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(54) **Machine for tablets preparation without tableting**

(57) Machine for the preparation of tablets comprising a support, a plate provided with stakes, an extractable plate, whose width guarantees that all the stakes are covered, another plate provided with a series of through holes, geometrically positioned as the stakes on the plate, characterized in that said machine comprises positioning means configured so that said plates can be stacked on said support so that the position of said stakes and said through holes arranged as said stake coincides, thus allowing to interpose removably said extractable plate between said staked plate and said plate provided with through holes.

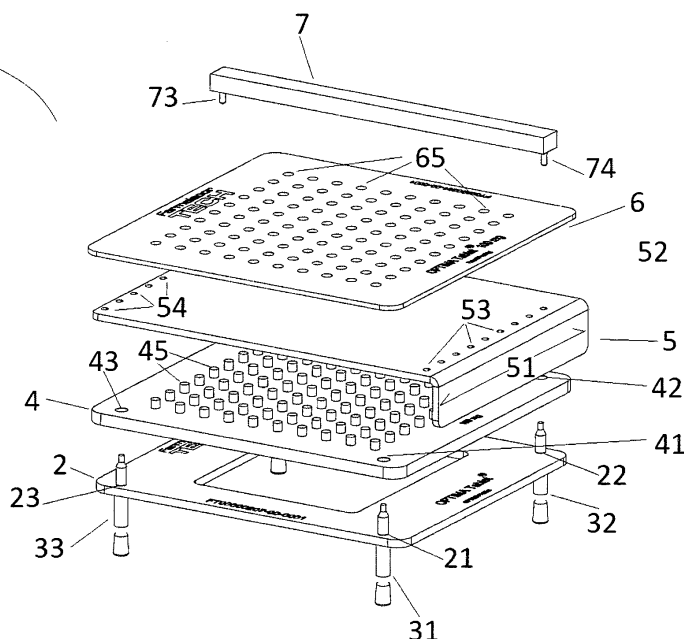


Fig. 1

Description

[0001] object of the present invention is a particularly comfortably usable machine for preparing tablets. The tablets are solid preparations, each containing a unique dose of one or more active ingredients and usually obtained by compressing uniform volumes of particles. They are destined to the oral administration and are commonly used in medical and veterinary field. Some tablets are swallowed as a whole, some others after being chewed, others are dissolved or dispersed in water before administration and still others are maintained in the oral cavity, where the active ingredient is released.

[0002] The tablets contain particles of one or more active ingredients, and they can comprise or not excipients substances as for example diluents, binders, disaggregating substances, swallowing favouring substances, lubricants, substances able to modify the behavior of the preparation in the digestive tract, authorized and flavouring colorants.

[0003] Generally the tablets are regular solid cylinders, with flat or convex basic surfaces and with possibly beveled edges. They can be provided with notches or other break marks useful to make it easier to split the same in predetermined dimensioned portions, both to easy the drug taking and to respect the dosage regimen. The tablets can be possibly coated.

[0004] There can be classified various categories of tablets for oral usage; uncoated tablets, coated tablets, effervescent tablets, soluble tablets, dispersible tablets, oro-dispersible tablets, modified-release tablets, gastro-resistant tablets, tablets to be used in the buccal cavity.

[0005] According to the state of the art, the tablets are usually prepared by compressing uniform volumes of particles or aggregates of particles obtained by granulation.

[0006] In the tablet production there are used suitable measures apt to guarantee that they have sufficient mechanical resistance to avoid crumbling or breaking during manipulations or following treatments. The mechanic resistance properties of the tablets can be shown by means of the friability tests of the uncoated tablets and by means of tensile strength tests.

[0007] According to the state of the art, in order to produce little lots of tablets without a tablet press, it is needed to position a plate provided with a series of holes on an anti-adherent material, such for example parchment paper, and to fill said holes with the tablet preparation. In the following it is needed to position the plate with the filled holes on another one provided with stakes, so that two centering holes coincide with two reference pins mounted on the staked plate, then the holed plate is softly pushed towards the staked plate, so that the stakes, by inserting themselves in the holes, extract completely the tablets from the same. Then the tablets are left to dry on the staked plate without extracting the holed plate.

