



Fig. 146.

This is our latest im-
proved nozzle, and throws
a conical shaped spray, simi-
lar to the well known Ver-
morel, but the angle of the
cone is greater, giving a
wider "spread" and thus
covering more surface. It
throws a fine, misty spray,
and each nozzle has two
hardened steel disks with
different sized holes. When used with our
 $\frac{1}{4}$ in. brass Y it makes an extremely satis-
factory double nozzle.

Price of single nozzle, 70c. Postage 5c.

THE NIAGARA SPRAY NOZZLE

Produces a fan-shape spray, either fine or coarse, and throws a solid round stream. It is also provided with a shut-off cock.

Notice the improved shape of the handles, nothing to catch on the limbs. PRICE, $\frac{1}{4}$ inch, all Brass, 70 cents. If ordered by mail, add 6 cents for postage.

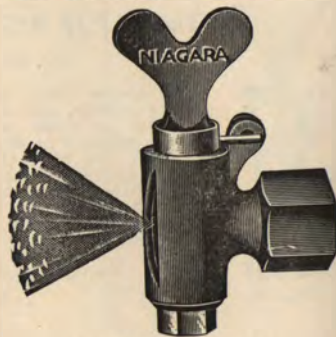


Fig. 66.

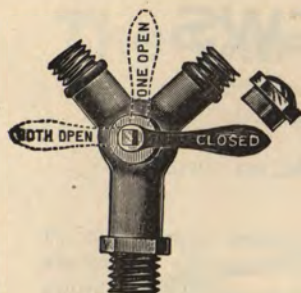


Fig. 104.

Brass 3-Way Cock.

This shows a double-hose connection for barrel spray pumps, and can be used in connection with Figs. 62, 63, 75, 61, also with Fig. 51. By its use either or both of the discharges may be opened or closed at will. The illustration indicates several positions of the handle.

PRICE, Complete as shown - - - \$3.00
Ash for Special Discount.



Fig. 123.

Hose Coupling $\frac{3}{8}$, $\frac{1}{2}$ or $\frac{3}{4}$ in.,
20 cts. each.

Special hose couplings for
5-ply hose: $\frac{1}{2}$ in., 60c;
 $\frac{3}{4}$ inch, 75c.



Fig. 124.

Hose Clamp, $\frac{3}{8}$, $\frac{1}{2}$ or $\frac{3}{4}$ inch,
6 cts. each.
Give size wanted.

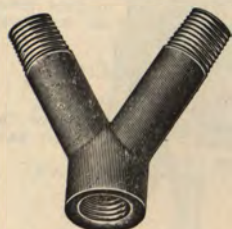


Fig. 78.

BRASS Y

For Attaching Two
Nozzles.

PRICE, $\frac{1}{4}$ -inch, 40 cents



Fig. 129.

BRASS U

For Two Nozzles.

PRICE, $\frac{1}{4}$ -inch, 40 cents.



Fig. 126.

TWO-ROW SPRAYING ATTACHMENT

THREE FEET LONG

For Spraying Two Rows of Potatoes, Cotton or Tobacco.

PRICE with Elbow Couplings (no nozzles), Galvanized Iron - 80c
Brass - - - \$1.50

BRUSH FOR AGITATOR ARM

They are fastened to the arm
of the agitator on our QUEEN
and KING Pumps, and keep the
strainer on suction pipe CLEAN

Price - 20 cents
By mail, postage paid.



Fig. 93.

UNDER SPRAYER WITH ELBOW and STOP-COCK

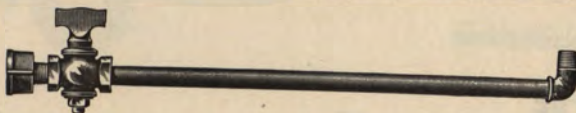


Fig. 73

PRICE, Galvanized Iron - - - \$1.00
All Brass - - - 1.50

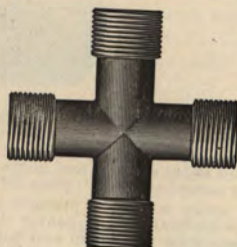


Fig. 131.

BRASS 4-WAY SPOUT

For Connecting 3 Leads of
Hose to Pump.

PRICE - - - \$1.00

THE GOOD NEWS

COMPRESSED AIR SPRAYER.

WITH KANT-KLOG NOZZLE.



Fig. 103.

You work the plunger quickly for 15 seconds; it will then spray for five or six minutes without further pumping. It throws a fine vapory spray; adapted for spraying grapes, potatoes, cotton or other low-growing crops. Made with Galvanized Steel and polished Brass Tank.

To fill the tank, simply turn the Pump to the left until it unscrews. The tank should be filled about two-thirds full of liquid. Then force in the air with the pump. Price, with two feet of hose and Kant-Klog Nozzle, Galvanized Steel, \$5.50; Brass Tank, \$8.00.

Before you buy a Sprayer of like design, see the **GOOD NEWS** and give it a trial.

Capacity, 4 gallons. Weight, 9 pounds.

Enclosed find check in payment of sprayer. I desire to say that I have, up to this time, ordered from you five sprayers, and they have proved to be ahead of any sprayer that has ever been in this Country.

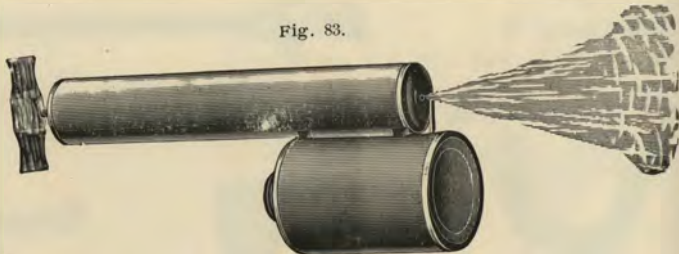
Respectfully,
C. C. WOLFORD.

We have used your pumps for four years. I have worked with other pumps and know the superiority of your line, and I shall be glad to recommend them to others. Hence, if you have no agent, I should like to work for you this winter.

Bangor, Mich., Aug. 21, '08.
Yours truly,
ARTHUR WAKEMAN.

THE VAPOR GEM SPRAYER

Fig. 83.



It vaporizes water with air. One quart of water will spray 400 hills. Strong, Durable, Efficient, Handsome. For House Plants, Flower Gardens, Green Houses, Vegetable Gardens, Poultry Houses. Uses every kind of Poisonous Spray, and will exterminate obnoxious and injurious insects. Use it to spray cattle for the horn fly. The tank is genuine polished sheet copper, and holds one quart. The Pump is also copper and will last 20 years. Not recommended for spraying trees. Price, \$1.50.

DIRECTIONS.—To produce a heavy spray work the plunger quickly. The liquid (no matter how poisonous) does not come in contact with the plunger, consequently the leather cannot be eaten away, and will last for years. The leather on plunger must be kept soft and pliable by using a good quality of oil. After oiling, shove the cap over the leather and leave it there until the rim of the cap is entered into the air chamber. To fill the tank remove the cap. One filling sprays 400 hills.

The Garfield Knapsack Sprayer

For Vineyards, Nurseries, Potatoes, Tobacco and Cotton Fields.
Tank Concaved to Fit the Back. All Brass Pump.



FIG. 50.

This Machine consists of a tank holding four gallons, and a pump made entirely of brass, which cannot corrode or rust. There is a large air-chamber placed inside the tank, which has sufficient capacity to keep up the pressure and continue to discharge the spray for one minute after the operator stops pumping. By removing five brass screws on top of tank the pump can be lifted out. The lower valve is screwed to bottom of cylinder, hence no trouble or expense to reach the valves. The tank having rounded ends is stronger and less liable to leak; it has handles for lifting, thus adding greatly to the convenience of "loading" upon the back. There is a large opening on top for the reception of liquid, with a fine strainer set inside. The Nozzle is our combination Vermorel, so highly recommended, and gives universal satisfaction.

These Sprayers have a record of more than 25 years in continuous use.

THE GARFIELD—PRICE LIST.

- Fig. 50—"B" with GALVANIZED steel tank, 4 ft. of hose, brass hand tube, shut-off cock and vermorel nozzle, and with churn dash agitator..... \$10.00
Fig. 50—"D" with BRASS tank, same hose and nozzle equipment as described in above, with agitator 14.00
Fig. 50—"E" with COPPER tank, same hose and nozzle equipment as above, with agitator 15.00

Additional hose at 15ct. per foot. Weight empty, 16 pounds—full 52 pounds; when boxed for shipment, 33 pounds. When lime-sulphur mixtures are to be used, we advise the brass tank.

Field Force Pump Co.,
Elmira, N. Y.

New Bern, N. C., Jan. 5, '10.

Dear Sirs:—

Please send me cost of repairs for Knapsack sprayer.

I have used my present outfit for 14 years. I borrowed two last summer but neither did me the service the old Garfield had done. Hoping to hear from you soon, I remain,

Very truly yours,

DANIEL LANE.

ADMIRAL SPRAY PUMP

WITH EXTRA LARGE AIR
CHAMBER

IMPROVED MODEL FOR 1911.

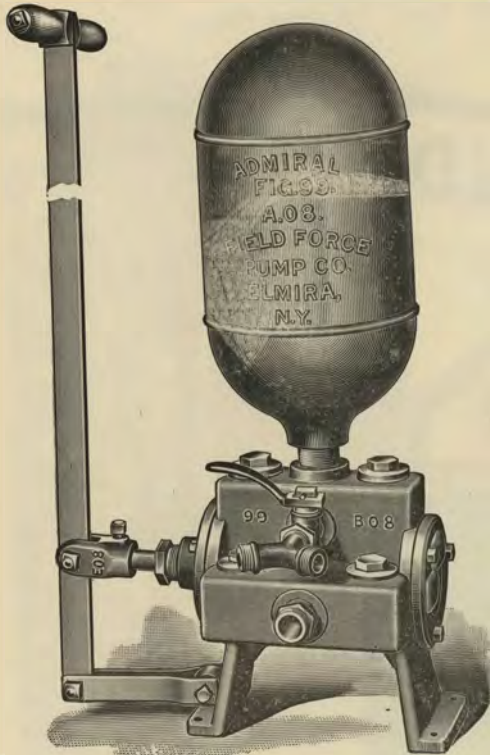


Fig. 99.

We show here a Strong, Powerful, Double Acting Spray Pump with sufficient capacity to supply four Tiger Nozzles.

It is especially designed for large orchards where it is desirable to do the work by hand. It has discharge openings on both sides of air chamber, one of which is plugged, unless otherwise ordered.

It has brass lined cylinder, brass valves and plunger rod and double brass spout with shut-off cock. All of the valves are reached by unscrewing the brass plug above the valve. This Pump should be used with our Half Round Tank, Fig. 114, as shown on page 29.

Weight, 75 lbs.

FIGURE 99, PRICES, ETC.

Outfit "A"	Diameter Cylinder, 2½ inch. For Suction hose, 1 inch. For Discharge Hose, ¾ inch	\$25.00
Outfit "B" Two Leads Hose	Pump with 5 feet 1 inch Hard Rubber Suction Hose, two 25 ft. leads of ¾ Discharge Hose, and two Tiger Nozzles	\$37.00
Outfit "C" Four Leads Hose	Pump with 5 ft. 1 in. Hard Rubber Suction Hose, four 25 ft. leads of ¾ Discharge Hose, with four Tiger Nozzles, also with couplings complete	\$52.00

Baden, Pa., May 3, 1910.

