

UNITED STATES PATENT OFFICE.

LÉON PARANT, OF GENEVA, SWITZERLAND, ASSIGNOR TO SOCIÉTÉ ANONYME DES TABACS
DÉSINTOXIQUES, OF GENEVA, SWITZERLAND.

PROCESS FOR REMOVING NICOTIN FROM TOBACCO.

No. 862,583.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed January 10, 1907. Serial No. 351,696.

To all whom it may concern:

Be it known that I, LÉON PARANT, a citizen of the Republic of France, residing at Geneva, Switzerland, have invented certain new and useful Improvements in and Relating to Improved Processes for Removing Nicotin from Tobacco, of which the following is a specification.

The present invention relates to a new process for removing the nicotin from tobacco, which is based on the principles of diffusion and dialysis.

If one or more wholly soluble substances be dissolved in a liquid, all the parts of this liquid, after a time, contain equal quantities of that or these substances, owing to the phenomenon of diffusion, because all these dissolved substances diffuse just as if each one of them were alone. If the vessel containing this liquid were divided into two separate parts by a sheet of parchment paper, moistened on both sides by the liquid, certain substances dissolved in the solution of both the parts will diffuse just as if there were no membrane interposed. If one of the parts contains more or less dissolved substances, the equality of the diffusion is restored by the principle of dialysis. Some of the soluble substances do not pass through the parchment paper, as they do not dialyze. These substances are called colloids, and the substances which do dialyze are called crystalloids.

Now I have found that the coloring matters in tobacco, the resins, the essences and the substances which produce the aroma of the tobacco, do not dialyze, with the exception of the nicotin and its salts which belong to the class of crystalloids, and do dialyze. If now water be poured into both the compartments of a vessel separated by a parchment paper, and if into one of these compartments, a bundle of 30 to 50 tobacco leaves be immersed, all the soluble parts of the bundle are dissolved and diffuse into the water and dialyze through the parchment paper into the water in the other compartment of the vessel. The colloids which give the aroma to the tobacco do not dialyze; but the nicotin and the crystalloids pass relatively rapidly through the parchment paper.

If the two compartments of the vessel are of the same capacity, the crystalloid substances will be found to be equally distributed on both sides of the membrane, whereas if the capacity of the compartment of the vessel into which the bundle of tobacco is immersed is one-tenth that of the other compartment, ten times more crystalloid substances and compounds of nicotin will be found in the compartment of greater capacity. It is therefore evident that by means of the respective dimensions of the compartments into which the vessel is divided, or by renewing the liquid, the amount of the nicotin removed from the tobacco may be varied.

But if the nicotin is removed in this manner, many

other soluble substances of the tobacco are also removed, and the tobacco loses from 15 to 20% of its weight and becomes less agreeable for smoking; and this process therefore which is very simple, may be used only for cheap tobacco. If the water containing the bundle of the tobacco leaves be replaced by tobacco juice and the liquid contained in the other compartment by essence of petrol, or any other liquid dissolving the nicotin, and not being miscible with water, these dissolvents of the nicotin, as they cannot dissolve the salts, will absorb only the nicotin which has been set free by ammonia, and in this manner, tobacco without nicotin may be obtained, which tobacco at the same time, retains its other ingredients and general qualities. The essence of petrol containing the nicotin, may be washed with water to remove the nicotin and to purify the petrol for a new operation. The fragility of the parchment paper membrane makes this process somewhat imperfect, so I prefer to fill the two compartments of the vessel with a liquid having the same composition and prepared so that a bundle of tobacco leaves saturated with this liquid and immersed into one of these compartments can neither take nor give anything else to the said liquid than its nicotin; for example, a number of bundles of tobacco are immersed so that they absorb a maximum quantity of water (about twice their own weight) which will dissolve all the soluble substances contained in the leaves. One half of these bundles are then compressed so that they lose the absorbed liquid, and this liquid is poured into both the compartments of a vessel or dialyzer. This liquid being of the same composition on both sides of the membrane, no dialysis takes place now: if in one of the compartments, one or more moistened bundles is placed, these bundles which are saturated with a liquid of the same degree of saturation as the liquid in which they are immersed, do not lose any of their ingredients to the surrounding liquid. But if the nicotin of the liquid on the other side of the membrane be removed, without removing any other crystalloid substance than its nicotin, the nicotin contained in the liquid surrounding the bundle will dialyze into the liquid on the said other side of the membrane, and while this is taking place, the nicotin in the leaves of the bundle will in its turn diffuse into the surrounding liquid proportionately to the quantity of nicotin dialyzed from the said liquid through the membrane to the liquid on the other side of the membrane. It will therefore be readily understood that by renewing the liquid from which the nicotin has been removed, the nicotin in the leaves of the bundle may be removed more or less completely. For removing the nicotin from the said liquid, any liquid dissolvent of nicotin may be employed which is not miscible with water, but I prefer to use the essence of petrol. The use of this dissolvent requires however certain precau-

tions; for instance, in order to avoid the emulsifying of the nicotinous liquid, the process of Schloessing for the determination of nicotine may be used, ammonia being added to the liquid containing nicotine and a quantity of two or three times its own weight of essence of petrol which may be renewed if necessary.

