UNITED STATES PATENT OFFICE.

CHARLES S. PHILIPS, OF BROOKLYN, NEW YORK.

METHOD OF MATURING, SWEATING, AND COLORING LEAF-TOBACCO.

SPECIFICATION forming part of Letters Patent No. 245,743, dated August 16, 1881.

Application filed February 25, 1881. (No specimens.)

To all whom it may concern:

Be it known that I, CHARLES S. PHILIPS, of the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in the Process of Maturing, Sweating, and Coloring Leaf-Tobacco, of which the following is a specification.

The object and nature of my invention are to cure, sweat, and color tobacco without developing or retaining odors of an empyreumatic nature; and it consists in sufficiently eliminating or neutralizing the rank or empyreumatic odor producing product of the leaf to accomplish the purpose during the curing, sweating, or coloring process. I will describe some practical ways by which it may be done.

Domestic seed-leaf or cigar tobacco is cut and gathered from the field early in the fall of the year. The whole plant is hung up in barns and sheds to dry out and partly cure, and the following winter, when the weather is moist enough to soften the tobacco, the plants are taken down, the leaves picked off and tied into hands or hanks of a few leaves each. About four hundred pounds of such hands are weighed off and packed into a wooden case about thirty inches wide, thirty inches high, and about forty-two to forty-eight inches long. These cases are then piled in barns or warehouses, and left until the following summer has fermented the tobacco, or until it has gone through a sweat. Each case is then inspected or sampled in order to ascertain its condition. The beneficial result of this fermentation, or "sweat," as it is called, will depend entirely upon the condition of the tobacco as to its moisture at the time it was packed, and the condition of the atmosphere surrounding the case during the sweat. The custom is to pack the tobacco rather moist, so that it will sweat hard, and thus avoid the necessity of resweating it; but the outer portions of each case dry out so much before the tobacco gets into a sweat that it does not color sufficiently, but comes from the sweat a strong leaf suitable for resweating, while the central portion of the tobacco in the case, which did not dry out, but went through a summer sweat, comes from the sweat dark enough in color, perhaps, but generally so tender as to unfit it for cigar-wrapping purposes, also unfits it for resweating, as such long periods of fermentation destroy the fiber or texture of the leaf, and consequently quite a large percentage of wrapping-tobacco is spoiled, while tobacco that is packed not too wet comes from the summer sweat in such a condition as to strength of leaf that it may all be resweated and used for wrappers without any loss.

A large percentage of the cigar-wrapping tobacco comes into market not sufficiently cured, and too light and uneven in color to meet the wants of manufacturers, and has to be resweated for the purpose of eliminating the wild, rank element of the leaf, and producing dark colors before it can be used for cigar purposes; and, for the purpose of curing and darkening the color of the leaf, manufacturers and others now take the tobacco from the cases and dampen it as much as they think it needs, and then stack it into square or round piles, the contents of several cases in a pile, or pack it into the cases again, and tier the cases in a room or apparatus, and as soon as possible heat the room to a high degree, so that the tobacco is quickly heated through, and it is then said to be "in sweat." They seem to labor under the delusive impression that the sooner they can get their tobacco heated to a high temperature and the more heat they can use the more rapid and better work they are doing, while quite the contrary is the fact, as experiments have proven to me that it takes or requires about forty-eight hours of moist heat at about 140° Fahrenheit to heat a case of tobacco through to its center, whether it be wet or dry; whereas if the tobacco be moist and placed under favorable conditions for the development or acceleration of fermentation—say at temperatures ranging from 75° to 85° Fahrenheit, or thereabout—or at such temperatures as will not kill fermentation, the same case will be heated through in about the same time. In the first instance fermentation is not allowed to develop. The heat must work its way gradually from the outside until it penetrates the middle of the mass. In the second instance fermentation is allowed to develop, and it commences in the center of the mass first and works outward, and by the time the whole mass has become

affected the interior temperature of the mass is much above the outside or surrounding atmosphere.