Your Admiral pump is fine. I put it up against one of another make of the same size on a trial at an orchard lesson by Prof. Surface.

We used them in spraying with lime and sulphur. Your pump did just as good work and worked easier. The representative of the other make claimed superiority because his pump had ball valves. Most of the farmers present did not like ball valves. The poorest spray pump I ever saw had ball valves. He wanted me to sell his pumps but I told him I thought I had a better one.

Yours truly,
F. W. SWAIN.

TRIPLEX POWER PUMP

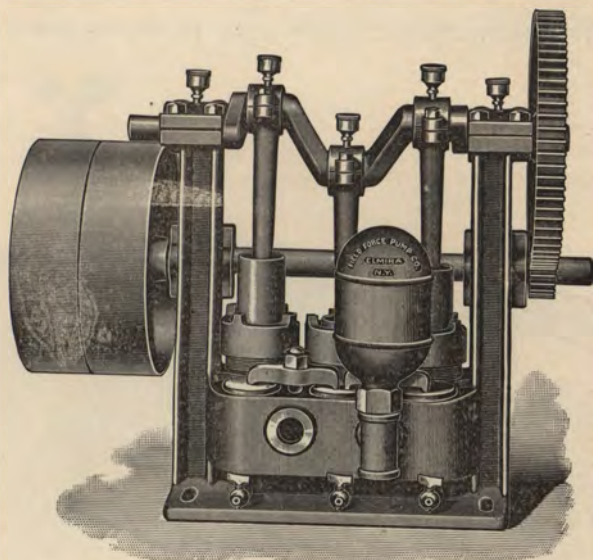


Fig. 1000.

The Triplex Power pump has three cylinders in each of which a plunger operates. These plungers are actuated by connecting rods from the crank shaft which has three cranks equally spaced. This construction causes the strokes to overlap, resulting in a free discharge of water and smooth operation of the driving mechanism.

The frame is of close grain gray iron cast in one piece with the cylinders and valve chambers. The crank shaft is an open hearth steel casting in one piece accurately machined. All crank shaft and counter shaft bearings are of babbitt metal.

The gears are of ample width with teeth cut from the solid and an air chamber of sufficient size is provided. The cylinders are $2\frac{1}{4}$ inches in diameter and the plungers have a $3\frac{1}{2}$ inch stroke. The plungers are seamless hard drawn brass tubing and the valve and valve seats are also hard brass, both accessible by the removal of a single nut. These parts, with the packing, are the only wearing parts in contact with the spray liquid. Any or all of these parts may be cheaply and quickly replaced, making the maintenance cost low even when handling hot spraying solutions.

The valve seats are screwed into the casting, instead of pressed in, making their removal and renewal easier and quicker than by the old method.

The pump is designed principally for a spray pump but may be used as a belt, chain or gear driven power pump for other purposes. It will discharge 9 or 10 gallons per minute at 50 revolutions with any discharge pressure up to 250 lbs. per square inch.

FIG. 1000, PRICES, ETC.

OUTFIT "A" Fig. 1000	Price for Triplex pump with 12 inch tight and loose pulleys with 3 inch face.....	\$56.25
OUTFIT "B" Fig. 1000	Price for Triplex pump with tight and loose pulleys, 12 in. in diameter with 3 inch face and pressure gauge.....	\$60.00
OUTFIT "C" Fig. 1000	Price for Triplex pump with discharge pipe, high pressure safety valve, "Y" spout, shut-off cock, tight and loose pulleys and pressure gauge.....	\$68.75

Weight of pump, complete, 210 lbs.

THE LEADER 3½ H. P. GASOLINE ENGINE

WITH HORIZONTAL PUMP AND PUMPING JACK.

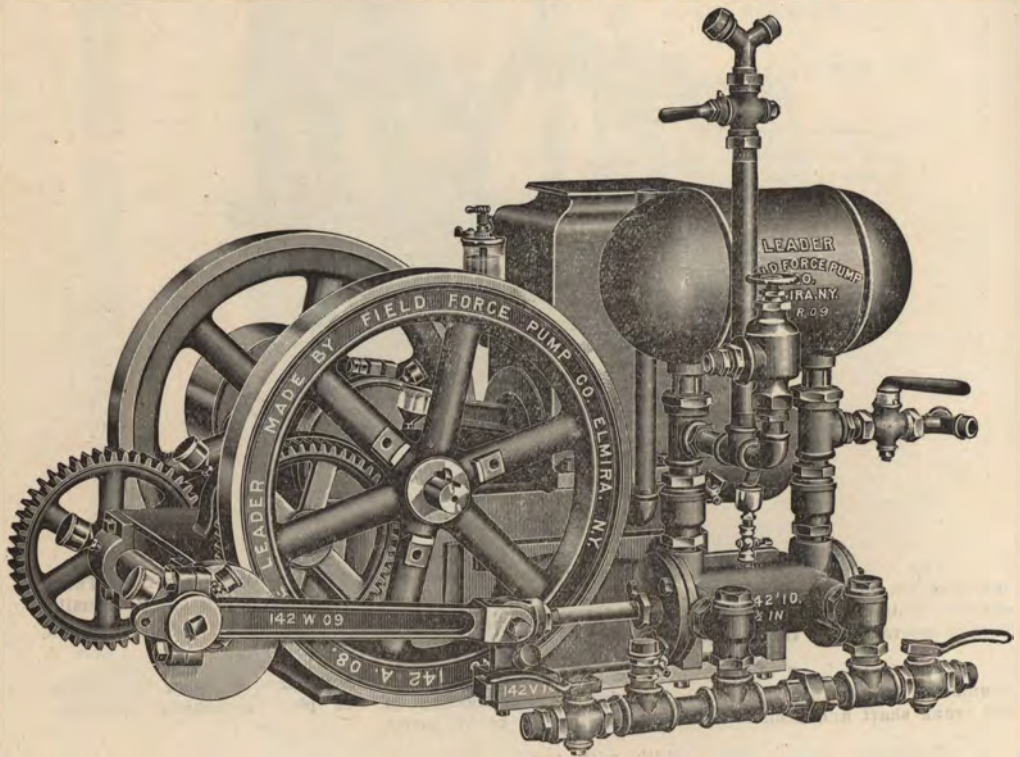


Fig. 158.

This outfit consists of a water-cooled, Gasoline engine, pumping-jack and horizontal Spray Pump, with Hopper Jacket for cooling the cylinder, and full electrical equipment.

It has a horizontal, four-cycle ENGINE with a hit and miss GOVERNOR of the fly-wheel type, which, of all the types in use, has conclusively proven to be the most reliable and positive in its action, as well as economical in the consumption of fuel and electric current, one gallon of gasoline being consumed in 10 hours for each Horse Power actually used. It also has the generally approved jump-spark IGNITION. The CYLINDER is 5x5¼ inches—the normal SPEED being 380 revolutions per minute, producing a guaranteed 3½ actual brake HORSE POWER. This engine is really underrated, giving ample reserve for all possible requirements for this capacity engine.

The cylinder, cylinder head and valves are entirely water-jacketed. All the parts are accessible, and so simple in their mechanism that their several purposes are easily understood.

The PISTON is of the trunk pattern, being extra long and fitted with 3 perfectly fitted rings with lapped joints. The piston-pin is made of machinery steel, the crank shaft is a drop forging and both have extra wide bearings. The fly-wheels are extra large, perfectly balanced—the counterweights being placed on the crank-shaft, thus reducing the vibration to a minimum. The CONNECTING-ROD is adjustable at the crank end, which is babbitted, and the piston end is fitted with a bronze bushing. All important bearings are fitted with compression grease cups, and the cylinder with a sight-feed lubricator.

The materials used and the workmanship in this entire rig is first class in every respect, and our high aim has been to offer to our patrons an engine of as simple and comprehensive construction as possible, and still maintain the highest efficiency and durability. The engine can be used for GENERAL PURPOSES other than spraying by simply removing a small pinion. It is regularly furnished with a 9 inch pulley with 4 inch face, but other sizes can be furnished at extra cost. The engine alone occupies a SPACE of 24"x36".

The PUMP has a 2½x8 inch brass lined cylinder. It has an extra large AIR-CHAMBER and connections for four leads of hose. It has a blow-off valve and pressure gauge, which enables the operator to carry any pressure desired, and is regulated by a hand wheel.

The regular spray pump can be disconnected and the engine can be used for general purposes.

The Pump is connected directly with the engine, both being mounted on a strong base, the two occupying a space of 36x48 inches, and is neat in appearance, compact and strong.

PRICES, ETC.

Outfit "B" This includes the Engine and Pumping-Jack, (shipping weight, **FIGURE 158** 600 lbs.) No Pump. Price..... **\$ 200.00**

Outfit "C" This includes the Engine with Pumping-Jack and SPRAY PUMP fitted with two brass Y spouts with shut-off cocks, pressure gauge and safety valve. (Shipping weight, 700 lbs.) Price... **\$ 233.25**

Outfit "D" This includes the Engine with Pumping Jack and SPRAY PUMP with the two brass Y spouts and shut-off cocks. One 10 ft. lead of suction hose and strainer, with cocks and couplings; two 20 ft. leads of ¼ in. 5-ply discharge hose, two 10 ft. bamboo, brass lined extension pipes with leakless shut-off cocks and two double Tiger nozzles, also with pressure gauge and safety-valve. (Shipping weight, 740 lbs.) Price..... **\$ 262.50**

With each gasoline engine (Fig. 158), we furnish all of the electrical and other necessary equipment for immediate use, viz: One set of five Columbia Ignitor No. 6 dry cell batteries, one spark coil, switch and weather proof wiring, one Mosler spit-fire spark plug, one generator valve, exhaust pipe and muffler, two "S" wrenches, one oil can, and full instructions for operating, and to insure the use of proper lubricants we send with the engine one can each of compression cup grease and cylinder oil for the sight feed lubricator. The Gasoline tank is located in the base of the engine, and the feed is by suction from the engine.

For prices and description of the **LEADER SPRAYER** with Tank, Wagon, Steel Tower and Elevated Platform, see page 24.

Stuarts Draft, Va., May 25, 1909.

Field Force Pump Co.,
Elmira, N. Y.

Gentlemen:—

We have given your "Leader" 3½ H. P. gasoline sprayer a thorough trial, and have found no fault with it whatever. It certainly does the work successfully and entirely satisfactorily, and we have used the engine for many other purposes beside spraying.

We recommend it to all who spray, and tell them just what we think; "that it is the best we have ever used."

We wish you success.

Yours very truly,

ALTA-VISTA ORCHARDS.

Robt. Kendig, Mgr

The Leader Gasoline Orchard Sprayer

WITH 3½ HORSE POWER, 4-CYCLE ENGINE.

It supplies 10 nozzles at a pressure of 200 pounds with safety valve blowing off, and this service can be increased without over-taxing the engine.

Wood tanks are standard, but galvanized steel tanks can be substituted upon request.

The Engine and Pump used with this rig is the improved model for 1911, same as Fig. 158, having the Hopper Jacket, the gasoline tank in the base of engine, the suction feed and the horizontal air chamber. See pages 22 and 23 for description.

It will refill the tank, saw wood, grind feed, run your repair shop, shell or clean your grain, run the cream separator or the churn, and is safe, simple and satisfactory.

We can furnish a Rotary Power Pump for filling the tank, to be run by a belt from the engine which will lift 25 gallons the minute for \$12.50 all bronze metal. \$25. This Rotary Pump is fitted for 1½ suction hose and for 1 inch discharge hose. Weight, 57 lbs. These prices include no hose. If delivery hose for filling tank is wanted add \$1.25.



