Claims

1. A diffusion promotion device having an accommodation space for accommodating a liquid agent supply device for supplying the liquid agent into surface layer of an object is formed internally, which generates an electric current for promoting diffusion of an active ingredient in the liquid agent under a surface of an object, wherein

the liquid agent supply device comprises:

a shaft portion in which a liquid agent storage space for storing the liquid agent is formed along with a first direction; and

a liquid agent supply unit disposed at a first end portion in the first direction side of the shaft portion, supplying the liquid agent contained in the liquid agent storage space to the subject, and

the diffusion promotion device comprises:

a first cylindrical member having a first accommodation space being formed internally for accommodating a predetermined portion located in a second direction side, which is opposite to the first direction side, of the liquid agent supply device, and the first accommodation space is disposed along a third direction parallel to the first direction;

a second cylindrical member having a first through-hole and a second accommodation space being formed internally for accommodating a predetermined portion in the first direction side of the liquid agent supply device and being disposed in the third direction side of the first cylindrical member, wherein the second cylindrical member allows the liquid agent supply device along

with the third direction so as to pass the first through-hole, and the liquid agent supply device along with the third direction not so as to pass the first through-hall, and;

a first electrode being used to promote diffusion of the active ingredient;

a second electrode being used to form a current path passing through the surface layer of the object with the first electrode when diffusion of the active ingredient is being promoted; and

a battery unit that generates a predetermined potential difference between the first electrode and the second electrode, and wherein

the accommodation space is formed of the first accommodation space and the second accommodation space.

2. The diffusion promotion device according to claim 1, wherein

the liquid agent supply unit includes a plurality of microneedles disposed at the end portion in the first direction side, each microneedle being hollow to communicate with the liquid agent storage space, and

the diffusion promotion device utilizes the plurality of microneedles to promote diffusion of the active ingredient being contained in the liquid agent supplied into the surface layer of the object.

3. The diffusion promotion device according to claim 2, wherein

the liquid agent supply device includes:

a first pressing operation member disposed at the end

portion in the second direction side; and

a liquid agent extrusion unit disposed in the shaft portion, which pushes out the liquid agent in the liquid agent storage space toward the liquid agent supply unit responding to pressure given to the first pressing operation member in the first direction, and wherein

the microneedle is protruded outside the second cylindrical member via the first through-hole in response to the pressure given to the first pressing operation member in the first direction, and then it provides the liquid agent to the object through the tip thereof

4. The diffusion promotion device according to claim 3 having a second through-hole being formed at the end portion in a fourth direction side of the first cylindrical member through which the shaft portion passes in the third direction, the fourth direction being opposite to the third direction, and further comprising;

a second pressing operation member that is insertable into and removable from the internal space of the first cylindrical member via the second through-hole that transmits a pressing force corresponding to the pressing operation of the second pressing operation member in the third direction to the first pressing operation member of the liquid agent supply device accommodated in the accommodation space.

5. The diffusion promotion device according to claim 3, further comprising

an elastic member, being capable of expanding and contracting in a fourth direction disposed in the second accommodation space,

which biases the liquid agent supply device accommodated in the diffusion promotion device in the fourth direction, the fourth direction being opposite to the third direction, wherein

the elastic member applies a biasing force to accommodate the entire liquid agent supply device into the accommodation space when the liquid agent is not supplied to the object.

6. The diffusion promotion device according to claim 1, wherein

the liquid agent supply unit includes a porous member absorbing and retaining the liquid agent, and the unit is disposed at the end portion in the first direction side and conducting, wherein

the porous member provides the liquid agent to the object when it is pressed against the surface of the object, and wherein

the diffusion promotion device promotes the diffusion of the active ingredient contained in the liquid agent provided by pressing the porous member against to the surface of the object under the surface layer of the object.

7. The diffusion promotion device according to claim 1, wherein

the first electrode is formed on at least a portion of the surface of the side of the first cylindrical member.

8. The diffusion promotion device according to claim 1, wherein

the second electrode is formed on at least a portion of the outer surface of the end portion in the third direction side of the second cylindrical member.

9. The diffusion promotion device according to claim 1, wherein the second cylindrical member is detachably attached to the end portion in the third direction side of the first cylindrical member.

10. An ion introduction system comprising:

the diffusion promotion device according to claim 1; and

the liquid agent supply device, wherein the liquid agent supply device includes:

the shaft portion having the liquid agent storage space to store the liquid agent being formed in the first direction; and

the liquid agent supply unit being disposed at the first end portion in the first direction side of the shaft portion for supplying the liquid agent stored in the liquid agent storage space to the object.