[0008] The state of the art is limited, since in order to obtain the tablets it is needed to move the plate provided

with the holes, with the tablets not yet solidified therein. Moreover, there is not provided a supporting equipment which maintains fixed the holed plate during the holes filling operation, and therefore the plate is manipulated with difficulty; the operator is obliged to fill a smaller number of holes with respect to the ones suitable so that the plate can be maintained fixed. This aspect requires more time for the production. Finally, this plate has two centering holes, which means a source of substance loss, since, during the filling operation, the operator will inevitably pour the substance in these holes, thus losing it.

[0009] Aim of the present invention is to provide a machine which is particularly suitable for the tablet production, and which, without using a tablet press, is able to allow the production of little and medium tablets lots, usable in any type of previously described usages.

[0010] In particular, as a way of not-limiting example, the machine described and claimed in the following can be used for the production of:

- sublingual/chewable tablets, individually dosed even for children,
- veterinary appetizing tablets (for example croquettes) with chewable active ingredients and flavoured according to the animal taste, and individually dosed.

[0011] The object of the present invention solves the prefixed aims since it is a machine for tablets preparation comprising a support, a staked plate, an extractable plate, whose width guarantees that all the stakes are covered and another plate provided with a series of through holes, geometrically positioned as the stakes, **characterized in that** it comprises positioning means of said support and said plates provided with stakes and through holes, configured so that said plates can be stacked on said support so that the position of said stakes and said through holes coincide and thus allowing to interpose removably said extractable plate between said staked plate and said plate provided with through holes.

[0012] In the following there is provided a detailed description of the invention, which will refer to figure 1 to 3.

Fig. 1 shows an axonometric view of the pieces which are part of a preferred embodiment of the machine according to the present invention;

Fig. 2 shows a view of a preferred embodiment of the feet which can constitute the positioning means; Fig. 3 shows a section view of the plate provided with through holes, along a section where there are no through holes but two blind holes, whose function is explained in the following.

[0013] As it is shown in figure 2, in a preferred embodiment, the machine (1) according to the present invention comprises a support (2), provided with holes (21, 22, 23) apt to receive the feet (31, 32, 33), whose shape is useful

to allow the support (2) to be maintained and to position a series of plates thereupon, as it will be described in the following.

[0014] In addition, the machine comprises a plate (4) provided with stakes (45). Also the plate (4) is provided with holes (41, 42, 43) for receiving the feet (31, 32, 33) and is therefore easily stackable on the support (2), once this one is positioned on feet (31, 32, 33). As it is shown in figure 3, the feet are suitably shaped so as to have a series of differently dimensioned diameters (3d1, 3d2, 3d3), which allow the support (2) to be fixed and the plate (4) to be guided.

[0015] In particular, the staked plate (4) has stacking holes (41, 42, 43) having a diameter greater than the second diameter (3d2) shown in figure 2, and a diameter smaller than the wider threaded diameter (3d1) shown in figure 2. In this way, the plate (4) is positioned by abutting the support (2), and can slide upwards.

[0016] In addition, the machine according to the present invention comprises an extractable plate (5), whose width is smaller than the gap between the adjacent holes (41, 42) of the staked plate. In this way, the sliding plate (5) can lean on the staked plate (4) without being engaged in the projecting portion of the feet (31, 32, 33), but it is laterally guided thereby. The width (51) of the sliding plate (5) has to be such that all the stakes (45) are covered by the same.

[0017] The plate (5) can be suitably provided with an abutting member (52), so that the positioning on the staked plate (4) and the extraction are made easier. Conveniently the sliding plate (5) can be provided with two series of holes (53, 54), arranged on the edges of the plate at the two parallel sides to the abutting member (52), whose usefulness is described in the following.

[0018] The machine according to the present invention comprises another plate (6) provided with blind holes (61, 62) shown in figure 3, configured so that they can engage the upper portion of the feet (31, 32, 33) and lean on the plate (5), with the aim of maintaining the plate (6) fixed during the sleeking operation, when the plate is mounted on the machine. Moreover, the plate (6) is provided with a series of through holes (65), geometrically positioned so that they correspond to the stakes (45) of the plate when the plate (6) is mounted on feet (31, 32, 33).