Fig. 142.

This illustration shows a four-wheel, wide tire, truck and skeleton platform, with the LEADER Gasoline Engine, pumping-jack and spray pump, described on pages 30 and 31, a 200 gallon, half-round tank with automatic agitator, steel tower with elevated platform; discharge hose, nozzles and equipped complete for spraying, and is designed especially for extensive work in commercial orchards, and will supply 10 nozzles at a pressure of 200 lbs. By the same apparatus, the tank can be re-filled, thus cleaning the pump and valves thoroughly with each refilling; pumping from 7 to 8 gallons per minute.

The engine, pumping-jack and pump can be easily removed from the platform when desired for other uses. The agitator is automatic and has a brush which keeps the suction-strainer clean. The engine, pumping-jack and pump are thoroughly housed in, thus protecting them from the elements, as well as the spray mixtures, while the roof of the "Housing" furnishes a convenient platform for those operating the nozzles. The sides and rear end are covered with heavy canvas curtains.

For the most COMPLETE, EFFICIENT and SATISFACTORY "HIGH PRESSURE" Gasoline Sprayer, we will put this, which is our new 1911 model, in competition with any engine on the market, and it is designed to meet every requirement for smooth and steady running, HIGH PRESSURE, Simplicity and Durability.

PRICES, ETC. Fig. 142.

OUTFIT E Fig. 142

This includes the Engine with Pumping-Jack and SPRAY PUMP with the two brass "Y" spouts and shut-off cocks. One 10 ft. lead of suction hose and strainer, with cocks and couplings. Two 20 ft. leads of ¾ in 5-ply discharge hose, two 10 ft. bamboo brass lined extension pipes with leakless shut-off cocks and Double Tiger nozzles, with pressure-gauge and safety-valve. Also with platform 200 gallon tank and agitator. Weight, 1200 lbs.; with skids and crating, 1400 lbs. No wagon..... **\$306.25**

OUTFIT F Fig. 142

This comprises all of the Outfit "E" complete, with the addition of a 4-wheel truck with iron wheels and 5 inch tires. Weight, 1800 lbs.; shipping weight with skids and crating, 2000 lbs. **\$350.00**

Additional 5-ply discharge hose, 20c per foot. Suction hose, 40c per foot. Steel Tower with floor and guard rail, as shown in cut, \$15.00 extra. Weight of Tower, 117 lbs.

We shall be glad to give you any additional information concerning this outfit, and solicit your correspondence.

The LEADER-TRIPLEX ORCHARD SPRAYER

This machine includes The LEADER Engine described elsewhere in this book (see Fig. 158) and the Triplex Pump (see Fig. 1000), making a combination Engine and Pump of superior construction, great power and durability but simple in its mechanical parts, all of these being in plain view and easily reached with wrenches and other tools.

The engine furnished with this rig is made in two sizes, viz: 2 and 3½ Horse Power.

The Pump, with its three separate cylinders, ensures smooth and steady running with a free and liberal discharge of 9 or 10 gallons of liquid per minute with any pressure up to 250 lbs. per square inch and at 50 revolutions per minute.

The plungers are seamless brass with outside packing, and the valves and valve seats are hard bronze metal and are accessible by the removal of one nut.



Fig. 165.

THE ENGINE.

We can assure the prospective purchaser that the 2 H. P. Engine will supply 10 Tiger nozzles and maintain a steady pressure of 200 lbs., hence if the engine is not required for other purposes the 2 H. P. engine is advised. This is included in the outfits A and B, Fig. 165, but if the engine is to be used for sawing wood and for other like work we advise the 3½ Horse Power Engine, this is included with outfits C and D.

We can furnish a Rotary Power Pump for filling the tank, to be run by a belt from the engine, which will pump 25 gallons the minute for \$12.50; all bronze metal, \$25.00. This Rotary Pump is fitted for 1¼ suction hose and for 1 inch discharge hose. Weight, 57 lbs. No hose included in these prices.

PRICES, WEIGHTS, ETC., FIG. 165.

Outfit "A"	This includes the 2 Horse Power Engine and Triplex Pump with two brass "Y" spouts and shut-off cocks, one 10 ft. lead of 1¼ inch suction hose with couplings, cocks and strainer. Two 20 ft. leads of 5-ply discharge hose, two 10 ft. bamboo brass-lined extension pipes with leakless cocks and Double Tiger nozzles, with pressure gauge and safety valve. Also with 150 gallon tank, platform and agitator. Weight, 950 lbs. Price.....	\$ 281.25
Outfit "B"	This includes the 2 H. P. Leader engine and all of the outfit "A" complete with the addition of a four-wheeled wagon with iron wheels and 5 inch tires. Weight, 1550 lbs. Price.....	\$ 325.00
Outfit "C"	This includes the 3½ H. P. Leader Engine and Triplex Pump with two brass "Y" spouts and shut-off cocks, one 10 ft. lead of 1¼ in. suction hose with couplings, cocks, and strainers. Two 20 ft. leads of 5-ply discharge hose. Two 10 ft. bamboo, brass-lined extension pipes with leakless cocks and Double Tiger nozzles, with pressure gauge and safety valve. Also with 200 gallon tank, platform and agitator. Weight, 1200 lbs. Price..	\$ 306.25
Outfit "D"	This includes the 3½ H. P. Leader Engine and all of the outfit "C" complete with the addition of a 4-wheeled wagon with iron wheels and 5 inch tires. Weight, 1800 lbs. Price.....	\$ 350.00

Additional 5-ply discharge hose, 20c per foot. Suction hose, 40c per foot. Steel Tower, with floor and guard rail, \$15.00 extra. Weight of Tower, 117 lbs.
We shall be glad to give you any additional information concerning this outfit, and solicit your correspondence.

The Leader Gasoline Sprayer

FOR CITY PARKS AND CRANBERRY BOGS.

WITH $3\frac{1}{2}$ HORSE POWER, 4-CYCLE ENGINE.

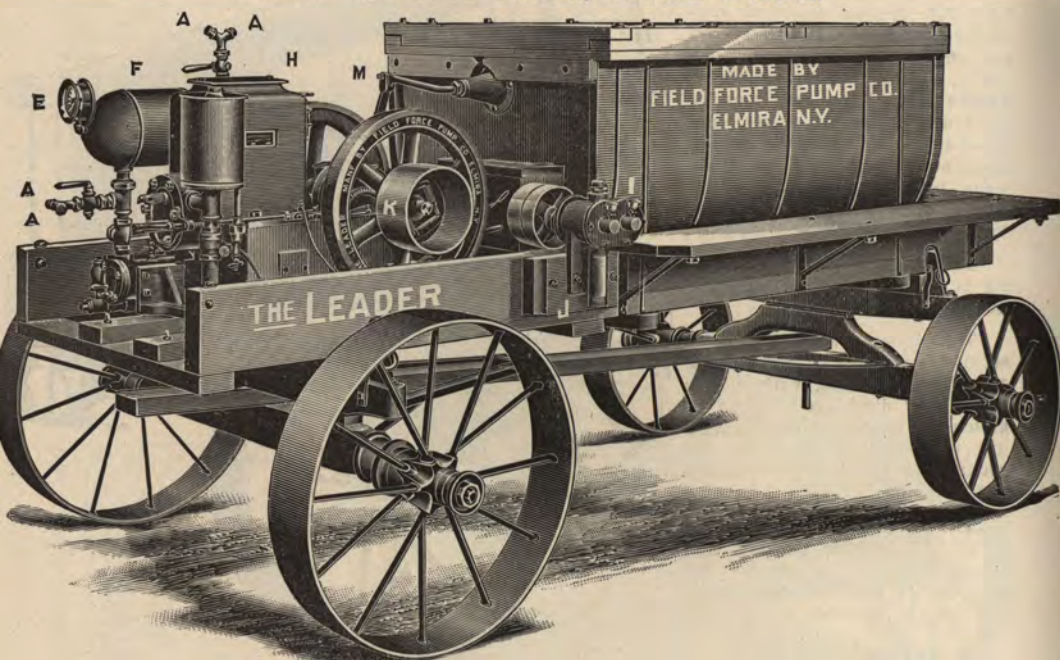


FIG. 161.

IMPROVED MODEL for 1911 with Hopper Jacket Engine and Suction Gasoline Feed.

The design of this machine was suggested by several of the larger cranberry growers of New Jersey and Massachusetts, and has also been found most satisfactory for spraying tall trees in city parks. It has our Leader Engine with a special 3x8 in. brass lined pump. The tank has two liquid compartments holding 150 gallons each, with separate suction pipes leading to each compartment and separate relief discharge valves. The wagon has wheels with 5 in. tires, and a running board on both sides of the tank. It has our Rotary Pump for filling the tank, this pump having a capacity of 25 gallons per minute. By use of the tank having two liquid compartments the spray mixtures may be drawn out of one part while the other is being refilled. We furnish with this machine all of the electrical equipment mentioned on page 31. The engine is covered with a stout platform on which the men may stand, and the sides and rear of the engine are well protected by heavy canvas curtains.

OUTFIT "B" This includes the engine with pump, 300 gallon cypress tank in two compartments, with wagon, platform and Rotary Pump "I," as shown, also 25 ft. of $1\frac{1}{4}$ in. wire-frame suction hose, with foot valve and strainer, also 8 ft. of 1 in. 4-ply delivery hose for filling the tank. No nozzles, extension pipes or discharge hose. Price..... **\$437.50**
(Shipping weight with skids and crating, 2300 lbs.)

OUTFIT "C" This includes everything mentioned in connection with outfit "B" and also two 50 ft. leads of best $\frac{3}{4}$ in. 4-ply rubber hose with long shank couplings, two Double Tiger Nozzles, and two 10 ft. bamboo, brass-lined extension pipes with leakless shut-off cocks and one water-proof cover for the engine and tank. Price..... **\$500.00**
(Shipping weight with skids and crating, 2350 lbs.)

Your Leader Park spraying machine is working very nicely indeed. The more I see of this machine the more highly pleased I am with it and I believe it is the best outfit on the market for spraying elm trees to destroy the beetle.

We have no difficulty in maintaining 225 or 240 lbs. pressure and we can throw a $\frac{3}{8}$ in. stream on limbs 40 ft. away. High Pressure is absolutely necessary to produce a fine spray. It is certainly giving us most excellent results.

Very truly yours,

G. E. STONE.

The Elmira Gasoline Spraying Machine

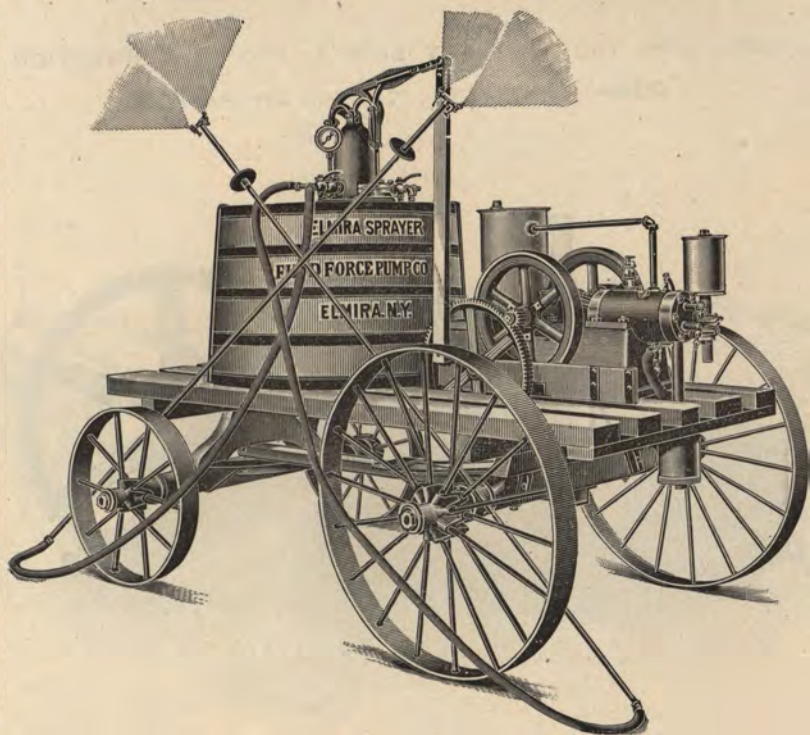


Fig. 110.

