

UNITED STATES PATENT OFFICE.

LEE BARNETT WILLIAMS, OF LEMON GROVE, CALIFORNIA.

METHOD OF ARTIFICIALLY COLORING CITRUS FRUIT.

1,061,253.

Specification of Letters Patent.

Patented May 6, 1913.

No Drawing.

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To all whom it may concern:

Be it known that I, LEE B. WILLIAMS, a citizen of the United States, residing at Lemon Grove, in the county of San Diego and State of California, have invented a new and useful Method of Artificially Coloring Citrus Fruit, of which the following is a specification.

This invention relates to a method of artificially coloring citrus fruits such as oranges and lemons, particularly the latter.

In the spring and fall of the year, mature lemons are picked while very green in color and in order to meet the demands of the trade, which calls for a light yellow fruit, it is necessary for the shipper to resort to means for producing artificially the desired hue. This has been accomplished heretofore by placing the fruit in a practically air tight room and subjecting it to the highest degree of heat permissible without injury, usually about 90° F., the heat being supplied by kerosene stoves placed in the room with the fruit, or in a basement beneath the latter, water evaporated by the heat of the stoves providing moisture, which, in conjunction with the heat, has heretofore been thought a necessary adjunct in carrying out the procedure. The danger present in the use of coal oil stoves has so increased the cost of insurance, that many firms have found it cheaper to construct separate buildings in which to carry out the coloring process, entailing thereby an expense which by the method constituting this invention is entirely eliminated.

As the result of practical experiments covering a period of several years, and of close observation as to the different results produced by various conditions, I have definitely proven that the desired change in the color of the lemon was not the result of heat, or of moisture, or of both combined, but was caused by the presence of a pungent gas that escaped from the coal-oil stoves. This decision was arrived at only after repeated and long continued tests and from observing that one type of stove produced more of the pungent gas than another, and that the most effective coloring resulted when the largest per cent. of gas was present. To prove the correction of my theory, I conducted a series of experiments, testing first with heat, then with moisture, and finally with gas, and found that the first two treatments were abortive, but that the last was perfectly successful.

Having established this fact, the next step was to obtain this gas cheaply and in sufficient quantities to meet all demands without the presence of moisture or of any appreciable heat, thus to eliminate the use of oil-burning stoves and their attending danger and expense, and to secure a more rapid, effective and uniform coloring. As an almost natural sequence of my investigations, it occurred to me that the fumes of gas produced by the exhaust from the explosions of an engine using gasoline or other liquid hydro-carbon, would contain the element sought, with the exclusion of heat and moisture. Tests proved my theory to be correct, and the method of this invention therefore consists in placing the mature but green colored fruit in a tent or room made as nearly air tight as possible and connecting with the inclosure the exhaust pipe of an explosive engine. As the gas will be discharged with considerable force, it will be caused by circulation to be brought into contact with all of the fruit and thus evenly and rapidly effect the desired change in the color of its skins without in the least impairing the flavor of the fruit. As will be evident, the gas will be discharged with considerable pressure, and will thus be caused to permeate the interstices between the fruit, as well as to envelop it in such manner as to insure its thorough and rapid coloring in a very much shorter time than if only natural draft or circulation were relied upon. Further, the pressure will remain constant so long as the engine is running, thus causing the gas to be constantly circulating with the result that freshly entering and thus most pungent fumes are caused to impinge against the fruit and effect its uniform coloring. This result is also assisted in a marked degree by the absence of any appreciable moisture in the gas, as when it is exhausted, it is dehydrated, and any small percentage of humidity it might absorb from the transpiration of the fruit will be negligible. The element in the gas that accomplishes the change of color is believed to be acrolein (allyl aldehyde, C_3H_4O) which is highly pungent character, and reacts on the chlorophyll of the skins or rinds and produces the result described. Fruit thus treated is not damaged in the least, and all danger of withering is eliminated.

As the agent employed is a waste matter, it will be seen that to carry out the process

will entail no expense on a fruit packing house employing an explosive engine as its motive power.

While not described, it is to be understood that the procedure outlined is equally advantageous in use in treating mature green colored oranges for the purpose stated.

What is claimed is:

1. The method of coloring citrus fruit which consists in subjecting it to the action of acrolein with an absence of moisture.

2. The method of coloring citrus fruit which consists in subjecting it to a dehydrated vapor, under pressure containing acrolein.

3. The method of coloring the skin of a mature citrus fruit which consists in subjecting it to the action of acrolein under constant pressure and circulation.

4. The method of coloring the skin of a mature citrus fruit which consists in subjecting it to the action of the fumes from the gases of an explosive engine.

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

LEE BARNETT WILLIAMS.

Witnesses:

CROMWELL MCKINNEY,
E. C. UPP.