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A KEROSENE ATTACHMENT FOR  
KNAPSACK PUMPS.

HOWARD EVARTS WEED.

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AGRICULTURAL COLLEGE, MISS.,

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## A KEROSENE ATTACHMENT FOR KNAPSACK PUMPS.

In Bulletin 27, of this Station, a description is given of an attachment to the Climax pump of the Nixon Company, whereby kerosene is mechanically mixed with water for use as an insecticide. This attachment to the Climax pump was designed by Prof. E. S. Goff, of the Wisconsin Station, and published by him in the Annual Report of the Wisconsin Station for 1891. The attachment as here described is that as applied to the "Perfected Galloway" Knapsack, of The Deming Company. As applied to the "Perfection Knapsack Sprayer" of the W. & B. Douglass Company, it differs only in one or two details, both attachments doing equally satisfactory work.

An exterior view of the outfit is shown in Fig. 1. The

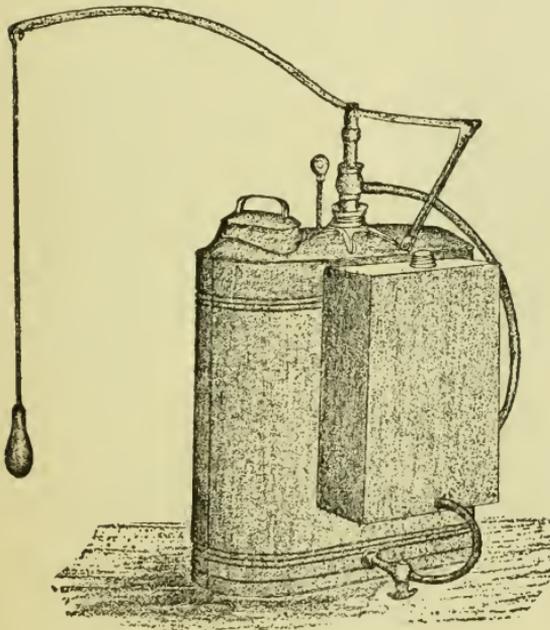


FIG. 1.

kerosene is placed in a separate tank, which is attached to the back of the main tank by means of two clips at the side near the top and holds one and one-fourth gallons. A one-fourth inch hose, attached by a collar, connects the kerosene tank with a brass pipe connecting with the cylinder of the pump just below the lower of the two small balls which serve as valves. A stopcock is provided, as shown in the figure, so that the kerosene, or a portion of it, can be shut off

at any time. Fig. 2 shows the attachment more in detail, and but little is needed by way of further explanation. A pipe for the passage of the water is provided, at right angles to the pipe through which the kerosene passes, and this is also provided with a stopcock with an elongated handle extending through the top of the main tank, as