This machine is especially adapted to be sold in parts and where a fruit grower has a small gasoline engine it is only necessary for him to buy the pump, tank, pumping jack and such hose and nozzles as he may need, and these are very reasonable in price. This admits of his using his own farm wagon and engine to complete a very powerful orchard sprayer.

The tank holds 150 gallons. The pump has double brass cylinders and all brass working parts with MECHANICAL AUTOMATIC AGITATOR and AUTOMATIC BRUSHES, which keep the suction strainers clean. Has a back pressure safety valve and pressure gauge as shown.

The engine furnished with this machine is a $3\frac{1}{2}$ H. P., 4-cycle type with hopper water jacket. When furnished as shown with two 10 ft. leads of hose, two double Vermorel nozzles and two 10 ft. extension pipes, the price is as follows:

WITHOUT WAGON, Weight 900 lbs.	\$ 262.50
WITH WAGON, Weight 1550 lbs.	300.00

All necessary electrical equipment is included in the prices named above.

The machine can be furnished with a tank holding 200 instead of 150 gallons at an extra cost of \$4.00. Additional 5-ply hose at 20 cents per ft.

The pump driven on the slow speed will supply eight nozzles and maintain a steady pressure of 140 lbs. If more pressure is wanted the Fig. 142, 165 or 161 is advised.

The engine can be used for any purpose within its rated capacity, such as sawing wood, pumping water, cutting fodder, etc., etc.

See page 28 for separate pumping jack to be used with other engines.

Separate Pumping Jack

TO BE USED WITH YOUR PRESENT ENGINE AND IN CONNECTION WITH
PUMP, TANK, ETC., SHOWN ON PAGE 27.

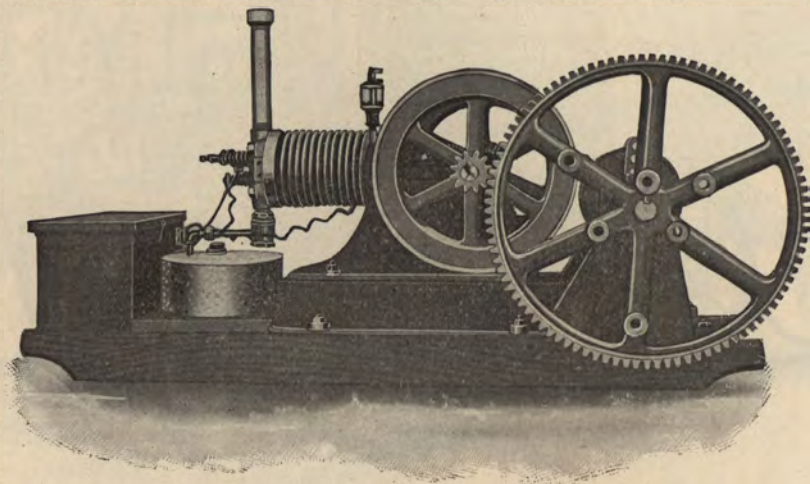


Fig. 77.

As hundreds of our patrons already own small gasoline engines from 1 to 5 Horse Power, we are prepared to furnish suitable pumping jack, tank, pump, etc. (being parts of Figure 110, see page 27) as per illustration. The tank may be 150 or 200 gallons. The pump is similar to the Empire King, except that it has two cylinders, two suction pipes with strainers, and two brushes on the agitator. This makes a very powerful and desirable pump and is competent to supply eight nozzles and maintain a steady pressure of 140 lbs. You can use your own engine with this.

Write for particulars.

Note.—For the Gilson engine we offer special jack (see Figure 77 above).

Write for special prices, stating just what parts of machine and equipment are wanted.

SPRAYING TANKS

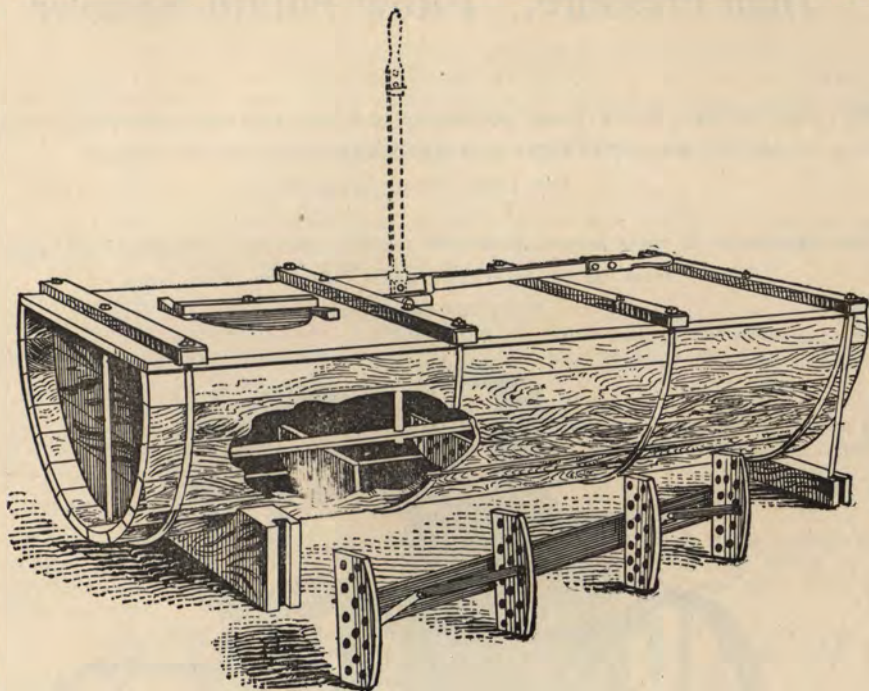


Fig. 114.

This illustration shows our Half-Round Tank, which is especially adapted for use with our Admiral, Fig. 99, page 27.

The staves are made of dressed $1\frac{1}{2}$ in. pine, the joints being machined, making them perfectly water tight, and the outside of the staves are convexed to conform to the circle of the hoops. As an improvement to the tank shown in the above cut, there is a strong frame made of 3x3 inch ash extending around the entire top of the tank, and through which the 7-16 inch rods pass which form the hoops, giving the tank greater rigidity and strength. This also adds to the strength of the top so that a pump can be fastened to it, and gives the operator a place to stand.

The Agitator is operated by hand and keeps the mixture thoroughly stirred.

The portion cut away on one side shows a section of the agitator which is suspended from the top by steel rods. Two loose bolsters are also furnished, which will set on the bolsters of a farm wagon.

The tank may be used not only for spraying but also for hauling water when setting out cabbage or celery or when drawing water for building. When used for such purposes the agitator can be taken out through the manhole on top of tank.

This tank is built from the ideas of some of the largest fruit growers in Virginia and New York and is giving universal satisfaction. Experience has proven that a wood tank is most practical for spraying, as the acid in the mixture eats out a metal tank.

Price of Tank with Bolsters and Agitator, 200 Gallon Capacity	-	-	-	\$20.00
Price of Tank with Bolsters and Agitator, 250 Gallon Capacity	-	-	-	24.00
Price of Flanged Strainer for Attaching Hose	-	-	-	1.50

WATSON==OSPRAYMO

“High Pressure,” 4-Row Potato Sprayer

Double wheel drive. Spray boom adjustable to follow the row. ENTIRELY AUTOMATIC with AGITATOR and BRUSHES which stir the liquid and keep the strainers clean.

Nozzles adjustable to rows from 2½ to 3 ft. apart. Wheels adjustable on axle any width from 52 in. to 72 in. apart, regularly fitted with thills for one horse.

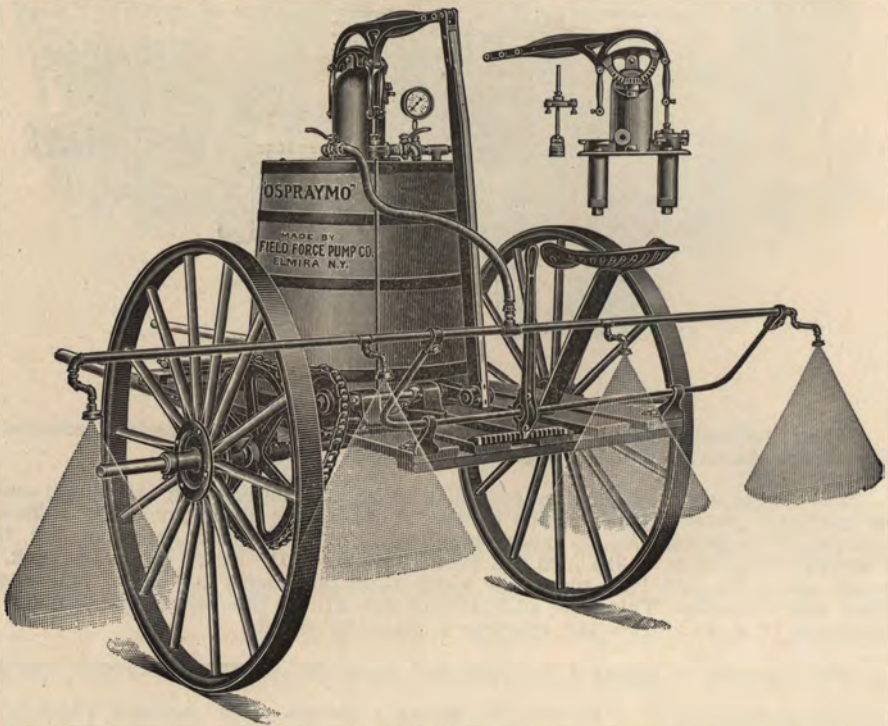


Fig. 600.

THE AXLE—

The axle is 19-16 in. steel, supporting the platform through three bearings.

THE PUMP DRIVE—

The pump is driven by power taken from the wheels. Each wheel is connected to the axle through strong, substantial ratchets. A large sprocket securely fastened to the axle drives a smaller sprocket fastened to the gear board shaft by means of a chain having an ultimate strength of 1600 lbs. The sprockets and chain are always close to the platform and away from the wheels. This keeps the chain free from mud and greatly increases its life.

The gear frame is of a new design, much more simple than any hitherto made. It consists of a short, rugged casting, supporting a shaft by two long bearings. The small sprocket previously referred to drives the shaft through a clutch. This clutch is operated by a

short lever permitting the driver to easily throw the pump in or out of gear. At the far end of the shaft is keyed a crank which drives the pump.

This improved drive eliminates all side draft on the horse and permits the use of spraying pressures only limited by the strength of the horse.

THE PUMP—

A double-cylinder pump, having all brass working parts, is used.