The essence of petrol may be washed with common or acidulated water to remove the nicotine. The nicotinous liquid gives to the essence of petrol besides its nicotine, other different substances belonging to the class of the aromatic colloids, but however, it maintains its composition of crystalloid matter, that is to say, its dialyzable substances.

By removing the nicotine from the liquid surrounding the bundle of tobacco, and therefore from the bundle itself by dialysis into another liquid containing the same dialyzable substances, nothing else is removed than the nicotine, so that when the bundles are removed from the liquid, they retain twice their own weight of the liquid (the maximum quantity they may absorb) and are then suitably dried and used as usual; and by this process nearly all the nicotine may be extracted from the tobacco without its losing any of its aroma.

In certain instances I may also employ an artificial liquid such as an aqueous solution of the crystalloid substances of the tobacco, and the use of this artificial liquid and also of a specially prepared juice effects a modification of the composition of certain tobaccos.

The dialyzers used for this process are preferably of the type of those used in the manufacture of sugar. These dialyzers generally consist of vertical wooden frames, placed side by side, of variable dimensions, and separated the one from the other by parchment paper. The even frames communicate with one another, as also, do the odd frames. The frames are each provided on the under and upper opposite corners with openings which allow the liquids to circulate from the bottom to the top in order to aid the diffusion and to accelerate the dialysis.

The liquids in the even and odd dialyzers circulate in the opposite directions in order that the liquid which contains less nicotine dialysis at first with the liquid which contains more nicotine.

The liquid rendered nicotineless by means of the essence of petrol, is stored by means of pumps in a large tank placed sufficiently above the dialyzers. This liquid passes through a filter-press which removes all the impurities which are detrimental to the dialysis, then enters the dialyzers, dissolves the nicotine and flows into rotating barrels, where it gives up its nicotine to the essence of petrol, etc. The liquid surrounding the bundles also flows out of a large tank provided above the dialyzers, then passes through a filter-press, enters

the dialyzers and is again pumped into the tank. The yield of nicotine of this liquid is as small as possible and nearly constant; the flow of the liquid being so calculated that it loses by dialysis during one of its cycles, the quantity of nicotine removed from the bundles of tobacco.

One half of the dialyzers are open at their upper parts, so that the bundles of tobacco saturated with the liquid as described above may be introduced and the liquids employed are produced as described above and may be used indefinitely, and by repeated tests for the quantity of nicotine, the process may be continued until the desired amount of nicotine has been removed from the tobacco.

I claim as my invention:

1. The hereinbefore described process for removing nicotine from tobacco, consisting in the diffusion of the soluble substances of tobacco in a liquid in which the tobacco is immersed, and permitting these soluble substances to dialyze from the said liquid in which the tobacco is immersed through a membrane into another liquid on the other side of the membrane.

2. The hereinbefore described process for removing nicotine from tobacco, consisting in immersing the tobacco to be treated into a liquid containing all the soluble substances of the tobacco including the nicotine, then permitting the nicotine to dialyze through a membrane to a liquid on the other side thereof containing in solution all the soluble substances in the first named liquid except the nicotine.

3. The hereinbefore described process for removing nicotine from tobacco, consisting in moistening the tobacco to be treated with a liquid in which the soluble substances of the tobacco are dissolved, then pressing the tobacco to squeeze out the liquid which is caused to flow into a vessel containing compartments separated by a membrane then immersing the tobacco in the liquid in one of the said compartments, and then removing the nicotine only from the liquid in the other compartment to cause the nicotine only in the liquid in the compartment containing the tobacco to dialyze from the said liquid through the membrane to the liquid in the other compartment of the vessel.

4. The hereinbefore described process for removing nicotine from tobacco, consisting in moistening the tobacco to be treated to the point of saturation in a liquid in which the soluble substances of the tobacco are dissolved, then pressing the tobacco to squeeze out the said liquid which is caused to flow into a vessel divided into compartments by a membrane, then immersing the tobacco in the liquid contained in one of the said compartments, and then adding a mixture of petrol and ammonia to the liquid in the other of said compartments to dissolve the nicotine therein, thereby causing the nicotine only in the first compartment to dialyze through said membrane to the mixed liquid in the other compartment.

In testimony whereof I have affixed my signature in presence of two witnesses.

LÉON PARANT.

Witnesses:

L. H. MUNICH,
R. DE WIRSTENBERG.