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## PROTECTION OF ECONOMIC CROPS

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This invention relates to methods and apparatus utilized in the protection of economic crops, and is more particularly concerned with methods and mechanisms enabling the ready application of vapors and gases to growing crops for the elimination of weeds, parasites, etc.

Among the objects of the present invention is the development of novel methods of treating economic crops to reduce or eliminate weed growth.

Other objects include novel methods of application of parasiticides.

Further objects include mechanical structures enabling such methods to be readily carried out.

Still further objects and advantages of the present invention will appear from the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only, and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

In connection with that more detailed description, there is shown in the accompanying drawings, in

Figure 1, a vertical cross section through a sulphur burner constructed in accordance with the present invention; in

Figure 2, a modified form of such sulphur burner; in

Figure 3, a sulphur vaporizer constructed in accordance with the present invention; in

Figure 4, a section on the line 4—4 of Figure 1; in

Figure 5, a side elevational view of a sulphur burner of the character shown in Figures 1–3 of the drawings mounted on a truck; in

Figure 6, a plan view of the structure shown in Figure 5; and in

Figure 7, a detail of the discharge mechanism including means for restricting the atmosphere in which the vapors and gases discharge when the discharge mechanism operates.

In accordance with the present invention, growing plants, particularly of the nature of economic crops, are protected by direct application thereto in the field of the desired gases and vapors or other materials which are to be applied to the plants for any of various purposes including the restriction of weed growth, or the entire elimination of weeds, the application of parasiticidal compositions, etc. The structures of the present invention enable ready application of the desired material to be made in situ on the growing plants in the field, and such mechanisms also make possible the ready application of gases and vapors or other materials, which have not heretofore been applicable directly to growing plants under field conditions.

In accordance with the present invention, the material to be utilized to treat the plants, or to eliminate weeds, or for other purposes, is converted into a gaseous, vaporous, or mist form, and in said sub-divided condition is applied directly to the plant under field conditions. In accordance with the present invention, the application of sulphur vapors or sulphur dioxide-containing gases applied to the growing plants under field conditions will be utilized to illustrate the present invention, without any intended limitation, since the methods of the present case, and the apparatus and structures enabling such methods to be utilized, may also be employed in the application of any desired type of material that can be readily converted into a gasified condition. The term "sulphurous gases" will be utilized herein to cover sulphur vapors or sulphur dioxide gases or similar materials derived from sulphur.

Sulphurous gases lend themselves readily to utilization for the treatment of plants under field conditions, since such sulphurous gases including both sulphur vapors, and sulphur dioxide-containing gases, may be readily and economically produced and utilized for such purposes. The sulphur dioxide may thus be generated and utilized particularly for the control of weed growth in economic crops, and is particularly useful in reducing or entirely eliminating weed infestation of grain or cereal fields, the sulphur dioxide acting as a general herbicide for the control of weeds. Cereal crops that may thus be treated include barley, etc., but other economic crops such as onions and so on may also be protected in accordance with the present invention. While the sulphur dioxide in such cases acts primarily as a herbicide, it also undoubtedly affects at least a partial control in the prevention or elimination of grain diseases. Among the weeds which may thus be reduced or eliminated by the utilization of such sulphur dioxide, there may be particularly mentioned mustard, wild radish, wild lettuce, Russian thistle, dock, Shepherd's purse, etc. Not only is there a direct elimination of or reduction in the growth of such weeds, but since certain weeds are known to be hosts for parasiticidal insects, the elimination of the weed also eliminates to a large extent the possibility of infestation due to such insects.