Many ways are employed for heating the tobacco or the rooms or apparatus in which the tobacco to be heated is placed; but everybody recognizes the fact that it requires moist heat and high temperature to produce darker shades of tobacco, and many mechanical contrivances have been tried to produce two results—dark-colored and merchantable tobacco—and by "merchantable" I mean that the tobacco should not have such an unnatural odor as to render it objectionable. In all the processes and apparatus now in use the heat, not being properly applied, produces very objectionable results, which as yet no one before me has been able to overcome. The tobacco comes from them all impregnated with an offensive and an unnatural odor. The length of time which tobacco must necessarily be subjected to heat to produce dark colors depends entirely upon how moist the tobacco is and the degrees of heat used and the quantity of tobacco which may be in the mass. As a rule it requires a heat of over 130° Fahrenheit to change the original colors of unfermented tobacco to darker shades. After resweating a great many thousand cases of tobacco, I find 110° to 145° Fahrenheit to be the best temperature of heat to work by on all kinds of tobacco already fermented enough to be called "cured," and from four to six days to be the average time necessary for such tobacco to be subjected to a heat ranging between those degrees. As the objectionable or empyreumatic odor is developed in new or uncured tobacco at a much lower temperature than in old, such tobacco should only be subjected to a heat ranging from 60° to 90° Fahrenheit for the purpose of facilitating natural fermentation until the tobacco has obtained proper age—that is, has become properly cured—and the gum is sufficiently reduced to permit its being cased or moistened and resweated, the same as old tobacco.

The offensive and unnatural odor before mentioned I find is caused by the too sudden application of a high degree of heat to the tobacco; and what I mean by "a high degree of heat" is any degree of heat that will kill natural fermentation, and it may be distinguished by the peculiar and unnatural odor the tobacco takes on while in the heat. It cannot be confined to a single degree, as it may vary considerably, according as the tobacco may be more or less wild and rich in rank elements. The safest way to facilitate and accelerate natural fermentation is ordinarily to keep between 70° and 85° Fahrenheit. High heats applied to freshly-wetted or uncured tobacco decompose some of the properties of the leaf, and the result is the bad odor of an empyreumatic nature is developed before the tobacco becomes sufficiently colored, which renders the tobacco so treated unmerchantable. This objectionable odor is commonly called by the trade "Kentucky smell" or "steam smell," and by many is supposed to be caused from chemicals used to color the tobacco; and by those who know that chemicals are not used the fault is laid to the metals or wood of the apparatus with which the tobacco came in contact during its treatment; but heat improperly or too suddenly applied is the sole cause of the bad odors.

I have discovered that if tobacco be subjected to a low heat that will facilitate fermentation, and for a sufficient length of time, the empyreumatic-odor-producing products of the leaf are broken up and eliminated, and that ammoniacal fermentation is generally established; and when fermentation takes place, and is allowed to proceed for a sufficient length of time, the tobacco may then be subjected to a high heat for producing dark colors, and the tobacco so treated will not have an empyreumatic odor, whereas if a high heat be applied to cold or unfermented tobacco it will be simply heated through. Fermentation not having been set up, decomposition by heat takes place, and a bad odor is soon perceptible. Fermentation may have started, but may not have been of sufficient duration to accomplish the purpose. As the length of time necessary for tobacco to undergo fermentation cannot be specified, it must be left to the judgment of the operator, but is best determined by the good smell the tobacco takes on while fermenting. Ten to twenty days may be sufficient for goods of a fine quality, while ranker crops would require several weeks. The more ammonia the fermentation develops the quicker will be the process. After the tobacco has been moistened and has stood an hour or so on a casing-board, I place it nicely and snugly into large wooden boxes which will hold one case each, taking care that the butts lack about one inch from touching the wood of the box. This leaves an air-space around the butts and prevents mold during fermentation. I let the tips of the tobacco-leaves lap, as usual, but do not press the tobacco into the boxes, as fermentation is more active if the tobacco does not press too heavily together. I cover the tobacco with a board that fits inside of the box, and thus it always lies on the top of the tobacco and prevents it drying out. I then let the boxes of tobacco stand four or five days. When the temperature is about 70° Fahrenheit, during the warm weather, I use only the natural heat, and in cold weather artificial heat. At the end of three or four days the tobacco should be in a good sweat. I now repack it into the original or seed-leaf cases, for the reason that when the tobacco comes to be subjected to a high heat the ammonia in the tobacco will be decomposed and the gas escapes; and I wish it to escape so slowly as not to become exhausted before the tobacco is colored and the process finished, and the tighter the cases are the more perfect will be the process.