[0019] Finally, the machine according to the present invention can comprise a separator member (7) provided with feet (73, 74) configured so that they engage a couple of holes belonging to the two series of holes (53, 54) provided on the plate (5). After describing all the members of the machine (1) according to the present invention, its functioning will be described to highlight the advantages with respect to what is known at the state of the art.

[0020] In order to prepare a lot of tablets by means of the machine (1) according to the present invention, it is sufficient to have the support (2) complete with feet (31, 32, 33) and staked plate (4). Therefore, on the staked plate (4) it is possible to position the sliding plate (5), and

on the same the holed plate (6). It is important to remember that the holed plate (6) engages the feet (31, 32, 33), while the sliding plate (5), being narrower, does not engage them. In this configuration, the holed plate (6) is leant on a flat member, and the holes (65) are closed downwards by the sliding plate (5).

[0021] In order to prepare a series of tablets is therefore useful to sleek the mixture on the holed plate (6) for the tablets preparation.

[0022] As a way of example, and not limiting the aims of the present invention, the mixture for the tablets preparation can be obtained by mixing the active ingredient/s with excipients, such for example lactose, dextrose, sucrose, mannitol and other suitable diluents which can be used as base. This latter can be suitably hydrosoluble and has not to be degraded during the preparation of the tablets. One of the most common bases, without this limiting the usage of other bases with the machine according to the present invention, is made up of 60-70% lactose, and 30-40% sucrose, this latter being adapted for making the tablets harder. In case of intolerance, lactose can be substituted by mannitol which gives a good sensation of freshness and sweetness in the mouth in case of orosoluble tablets.

[0023] Anyway, a binding solution is added to the base, preferably but not in a limiting way, hydro-alcoholic solvent, to moisten the mixed powder which, in this way, adheres better to the recesses in the dye during compression.

[0024] The hydro-alcoholic solvent is preferable since the alcohol dries rapidly the added liquid and the water causes a little sugar dissolving thus permitting the tablets to bind.

[0025] Before adding the binder, the powder mixture can possibly be micronized and/or sieved by means of a sieve, for example about 80-100 μm , or by means of a blade-type homogenizer.

[0026] Once the base is prepared for the tablets, with the correct doses of active ingredient and excipients, and once the plates are positioned on the support in the above-described order, it is needed to sleek the moistened mass on the holed plate (6), by exerting a light pressure on the recesses of the plates using a flexible sleek. The operation of sleeking allows to fill completely the recesses with a controlled quantity of moistened mass and at the same time to eliminate the excess mass from the upper portion of the plate (6).

[0027] After sleeking, it is needed to extract the tablets from the holes (65). In order to do that it is sufficient to extract the plate (5) and lift the staked plate (4), until the stakes (45), engaging the holes (65) where there are the tablets, extract them from the holes. At this time, both the plates, extracted from the support (2), will lean on a working plane. Therefore, it is needed to wait the moistened mass to be dried and that the extracted tablets, leaning on the stakes (45) of the plate (4), take the correct consistency.

[0028] The holes have a diameter and a thickness de-

fined according the shape of the tablet to be produced.

[0029] It is clear that the dimension of the holes (65) on the plate (6) and the thickness of the plate (6) will therefore determine the mass of the tablet realized according to the density of the used powders. According to preferred embodiments, the holes are set so that 100, 200, 300, 500 mg tablets are obtained (having as reference a density value for the powder about 1,3 g/ml). It is possible to obtain other weights using powders with different density. As it is also clear, by changing the holed plate (6) and the staked plate (4), the machine according to the present invention can be used for the production of tablets of different weight.

[0030] Another advantage of the machine according to the present invention is that by positioning the separator (7) in a suitable position, by means of the feet (73, 74) engaging a couple of holes of the series of holes (53, 54) provided on the sliding plate (5), it is possible to limit the space where the product has to be sleeked. This is useful to avoid material waste when it is desired the production of a number of tablets smaller than the number of holes (65) provided as whole in the plate (6).

[0031] Therefore, the machine described and claimed in the following allows to realize simply tablets usable in each application described in the introduction, guaranteeing accuracy in dosing, rapidity of operation, product refinement, low costs of production and possibility to arrange little and medium lots of production.

[0032] Without this limiting the usage of other compositions by means of the machine object of the present invention, in the following there are reported some example of compositions formulae of the base useful for the preparation of tablets by means of the described method.