The cylinders are heavy, seamless brass, $2\frac{1}{2}$ in. by 8 in., WITH NO LEATHER OR RUBBER PACKING WHATEVER. Each cylinder draws its supply of liquid through separate short vertical suction pipes capped by strainers extending nearly to the bottom of the tank.

To keep the solutions thoroughly mixed an AUTOMATIC AGITATOR is provided.

THE AGITATOR—

A bar fitted with paddles and brushes is driven back and forth under the suction strainers at every stroke of the pump. The BRUSHES are so fitted to the AGITATOR that at every sweep the strainers are automatically cleaned.

THE TANK—

A tank holding 60 gallons is regularly used, but a tank of 100 gallon capacity can be furnished at extra cost. This tank is made of carefully selected white pine held by five hoops.

THE PLATFORM—

The platform is of skeleton form as shown, made up of 5 in. wide hardwood strips, 50 in. stout wheels with 3 in tires and 14 spokes are used. Provision is made for lubricating the hubs by suitable oil holes.

SPRAY BOOM—

An improved system of pipes and nozzles is provided. Single Tiger nozzles, adjustable to spray four rows from $2\frac{1}{2}$ to 3 ft. apart, are fastened to a cross pipe, which in turn, is connected to the discharge of the pump through extra strong 4-ply hose fitted with double clamps at each end.

By a slight forward motion of the vertical lever shown in Fig. 600, the spray boom is freed and may then be shifted to follow the rows through a range of 12 in. Upon releasing the shifting lever the boom locks itself in position.

Vertical adjustments with a range of 18 in. can be made in two minutes time. The Tiger Nozzles used give a fine spray, forming a cone of large angle. The WATSON-OSIRAYMO will spray from 30 to 40 acres for a day's work.

Shipping weight, 600 lbs.

PRICE, INCLUDING PRESSURE GAUGE	-	-	-	-	\$75.00
---------------------------------	---	---	---	---	---------

For all brass pipes and fittings outside as well as inside of tank add \$8.00. With pole for two horses in place of thills no extra charge; for long neckyoke and long eveners add \$3.00; for 100 gallon tank in place of 60 gallon add \$4.00.

We can furnish the WATSON, 4-Row Machine, Fig. 111, 1910 Pattern, for \$68.00; same as last year.

Pt. Pleasant, Pa., 3-2'10.

All the goods we ordered from you have been received in tip-top shape.

If I need anything further you can rest assured you will receive the order as you certainly do live up to the Golden Rule, which is a rare thing in these days.

Again thanking you for your courteous attention to my order, I am,

Yours truly,

JNO. ASHEN CLEMENS.

Ellenton, Fla., April 11, '10.

We have sold your pumps for the past three or four years and all of our customers who have used them claim that they are the best to be had for the money.

Yours very truly,

The C. P. FULLER CO.

The Wooster Combined Potato and Orchard Sprayer

Automatic, but can be Worked by Hand. Has Automatic Agitator and Brushes for Stirring Liquid and Keeping Suction Strainers Clean.

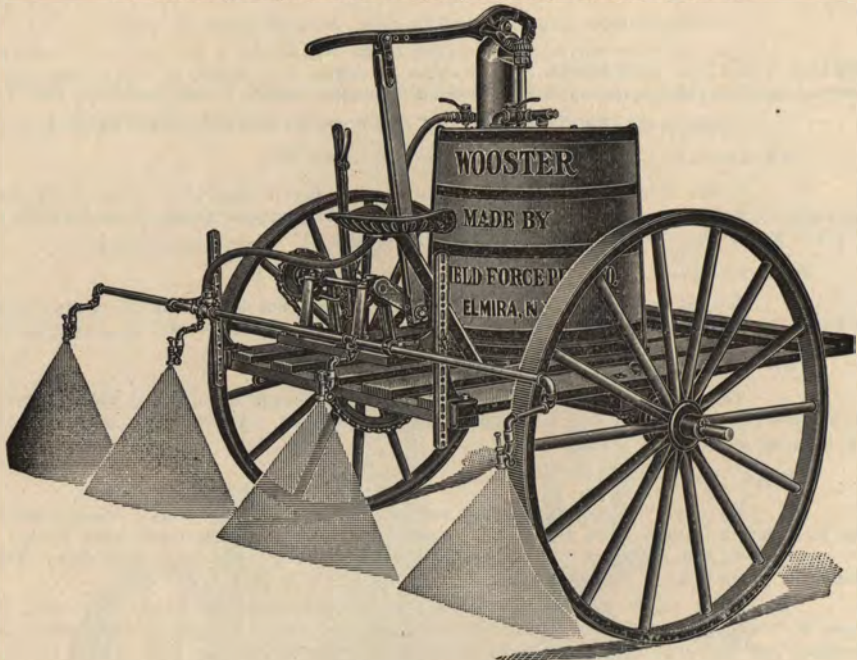


Fig. 76.

Tank holds 60 gallons. Platform is maple, has thills for one horse, wheels 50 inches in diameter with 3 inch tires, adjustable on the axle, which is turned steel, with three boxes, one in the centre to prevent springing; Pump has large Air Chamber, with one 3x8 inch brass cylinder with brass lower valve and brass plunger with Vit. leather bucket. The Agitator swings under the strainer at lower end of suction tube and carries a brush which keeps the strainer clean. No danger of clogging.

Pressure adjustable, 50 to 100 lbs., by use of a back pressure safety valve which also provides for the thorough stirring of the liquid before commencing to spray.

Four improved single Vermorel nozzles, adjustable to spray potatoes planted in rows two and one-half to three feet apart, also a vertical adjustment of pipes and nozzles of eighteen inches up and down; extreme height forty-three inches from the ground.

Nozzles and pipes as shown are in position for spraying four rows of potatoes when the tops are small, but the pipes should be raised as the plants make larger growth. May be removed for passing through gates by loosening two thumb screws.

Will spray orchards, shrubs, or any crop where it can be moved about and may be readily converted into a hand sprayer.

The Wooster is a "High Pressure" machine and will spray 30 acres per day.

When this machine is used for orchard spraying an extra lead of $\frac{1}{2}$ in. hose with extension pipe (Fig. 120) should be used. For prices and information, see page 14.

Shipping Weight, 550 lbs.

PRICE, COMPLETE AS SHOWN, \$58.50.

For all brass pipes and fittings, inside and outside of tank, add \$8.00.

For Horizontal Pipe Shifter, add \$3.50. Pressure Gauge, \$2.50.

This machine can be furnished with pole for two horses without extra charge, and with long evener and long neck-yoke for \$3.50, also with 100 gallon tank at \$4.75 additional.

THE AROOSTOOK

SIX ROW HIGH PRESSURE SPRAYER (Entirely Automatic.)

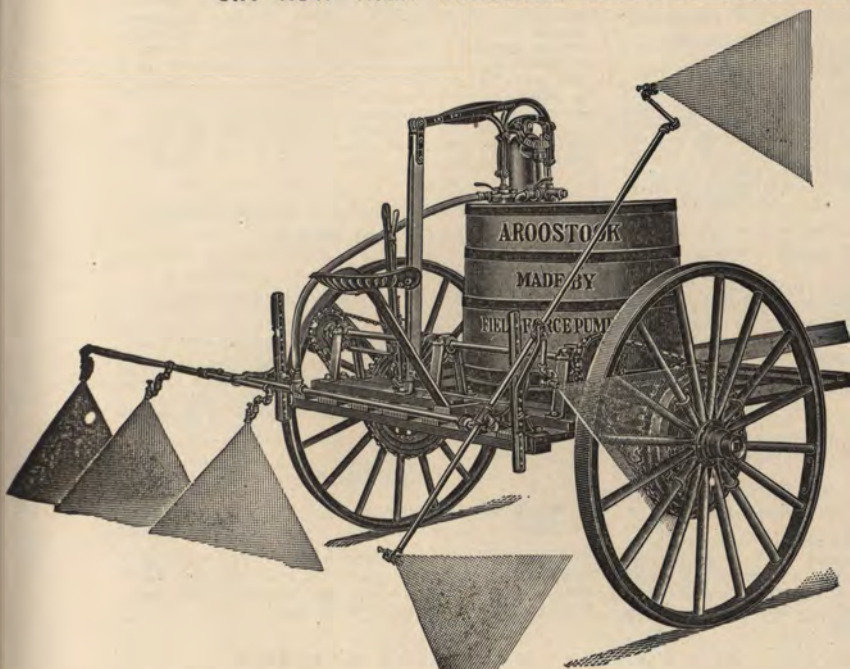


Fig. 108.

Tank holds 110 gallons, has double 3 inch brass cylinder pump, all brass working parts, mechanical automatic agitator with automatic brushes for keeping strainers clean, stout wheels fifty inches in diameter with three inch tires, pole for two horses, six improved Vermorel nozzles. As shown it straddles two rows planted three feet apart, with 1½ inch steel axle. It is furnished with 6 Tiger nozzles adjusted for rows three feet apart. The Pump has a back pressure safety valve. The nozzles and pipes shown on the right, are in position for passing through farm gates, and are turned down horizontally for spraying, having brass hinged joints for that purpose. This machine sprays forty acres of Potatoes, Cotton, Tobacco or Vegetables for a day's work, and without waste of Liquid. Potatoes must be planted 3 ft. apart if this machine is used.

This machine has attachments for raising and lowering nozzles, allowing for a variation of 18 inches up and down.

PRICE, complete, as described above with pole, long neckyoke and long evenner\$80 00

For all brass pipes and fittings outside as well as inside of tank, add \$12.00.

Shipping Weight, 750 lbs.

Pressure Gauge, \$2.50 extra. Extension handle for hand pumping, \$1.50.

NOTICE—This machine has a tank holding ONE HUNDRED AND TEN GALLONS.

An actual test of this machine developed the following facts: 100 gallons of water made twelve trips of 432 feet each, SIX rows wide, equal to two acres of potatoes, the actual time consumed being twenty-five minutes, the pressure gauge showing a continuous pressure of one hundred pounds, and produced a fine vapory spray which was driven through the foliage with great force.

Allowing ten minutes to re-fill the tank, it will be seen that this machine sprays FOUR acres every hour, or FORTY acres in TEN hours, and that FIFTY gallons of liquid covers ONE ACRE OF VINES.—This machine was successfully used for the destruction of wild mustard during the past season. See testimonials.

East Rodman, N. Y., July 20, 1909.

Field Force Pump Co.:—

Yours of the 14th was duly received in reply to my wire. The Aroostook Sprayer arrived at Watertown the 15th all right. I found no difficulty in setting it up and operating it. It works fine. Would not sell it at any price if I could not get another.

Yours truly,

JNO. S. EDWARDS.

Jenkins Bridge, Va., June 28, 1909.

I have one of your Aroostook Sprayers and it gives perfect satisfaction.

Yours very truly,

A. FLETCHER.

FORMULAS.

PARIS GREEN.

Paris green 1 pound
Water 150-300 gallons

If this mixture is to be used upon fruit trees, 1 lb. of New Process lime should be added, and repeated applications will injure most foliage, unless the lime is used. *Paris green and Bordeaux mixture can be applied together with perfect safety.* For insects which chew, Arsenate of lead, 3 lbs. to each 50 gallons of water may be used in place of Paris Green and mixes better with the water.

POTATOES.

Spray with Paris green, eight ounces to 50 gallons of water to destroy potato bugs (Colorado beetle). Repeat as often as the beetles appear. Potato rot or blight can be prevented by spraying with Bordeaux mixture: first application when tops are about half grown, repeating every fifteen days until six treatments have been given.