As soon as the tobacco is taken from the boxes and packed into cases, the cases must go back to 70° or 80° Fahrenheit temperature, or thereabout, again for a few days, (from two to five,) or until the tobacco becomes heated through again by fermentation before the heat can be raised for colors. This makes about ten days the process has been going on, and now is the time to decide when the tobacco will be sufficiently fermented to go into high heat for colors. Any goods that show a green uncured condition, or a heavy gummy leaf, or a leaf that would swell when smoked as a wrapper, must be left to a few more days' fermentation. All such defects must be thoroughly corrected by fermentation before the tobacco is put to a high heat, for the reasons before stated, and also because high heat does not take out the gum from the leaves as fast or as well as low heats and fermentation. All goods that seem to have fermented or sweated enough so that they will sweat for colors, I now subject to such heats as will bring out dark colors. I find it a very safe and satisfactory rule to work by to give the tobacco 110° Fahrenheit for the first three or four days, (counting twenty-four hours continuous process for one day,) and then raise the heat to 140° Fahrenheit, and continue it for about three days or more. If it be desirable to keep the heat up only during the working-hours of the day, then the process may be continued a sufficient number of days to accomplish the object. At the end of the fifth or sixth day I examine the tobacco and take from the process all the cases that may be done, and after they have stood an hour or more I then shake out the tobacco, and either repack it or give it to the workmen to be worked up. The reason for shaking it out after it comes from the process, and while it is yet warm, is because the tobacco, if left to get cold in the mass, would mat and stick together, and soon be much like plug-tobacco, and be worthless for wrapping purposes; but while it is yet warm the leaves will easily separate by gently shaking them out. I let the cases of tobacco stand long enough before shaking them out to allow the mass to lose a large percentage of its heat, as the cooler air, if allowed to strike the tobacco while it is too warm, would cause a thickening of the leaf by contracting its pores. Upon examining the tobacco, any that is not dark enough I put back for one or more days' treatment, and so on until it is finished. At the end of the fourth day's treatment at 140° Fahrenheit any tobacco that will color under that degree of heat will have done so, or at least will show a decided disposition to do so, and any tobacco that does not show such a disposition and has a red leaf I subject to a temperature of 160° or 180° Fahrenheit, and examine it about every twelve hours until it is as dark as I wish it to be.

If by any error in not first fermenting the tobacco sufficiently before subjecting it to the high heat any case should come from the process with a bad odor, I shake out such tobacco at once while it is hot and hang it up so that every hand hangs free, and will dry quickly and sufficiently to allow it being recased, and then commence the process all over again, and as soon as the tobacco goes into a fermentation again it will resume its natural flavor or odor.

Tobacco can be made dark-colored with a much lower degree of heat after it has been properly fermented than before. If the tobacco to be treated be sufficiently fermented, 140° Fahrenheit will, as a rule, be sufficient, while tobacco not first fermented often requires from 180° to 212° Fahrenheit to bring out the dark colors, and under such high heats the colors generally are of a dead and grayish appearance and useless for fine wrappers, while a rich and lively appearance is preserved by the process and under the low heats heretofore mentioned, and it is therefore very desirable to get the colors with as low heat as possible.

It is not absolutely necessary that the tobacco should be repacked from the boxes into cases after it has commenced to ferment for the first time; but this is rather a precautionary measure, for the reason that when the tobacco comes from the casing-board the bulbs are wet, and if they be packed into a tight box they will be apt to mold during the fermenting process; but if fermentation be carried on in an atmosphere sufficiently dry to prevent molding, the tobacco may be packed into cases at once from the casing-board, and the labor of repacking in that stage of the process may be dispensed with. The head-boards of the cases may be left out during fermentation, and placed in again while under moist heat or treatment for colors.

In subjecting the tobacco to a high heat I prefer that it should be a moist heat, so that the tobacco will not dry out, and that is best accomplished by exhausting steam, or evaporating sufficient water in the sweat-rooms or apparatus to keep the atmosphere well saturated. If the tobacco be in wood or other receptacles, it will thus be protected from oversaturation; but if it be in bulk, then the evaporation of the water should be so regulated that the tobacco will not become too wet. Matted, sticky, or thin-leaf tobacco may be easily shaken out and made free by first subjecting the tobacco, case and all, to a moist heat of 145° Fahrenheit for about forty-eight hours, or until heated through, and then shaking it out. The tobacco should lie in piles for about forty-eight hours to get cold before casing it. The process may then be carried on as before.

This treatment adds greatly to the strength of a fine or tenderly-inclined leaf.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The process of curing, sweating, and coloring tobacco which consists in piling or packing it while in a moist condition, then subjecting it to a temperature between 60° and 90°

Fahrenheit until fermentation is established, and then continuing fermentation for from two to six days, or such time as may be necessary to wholly or partially eliminate the undesirable element of the leaf, then increasing the heat to a temperature between 90° and 110° Fahrenheit for two or three days, and then continuing for one day or such a period, and at any higher temperature less than 180° Fahrenheit as the nature of the tobacco may require, in order to produce darker shades of color, substantially as described.

2. The process of maturing partially or improperly cured tobacco which consists in piling or packing it while in a moist condition, and then subjecting it to a temperature between 60° and 90° Fahrenheit until fermentation is established, and then continuing fermentation from ten to twenty days, or until the rank elements or empyreumatic-odor-producing products are sufficiently expelled and the tobacco matured, so as to be fit for further manipulation, substantially as described.

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Witnesses:
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