Example 1:

[0033] Lactose (or mannitol or sorbitol) 70%
Sucrose 30%
Flavor q.s.

[0034] To 100 g of said powder, 20-25 g of binding solution are added, taking care of preparing 20% more mass of the total quantity which will be contained in the tablets. For example, to produce 100 tablets of 300 mg each, it is good to start from about 36 g of the above described powder.

Claims

1. Machine (1) for the preparation of tablets comprising:

- a support (2),
- a plate (4) provided with stakes (45),
- an extractable plate (45), whose width guarantees that all the stakes (45) provided on the plate (4) are covered,
- another plate (6) provided with a series of

through holes (65), geometrically positioned as the stakes (45) on the plate (4),

characterized in that

said machine (1) comprises positioning means of said support (2) and said plates provided with stakes (4) and through holes (6), configured so that said plates (4, 6) can be stacked on said support (2) so that the position of said stakes (45) and said through holes (65) arranged as said stakes, coincides, thus allowing to interpose removably said extractable plate (5) between said staked plate (4) and said plate provided with through holes (6).

2. Machine for the production of tablets according to claim 1, **characterized in that** said positioning means comprise feet (31, 32, 33) configured so that they engage threaded holes (21, 22, 23) provided on the support (2) and through holes (41, 42, 43) on said staked plate (4) and blind holes (61, 62, 63) provided on said plate (6) provided with through holes, said holes (21, 22, 23, 41, 42, 43, 61, 62, 63) engaged by said feet (31, 32, 33) being arranged so that the positions of the stakes (45) and through holes (65) coincide.

3. Machine for the production of tablets according to claim 2, **characterized in that** said positioning means comprise feet (31, 32, 33) configured so that they engage threaded holes (21, 22, 23) provided on the support (2) and through holes (41, 42, 43) on said staked plate (4) and blind holes (61, 62, 63) provided on said plate (6) provided with through holes, said holes (21, 22, 23, 41, 42, 43, 61, 62, 63) engaged by said feet (31, 32, 33) being such that they guarantee a suitable and stable positioning during the sleeking operations.

4. Machine for the production of tablets according to claim 3, **characterized in that** said extractable plate (5) has a width (51) such that all the stakes (45) provided on said plate (4) are covered and which, at the same time, is smaller than the gap between two adjacent feet (31, 32), so that it can slide inside the same feet (31, 32) on the plate (4) provided with stakes (45).

5. Machine for the production of tablets according to claim 4, **characterized in that** said extractable plate (5) is such that it constitutes the leaning and working plane for the plate (6).

6. Machine for the production of tablets according to any one of the preceding claims, **characterized in that** said extractable plate (5) is provided with an abutting member (52), configured so that it defines a position of end of stroke of the extractable plate (5) on the staked plate (4).

7. Machine for the production of tablets according to any one of the preceding claims, further comprising a separator member (7) provided with feet (73, 74) and **characterized in that** said sliding plate (5) has two series of holes (53, 54), arranged at the edges of said plate at the two sides parallel to the abutting member (52) and **in that** said feet (73, 74) are configured so that they engage a couple of holes belonging to the two series of holes (53, 54) provided on the plate (5).