BUG DEATH—FORMULA No. 1.

Direction for Spraying One Acre of Potatoes with Bug Death with Watson Sprayer.

Mix from 15 to 25 pounds of Bug Death in a pail, using water enough to stir easily (it will pay to use the larger amount), fill your Sprayer about half full of clear water, add the Bug Death and stir, then finish filling your Sprayer with water.

TO DESTROY MUSTARD,

King-head and other weeds in grain fields, Prof. H. L. Bolley, of North Dakota, recommends as follows:

1st Formula:—Iron-sulphate, 75 to 100 lbs. to each 52 gallons of water. If the weeds are young 75 lbs. will serve the purpose. In extremely dry weather 100 lbs. should be used.

2nd Formula:—Copper-sulphate, 12 to 15 lbs. for each 52 gallons of water.

3rd Formula:—1-3 bbl. salt for each 52 gallons of water. The latter solution is more injurious to grain, but acts more quickly upon King-head than iron-sulphate.

4th Formula:—The best spray for destroying Canada Thistles is sodium-arsenite—1½ to 2 lbs. for each 50 gallons when used with a spray beam over grain, but when the spray can be directed by hand use from 2 to 2½ lbs. for each 50 gallons of water.

These formulas are recommended for destroying mustard, king-head, Red-River weed, common rag-weed, pepper-grass, and will retard the development of French weed, wild buckwheat and other destructive weeds.

BORDEAUX MIXTURE.

Paris green 8 ounces
Copper sulphate, blue vitriol .. 5 pounds
New Process lime 5 pounds
Water 50 gallons

Dissolve the copper sulphate by pouring on hot water so that it is just covered by the water. Use an earthen or wooden vessel. Add the lime and enough water to make 50 gallons.

It is then ready for immediate use. If the mixture is to be used on peach foliage it is advisable to add two pounds of lime in the above formula. When applied to such plants as carnations or cabbages it will adhere better if about a pound of hard soap be dissolved in hot water and added to the mixture. For rots, moulds, mildews and all fungus diseases. If New Process lime is used no slacking is necessary. 3 lbs. of Arsenate of Lead may be substituted in place of the Paris green in the above formula.

IRON SULPHATE AND SULPHURIC ACID SOLUTION.

Water (hot) 100 parts
Iron sulphate as much as the water will dissolve.
Sulphuric acid (commercial) ... 1 part

The solution should be prepared just before using. Add the acid to the crystals and then pour on the water. Valuable for grape anthracnose, the dormant vines being treated by means of sponges or brushes.

HELLEBORE.

Fresh white hellebore 1 ounce
Water 3 gallons

Apply when thoroughly mixed. This poison is not so energetic as the arsenites, and may be used a short time before the sprayed portions mature. For insects which chew.

KEROSENE EMULSION.

Hard soap ½ pound
Boiling water 1 gallon
Kerosene 2 gallons

Dissolve the soap in the water, add the kerosene and churn with a pump for 5-10 minutes. Dilute 4 to 25 times before applying. Use strong emulsion for all scale insects. For such insects as plant lice, mealy bugs, red spider, thrips, weaker preparations will prove effective. Cabbage worms, currant worms and all insects which have soft bodies, can also be successfully treated. It is advisable to make the emulsion shortly before it is used.

TOBACCO WATER.

This solution may be prepared by placing tobacco stems in a water tight vessel, and then covering them with hot water. Allow to stand several hours, dilute the liquor from 3 to 5 times and apply. For soft bodied insects.

ARSENIC—SAL-SODA SOLUTION.

Destroys Leaf-Eating Insects—A Substitute for Paris Green.

White Arsenic 2 pounds
Sal-Soda 6 pounds
Rain Water 2 gallons

Boil about 30 minutes or until clear, then use 1½ pints to 40 gallons of water, adding 3 pounds of New Process Lime. Kills potato bugs and other leaf eaters. It may be used with Bordeaux Mixture, same as Paris Green.

Always label the stock solution "Poison," and put it out of the way of children.

Directions for Spraying Apple Trees

FIRST—To kill fungus, prevent blight and to make the tree healthy. This spraying to be early and before the leaves start, using 5 lbs. blue vitriol and 8 or 10 lbs. lime in 50 gallons of water, spraying to be thorough, applied to body and limbs until it drips.

SECOND—To kill the aphids, spray soon as blossoms fall, with 5 lbs. blue vitriol, 5 lbs. lime, 5 oz. Paris green in 50 gallons of water. To secure *Best Results* spray must be applied within six days after blossoms fall.

THIRD—To kill codling moth nit, spray when apples are size of cherries, or any time before the apple turns downward, with 5 lbs. blue vitriol, 5 lbs. lime, 5 oz. Paris green in 50 gallons of water.

FOURTH—If the canker worms appear, spray immediately with 5 lbs. blue vitriol, 8 lbs. lime, 8 oz. Paris green in 50 gallons of water. This is **SURE DEATH** to the canker worm, but **DON'T** NEGLECT him, he destroys the foliage, and if the leaves are eaten two years in succession the tree will be nearly ruined, and the third year kills it entirely.

FIFTH—*Making the Mixture.* To dissolve the vitriol, place it in a coarse sack, and suspend in top of barrel, or tub, not allowing bottom of sack to touch bottom of barrel, add two pails of water to every 5 lbs. of vitriol. This is your Stock Solution. Put in water enough to cover and dissolve the vitriol, and in using, dip out two pails of the Stock Solution and you have what is equal to 5 lbs. of vitriol. By lifting sack you will know when vitriol has dissolved. The Vitriol should be placed in the cask to dissolve at least 24 hours before spraying begins, but **DON'T** dissolve more Vitriol than is needed for each spraying.

SIXTH—It will require about one gallon of the dilute mixture per tree for the first and two gallons for the second spraying. This estimate is based upon trees about fifteen to twenty years old.

SEVENTH—To prepare the lime, place in a box or tub and pour on hot water until thoroughly slacked. Use two pails of the lime water to 5, or 8 or 10 lbs. of lime, according to the formula recommended above. For instance, if you are to use 8 lbs. of lime as recommended in the first formula, use 2 pails of water to each 8 lbs. for slacking Stock Solution, then every two pails of the lime water dipped out represents 8 lbs. of lime, but it must be well stirred before dipping out. If the *New Process* lime is used, no slacking or straining is necessary. *Paris Green* should be placed in the pump barrel first, then the lime water, then the vitriol water, then fill up the barrel and go ahead. *Don't* put vitriol water in the pump barrel without lime. *Don't* leave the vitriol and lime water in the pump barrel over night.

LAST—When all ready to begin spraying, work your pump for two minutes, discharging back into the cask. This gets the agitator at work and removes any danger of scorching the foliage, caused by taking the poison out of the bottom of cask before the agitator has commenced to do its work.

Three (3) lbs. of Arsenate of Lead may be substituted in place of the Paris Green in the above formulas. This is prepared as follows:

"Rub up the desired quantity into a smooth, thin paste, in a small amount of water, and pour into the spray tank or barrel.

Keep the mixture well stirred and use a nozzle that throws out a fine mist-like spray.

Spray until the leaves begin to drip, then stop. Use at the rate of 3 lbs. to 50 gallons of water.

Select a bright day so that the Arsenate of Lead will have a chance to dry on the foliage.

SAN JOSE SCALE.

Directions for preparing the lime and sulphur wash for destroying the San Jose Scale.

Slack twenty pounds of lime in a tub, with hot water, and dilute to 20 gallons; to this add 15 lbs. flour of sulphur and stir it into the slacked lime very thoroughly. Put this mass of lime and sulphur into a kettle holding 50 gallons and fill the kettle with water, and boil for one hour. Put all into the spray barrel, straining the mixture as it is poured in the barrel. Work the pump half a minute discharging back into the barrel. It will be necessary to have gloves on to handle the nozzles, the solution being applied hot. We also advise the use of rubber blankets on the horses. Spray trees once thoroughly during the fall and early winter and again in March or first of April, before the leaves start.

Always—Remembering that our *Empire King* and *Queen* are the only hand pumps having the *Mechanical Agitator* with the *Automatic Brush* which swings under the suction tube and keeps the Strainer Clean. All of our Power Sprayers have these improved features.

You cannot burn the foliage with our pumps.

"THE LEADER IN ACTION"



DOES SPRAYING PAY?

SEE PAGES 38 TO 40 FOR THE ANSWER.

Island, Pa., Oct. 5, '09.

Am very much pleased with my Watson Sprayer. Does fine work in both orchard and potato fields. The arrangement for swinging the pipes out of the way when on the road is a great advantage.

Yours truly,

A. T. BAIRD.



Dayton, N. J., Sept. 7, '08.

I sold a friend at Heightstown one of the Watson Sprayers and got him to spray his potatoes RIGHT. He sprayed every ten days from the time his potatoes were up one month until the vines were dead. I am sending the farmers there to see them. They are yielding from 300 to 400 bushels per acre, and are a sight when dug out.

Yours respectfully,

LEWIS D. ROWLAND.

YOU NEVER HAVE "THAT SWINDLED FEELING" if you buy our PUMPS.

This half-tone shows a New Jersey Potato field sprayed with a
WATSON High Pressure Automatic Sprayer.

—MADE BY—

The Field Force Pump Co., Elmira, N. Y.

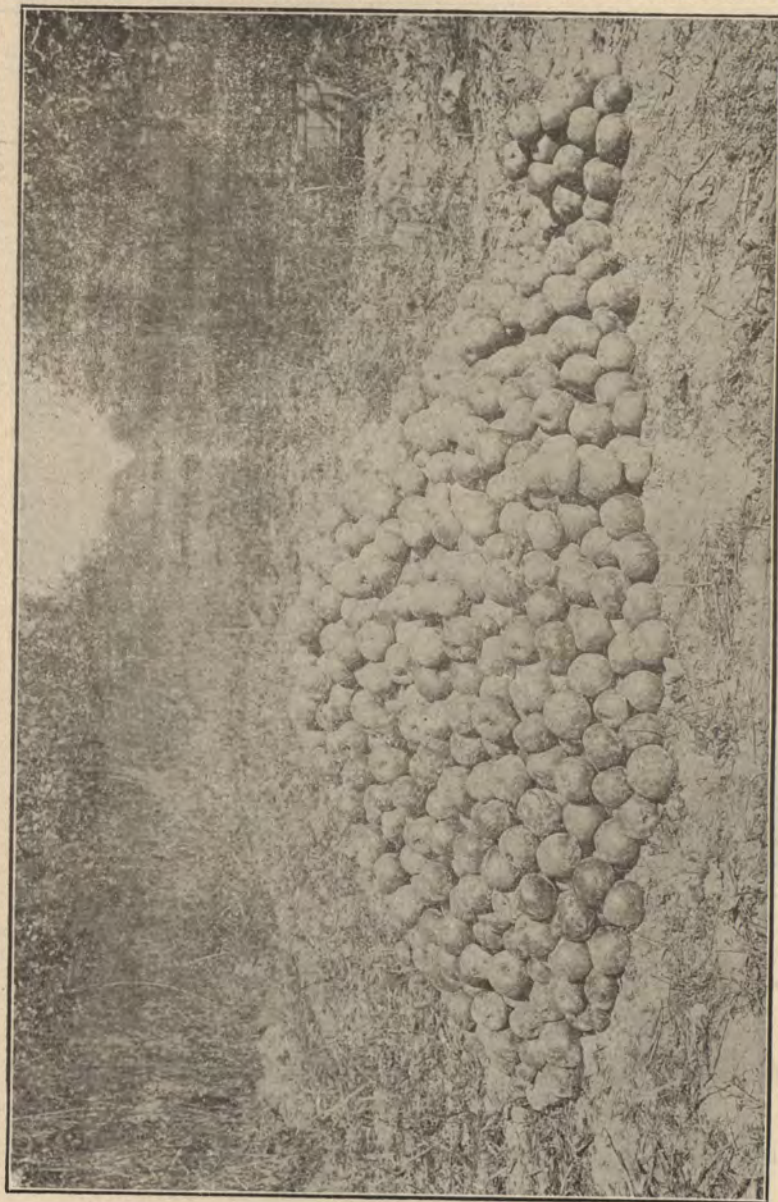


PLATE 1.—ENTIRE CROP OF SIX LANSINGBURG TREES SPRAYED SEVEN TIMES. SOUND, 3018 APPLES IN PILE ON LEFT; WORMY, 40 IN PILE ON RIGHT.