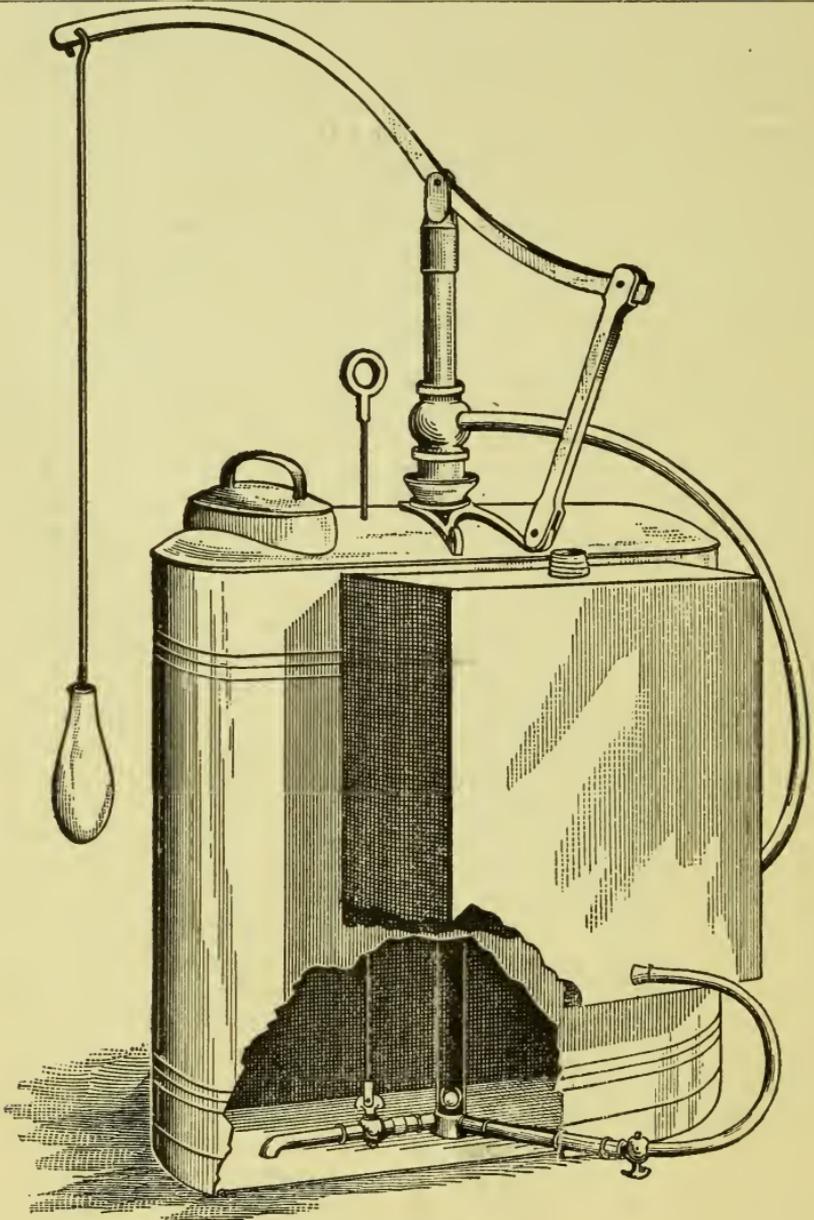


FIG. 2.

shown in the illustration, so that the water may be shut off if desired. Owing to the action of kerosene upon rubber, the small rubber balls which serve as valves at the bottom of the pump cylinder, should be replaced with marbles.

The hose connection between the kerosene tank and the pump should be of cloth insertion, so that it may last longer than would be the case if composed of rubber alone. It will occasionally be necessary to put on a new hose connection here, which is easily done. The kerosene tank can be made of tin, unless wanted for corrosive compounds, as explained later, and is readily detachable from the pump proper, so that when the pump is used for purposes other than where a mechanical mixture of two liquids is wanted, it will in no way interfere with the use of the pump in the ordinary manner.

The mechanical mixture of kerosene with water is designed to do away with the necessity of making a kerosene emulsion. Kerosene is an excellent destroyer of insect life, and by its use many insects can be destroyed which could not be reached in any other way. Heretofore the kerosene has been made into an emulsion by first mixing with soap-suds or sour milk and then diluting with water, as it cannot be used in an undiluted state on plants on account of its injurious effects. While it has been used as an insecticide very successfully in the form of an emulsion, yet various writers have reported far different results from their attempts in making a stable emulsion. It would seem that different conditions as to the kind of soap and water used, temperature, mode of operation, etc., so effect the making of the emulsion that the same results are not always obtained even by the same person when working under what might be considered the same conditions. Such being the case, if by the mechanical mixture of kerosene and water we can accomplish the same results obtained by an emulsion, we have greatly simplified the matter so that it will be used as an insecticide much more extensively. Kerosene is wanted for use as an insecticide most extensively in garden work and for such purposes the knapsack pumps are used almost exclusively. It is on this account that we have fitted the attachment to these pumps. By means of this attachment any proportions of kerosene and water desired can be pumped from the nozzle by simply turning the stopcocks. Both stopcocks can be reached with the hand when pumping, although for ordinary purposes it is only necessary to turn the cock of the kerosene pipe, this being the more easily reached.

Experiments with this attachment show that the kerosene and water are so thoroughly mixed in the act of pump-

ing that the kerosene is as harmless to foliage as is an emulsion of the same strength, and upon all plants so far as we have experimented we have been enabled to kill the insects without injury to the foliage. We have been especially successful in using the attachment upon the green Cabbage-worm (*Pieris rapæ*) and the Cabbage aphid (*A. brassicæ*), the proportion of kerosene used being about one-tenth. For the Cattle Tick (*Boophilus bovis*) we have used the attachment successfully by using equal amounts of kerosene and water.

This attachment can also be used for many purposes other than the mechanical mixture of kerosene and water. In many cases it may be best to dilute fungicides only when applied to the foliage in the act of pumping and for this purpose it will prove useful. A recent report (Delaware Station, Bulletin 22) recommends this method as being the most efficient in the preparation and use of the ammoniacal solution of copper carbonate. Of course when the copper or other corrosive compounds are used in this manner, the small tank should be made of brass instead of tin.

This attachment for the knapsacks can be obtained from The Deming Co., Salem, O., in connection with their "Perfected Galloway Knapsack," at eighteen dollars, and from the W. and B. Douglas Co., Middletown, Conn., in connection with their "Perfection Knapsack Sprayer" at the same price. These pumps with their attachments are of about equal value, both being of the same pattern and differing only in details.

#### SUMMARY.

1. By means of an attachment to the knapsack pumps we are now enabled to mechanically mix kerosene with water for use as an insecticide.

2. This mechanical mixture appears to do all the work of a kerosene emulsion, thus greatly simplifying the method of applying kerosene as an insecticide.

3. This attachment is applicable to all the knapsack pumps of the Galloway pattern, and can now be obtained in connection with the "Perfected Galloway" and the "Perfection" knapsacks.

4. As this attachment is not patented, all manufacturers are at liberty to place it upon their pumps.

5. The attachment can also be used for many purposes where a mechanical mixture of two liquids is wanted.