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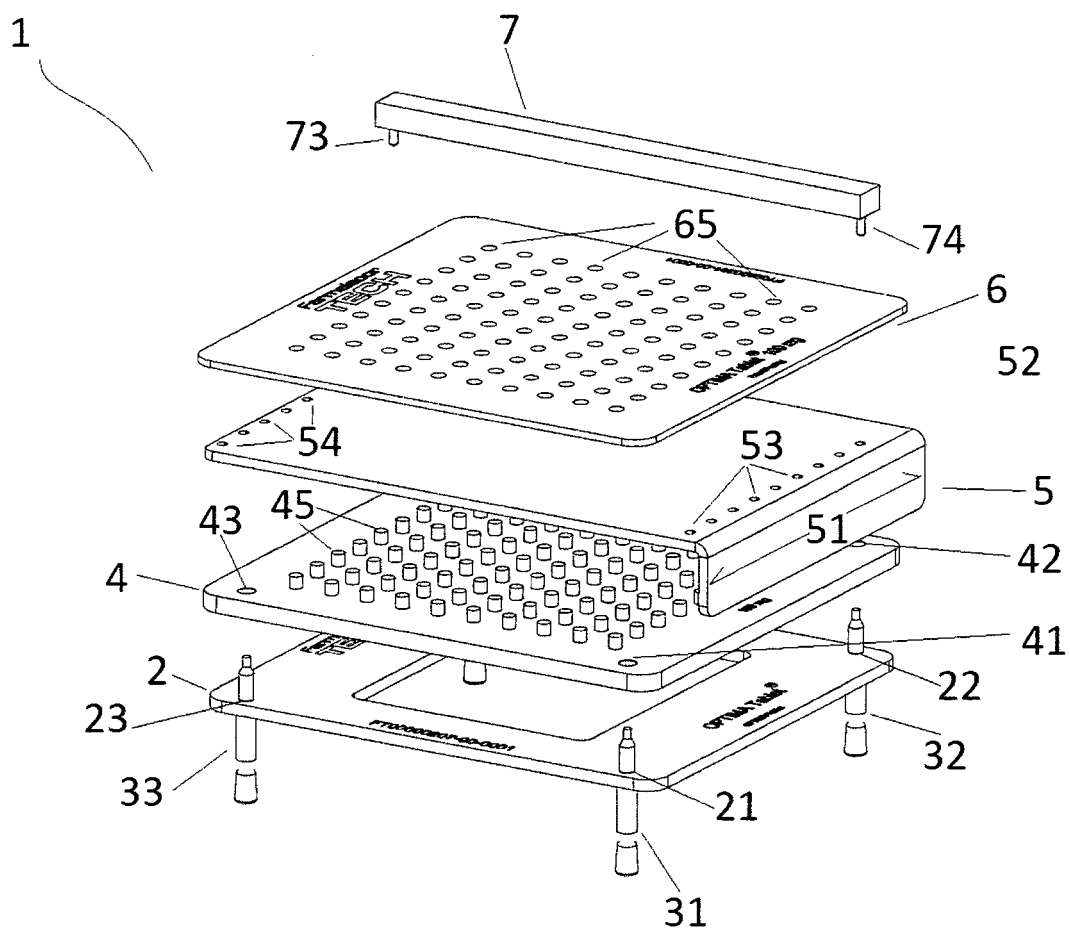


Fig. 1

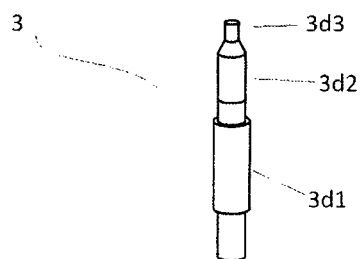


Fig. 2

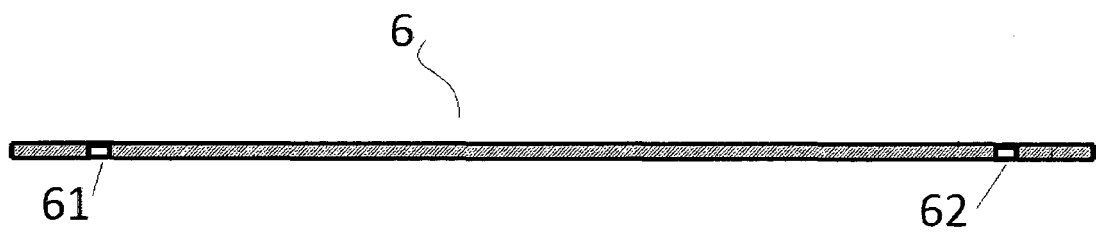


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 12 42 5088

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2 386 076 A (TAYLOR HARDEN F ET AL) 2 October 1945 (1945-10-02) * page 2, column 1, line 42 - column 2, line 46 *	1	INV. A61J3/06 A61J3/10 A23K1/00
A	US 1 658 423 A (WARE GEORGE A) 7 February 1928 (1928-02-07) * page 2, column 1, line 18 - line 41 * * figures 1, 4 *	1	
A	US 2010/032058 A1 (LIN YUTSUN [TW]) 11 February 2010 (2010-02-11) * paragraph [0020] - paragraph [0023] * * figures 1-7 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			A61J A23K A23N A23P A23G
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 October 2012	Examiner Ong, Hong Djien
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.92 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 42 5088

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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08-10-2012

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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