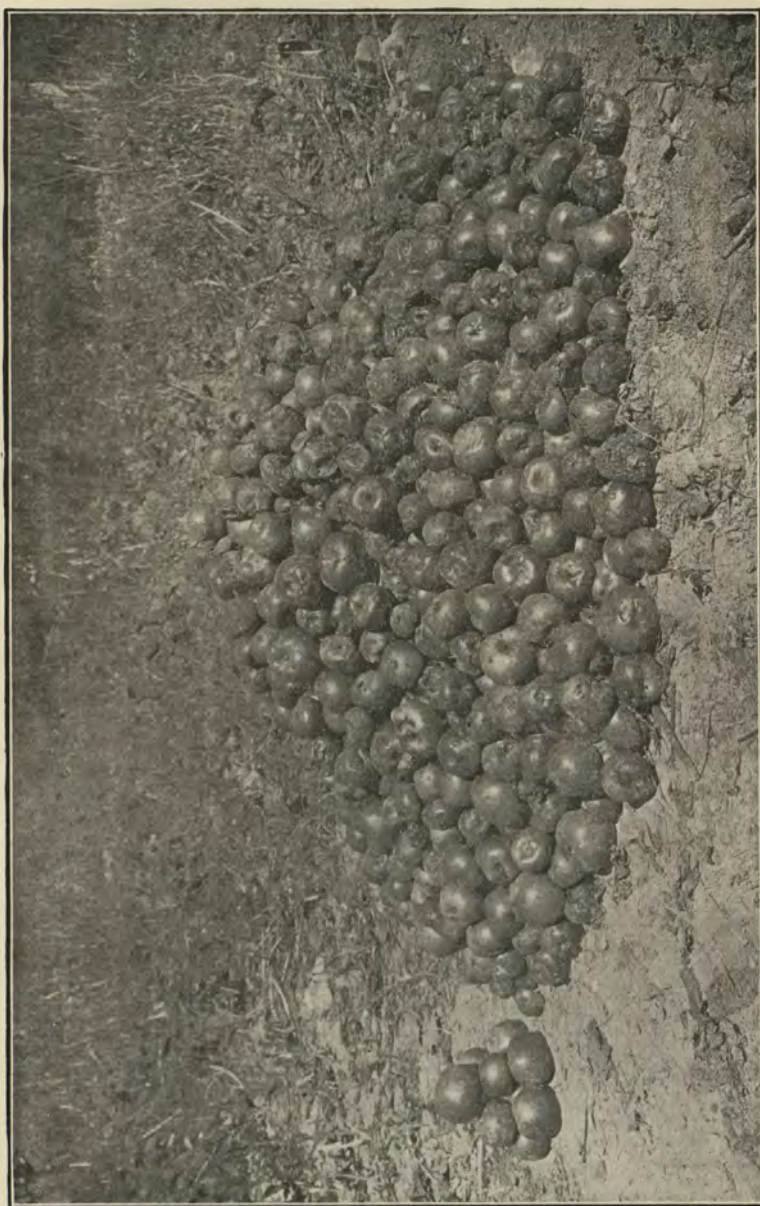


PLATE 3.—ENTIRE CROP OF NINE UNTREATED LANSINGBURG TREES. MER-
CHANTABLE, 10 APPLES IN PILE ON LEFT; CULLS AND WIND-
FALLS, 2014 IN PILE ON THE RIGHT.



PLATE 5.—EFFECT OF SPRAYING UPON THE FOLIAGE. THE ROW ON THE LEFT WAS SPRAYED ONCE IN APRIL. THE ROW ON THE RIGHT IS UNSPRAYED. PHOTOGRAPH OCTOBER 15th. THE SPRAYED ROW IS STILL IN ALMOST FULL FOLIAGE.

THE QUESTION IS ANSWERED, IT PAYS TO SPRAY.

POINTERS

No Spray Nozzle worthy of the name can throw spray more than fifteen feet. To do the most efficient work spray must be very fine and misty, not a deluge of coarse, heavy drops, which immediately run off and do no good. To secure the mist spray two things are necessary—first, a Pump which will give you a working pressure of not less than 100 pounds; and second, a fine Spray Nozzle which will produce the misty spray.

It frequently becomes necessary in order to reach the highest foliage on tall trees, to use long lengths of hose, or extension pipes, we advise the extension pipes and the Vermorel, Dewey, Tiger, or Niagara Nozzles for this purpose.

Pumps must be scientifically designed in order to be capable of producing and sustaining the necessary pressure. All our Spray Pumps are designed with this end in view, and all are *guaranteed* to give satisfaction.

Our pumps have been on the market for more than 28 years. They are well and favorably known all over the American continent. If you want the best, we can furnish it, and True Economy is to Buy the Best.

PROOF. You are not expected to accept our unsustained statement, but we simply ask you to read the descriptive matter in connection with each Pump carefully, and then refer to the following.

UNSOLICITED TESTIMONIALS.

WHAT SOME OF OUR CUSTOMERS SAY ABOUT THE "LEADER" AND OTHER SPRAYERS.

Troutville, Va., May 17, 1909.

Referring to the Leader Sprayer recently gotten of you, it gives me pleasure to say that I have sprayed my orchard of about 5,000 trees several times with it, and it gives entire satisfaction; in fact, I don't see how any Sprayer could work any better than this one does, and I will take great pleasure in recommending it to others who may be in need of one, and in doing this, I shall feel that I am doing them a favor in pointing them to a sprayer which, in my judgment, cannot be improved upon.

Yours truly,

E. H. STEWART.

Pemberton, N. J., July 22nd, '10.

The Leader pump you sent me last winter works very nicely and we think all the other machine wants is a new safety valve.

C. E. BUDD.

Portland, Ind., July 23, '10.

We have been using the spraying machine, the "Wooster," that we got from you in the spring for some time and are highly pleased with it. The machine certainly does the work better than anything we have seen. We will likely want a larger machine in the spring.

Respectfully yours,

PORTLAND NURSERY CO.

Bloomington, Ill., April 22, '10.

We have used the Leader for three sprayings and it has been running almost steadily except when the snow was too deep to run it.

We are more than pleased with the machine and with the pump. I do not see how it could work better, or how a simpler pump to handle could be gotten up. It has given us no trouble whatever, and is handled by men who have not been used to machinery to any great extent.

I congratulate you on the outfit you have on the market.

Sincerely yours,

R. O. GRAHAM,

Mgr. Lilly Orchard Co.

Northampton, Mass., May 11, '10.

The Leader Engine Sprayer sold to the City of Northampton is all right.

Our people are looking up many powerful machines for spraying from the ground. I find the work IS BETTER DONE from ladders with the men close to their work under the foliage. I spray thoroughly with $\frac{1}{2}$ in. nozzle, spraying trees 60 to 70 ft. high in 8 MINUTES THOROUGHLY. Spraying from the ground is not so effectual. You cannot get under the foliage as well as when the men are close to their work and you can use better judgment as to PERFECT PROTECTION.

Yours truly,

CHRISTOPHER CLARK,

Chairman City Imp. Com.

Carpenter, O., 4-12-10.

We have just finished spraying 400 apple trees with the Empire King Pump purchased of you a few weeks ago and we are very much pleased with it. It works easily and furnishes plenty of pressure for the two double Vermorel nozzles.

It is the cause of much favorable comment by those who have seen it work, and thinking I might handle the line for you I write to ask what terms you would be willing to make.

Very respectfully,

JOHN L. CARPENTER.

Westfield, Mass., May 24, 1909.

We have received your Leader Tree Spraying Apparatus and tried it out to-day. We find it works very satisfactory. We will approve bill and forward check for same.

Yours very truly,

JOHN L. BARRY,

Tree Warden.

RECENT UNSOLICITED TESTIMONIALS

READ THEM

The Empire King pump bought in April works far better than I expected.
We have sprayed from 200 to 250 large apple trees and find that the pump is capable of handling four nozzles nearly as easily as two. The agitator is certainly a *Hummer* and does its work far superior to anything I have yet seen.

Pepperell, Mass., May 9, '10.

Yours,
P. O. RICHARDSON.

Field Force Pump Co.,
Elmira, N. Y.

Gentlemen:—I have used the Leader Gasoline Cranberry Sprayer purchased of you for the past season, using as much as one thousand feet of hose at a time, and am so well pleased with it that I intend to order another like it in the spring.

Pemberton, N. J., Oct. 22, '08.

I remain,
Yours respectfully,
C. E. BUDD.

I am pleased with the power your Leader gives us and it stands the pressure well. We will want more of such machines in the future.

Edgemont, Md., April 28, '10.

Respectfully,
JOHN A. NICODEMUS.

You will remember that I have written you this spring for catalogue and prices on the "Watson" Potato Sprayer and now I wish to say that I am the proud owner of one of your "Watson" machines, which I bought of my neighbor, Mr. DeLong, who bought the sprayer of you last spring, and I like it very much.

Pennsburg, Pa., July 29, '10.

Very truly yours,
C. A. MACK.

Your Leader Gasoline Sprayer is a peach. We have been using it every day and it has not given us a moment's trouble and is always ready to start. Don't see where you could improve it. We put out 1,000 gallons of spray at 100 lbs. pressure and only used 7 pints of gasoline.

I have had 12 years experience with engines and pumps and think your engine is O. K. You certainly have got as good if not the BEST rig on the market.

Wishing you success and thanking you for past favors, I remain,

Yours respectfully,
GEO. E. STEPHENS,
Mgr. W. B. Robinson & Sons Fruit Farm.

Please ship us at once one Leader Gasoline Sprayer complete. We have an order for this machine from Mr. John H. Miller, who is the largest individual apple grower in the United States.

We sold him one earlier in the season, and while he has three other makes of gasoline sprayers, he has given us a duplicate order.

Martinsburg, W. Va., 4-27-'09.

Yours truly,
ROTHWELL & CO.

I desire to say that were I to manufacture or make the "Leader Orchard Sprayer," 3 1/2 H. P., I could not do it justice.

After last seasons spraying using 175 lbs pressure right along, then finishing up by putting sprayer in the shed WITH NO CARE, I started to spray "scalecide" this morning and the engine WORKED GRAND, and there was no difference in it. It worked just the same as the FIRST DAY I USED IT.

I am just as enthusiastic over this kind of all sprayers as I ever was. I have used three kinds and they were considered the VERY BEST, even having a plant for compressed air sprayers, but I want to tell you honestly and truthfully that the "Leader" sprayer has them ALL BEAT in any way they want to test it. I am going to buy another one.

Yours respectfully,
CLARENCE W. COCHRAN.

Field Force Pump Co.,
Elmira, N. Y.

Gentlemen:—Enclosed find check to balance account.

We have used the Leader Engine and Pump for two full days and are highly pleased with it. Everything worked to perfection and we had all the power needed and some to spare at all times under high pressure, and we are convinced that the spraying was the best we ever did and believe that the outfit will more than return its cost this year by reason of perfect work.

We shall recommend it to our friends. We were solicited by three other pump companies but are glad we stayed with you and bought the Leader.

St. Clairsville, Ohio, May 10, 1909.

Yours truly,
S. D. & J. W. RILEY.

Empire King Pump

Showing Detached Parts.

In ordering repairs give name as well as the number of the parts wanted.

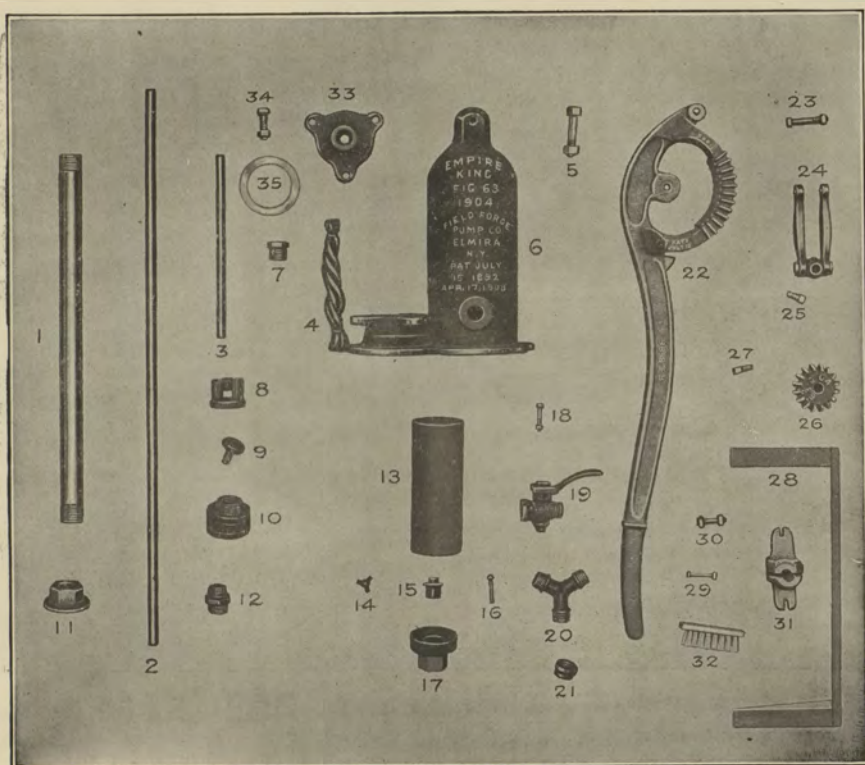


Fig. 112.

PRICE LIST.

No.	Price.	No.	Price.
1. Suction pipe	\$.50	19. Shut-off cock	\$1.00
2. Agitator shaft	.50	20. $\frac{3}{4}$ Brass Y for two hose	.60
3. Plunger rod	.60	21. Cap for Y	.15
4. Hemp packing for rod	.10	22. Lever	1.25
5. Bolt for top of air chamber	.10	23. Bolt for lever	.06
6. Air chamber	3.00	24. Links and cross head	.30
7. Brass follower for plunger rod	.30	25. Screw for cross head	.10
8. Brass cage for plunger	.40	26. Small gear for agitator shaft	.50
9. Brass valve for plunger	.20	27. Steel screw for small gear	.10
10. Brass bucket for plunger	.80	28. Agitator paddles	.40
11. Strainer for suction pipe	.40	29. Bolts attaching casting to paddles	.02
12. Single spout for one lead hose	.40	30. Bolt for attaching agitator castings	.10
13. Brass cylinder	1.00	31. Agitator casting	.20
14. Brass triangle	.10	32. Brush	.16
15. Brass poppet valve	.20	33. Cap for top of cylinder	.50
16. Brass rivet for poppet valve	.06	34. Bolt for cap	.04
17. Brass valve seat	1.00	35. Packing ring for No. 33	.10
18. Bolt fastening to barrel	.02		

We can furnish chemically treated Vit. leather buckets to be used between Nos. 8 and 10 at 30c each. Russet leathers at 15c each, or Canvas at 20c.

IF REPAIRS ARE WANTED FOR THE EMPIRE QUEEN, JUNIOR EMPIRE OR WOOSTER PUMP, USE THESE NUMBERS, BUT BE PARTICULAR TO SPECIFY THE PUMP FOR WHICH PARTS ARE WANTED.

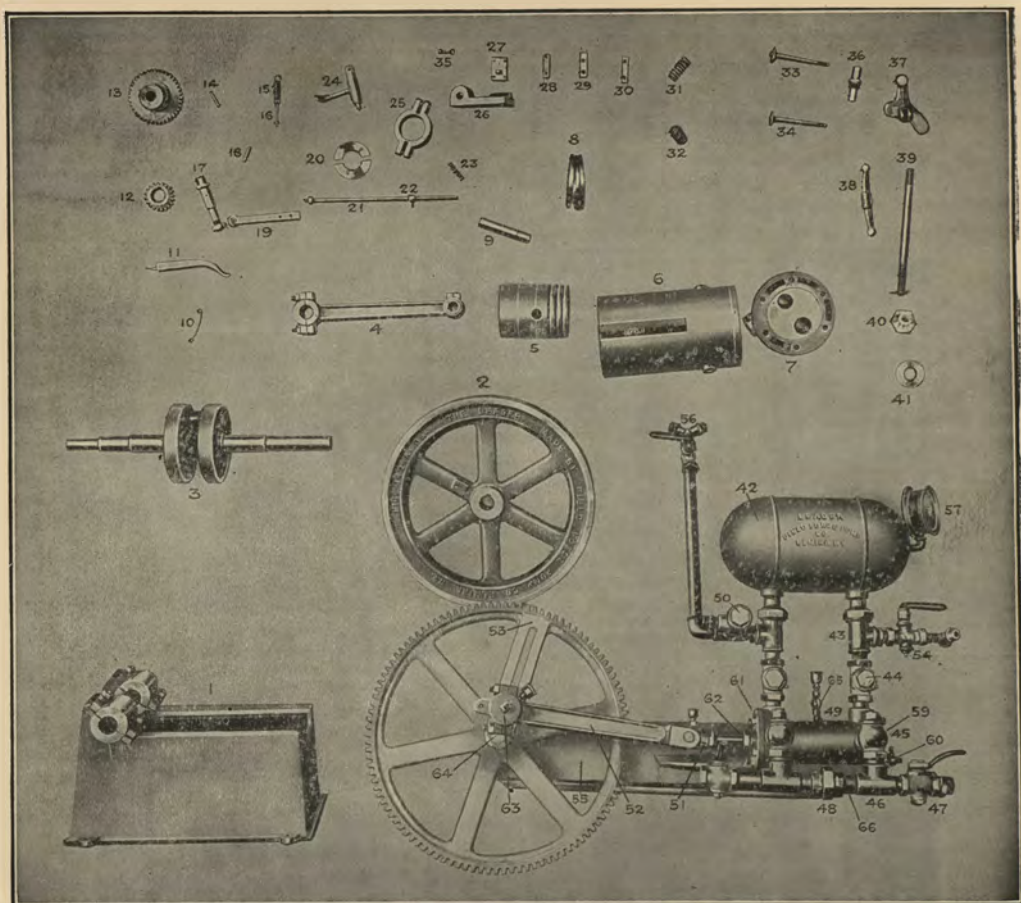


Fig. 157. **Detached Parts of "LEADER" Engine and Pump**

In ordering repairs give letter and number on the casting as well as the number shown on this sheet, and be particular to specify whether the pump has 2½ or 3 inch cylinder.

No.	Name of Part.	List Price.	No.	Name of Part.	List Price.
1.	Engine Base	\$10.50	37.	Walking Beam Bracket	.45
2.	Fly Wheel	9.00	38.	Walking Beam	.30
3.	Crank Shaft	10.50	PUMP PARTS.		List Price.
4.	Engine Connecting Rod	2.50	39.	Brass Plunger Pump Rod	1.35
5.	Piston	3.50	40.	Brass Plunger Nut	.45
6.	Cylinder	10.50	41.	Brass Collar for Plunger	.30
7.	Cylinder Head	3.50	42.	Pump Air-chamber	6.00
8.	Piston Rings (three.) Iron	.75	43.	1 in. Union Tee	.60
9.	Piston Pin	.75	44.	Upper Check Valve	3.50
10.	Spring for No. 11	.15	45.	Lower or Angle Check Valve	3.25
11.	Governor Arm	.75	46.	1 in. Tee	.40
12.	Small Gear 2 to 1	1.20	47.	1 in. Suction Shut-off	1.05
13.	Large Gear 2 to 1, Cam and Eccentric	4.20	48.	1 in. Union	.30
14.	Governor Weight Pin	.15	49.	Iron Pump Cylinder	1.80
15.	Governor Weight Spring	.15	50.	Safety Valve	5.00
16.	Governor Weight Spring Rod	.15	51.	Pump Cross Head	.75
17.	Cam Stud	1.05	52.	Pump Connecting Rod	2.25
18.	Pin to Connect No. 11 with Cam Stud	.15	53.	Large Gear	5.25
19.	Cam Plunger with Roller Attached	1.05	54.	¾ Discharge Shut-off	1.50
20.	Governor Ring	.75	55.	Pump Jack Base	7.25
21.	Cam Push Rod	.30	56.	¾ Brass "Y"	.75
22.	Collar for No. 21	.15	57.	Pressure Gauge, High Pressure	4.00
23.	Spring for No. 21	.15	58.	Brass Lining for Iron Cylinder. (not shown.) Give Diameter	1.30
24.	Governor Weight, (each)	.45	59.	Pump Cylinder Head	.50
25.	Governor Collar	.90	60.	¼-in. Drain Cock for 59	.45
26.	Cam Bracket	.90	61.	Pump Cylinder Head, Stuffing-box End	1.80
27.	Brass Plate for No. 26	.30	62.	Brass Follower for Stuffing-box	.60
28.	Vulcanized Fibre Insulator	.15	63.	Crank Pin for No. 53	.75
29.	Steel Catch for Governor	.30	64.	1 7-16 Steel Shaft for No. 53	1.20
30.	Ignitor Spring	.15	65.	¼-inch Oil Shut-off for Pump Cylinder	.30
31.	Inlet Valve Spring	.15	66.	One of 12-1 in. Close Nipples	1.50
32.	Exhaust Valve Spring	.15	67.	Pump-drive Pinion (not shown)	1.50
33.	Inlet Valve	1.05		Iron Pulley, 9 in. Diam., 4 in. face	2.50
34.	Exhaust Valve	1.05		Iron Pulley, 12 in. Diam., 4 in. face	3.75
35.	Ignitor Adjusting Screw	.15		Plunger Packing (3 composition rings 2½ inch, \$1.60; 3 inch	2.00
36.	Valve Guide (exhaust or inlet)	.60			



1911

SPECIAL EDITION

BRACKETT, SHAW & LUNT CO.

GENERAL DISTRIBUTORS

62 N. WASHINGTON ST., BOSTON, MASS.

and SOMERSWORTH, N. H.