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(54) Portable device for crushing pills and method for using said device

(57) Device for crushing pills and the like in order to facilitate the intake thereof. Said device comprising a frame (1) with a moveable crushing element (4), having a plate (6) which is curves in the shape of a segment of a circle. Said crushing element is driven via a guide (7, 8) in such a way that the segment of a circle-shaped plate performs a rolling movement over a substrate (13) on which a bag (14) of flexible plastics material containing the pills (15) to be crushed is placed. The substrate consists of a plate (13) resting on a layer (12) of a resilient plastics material.

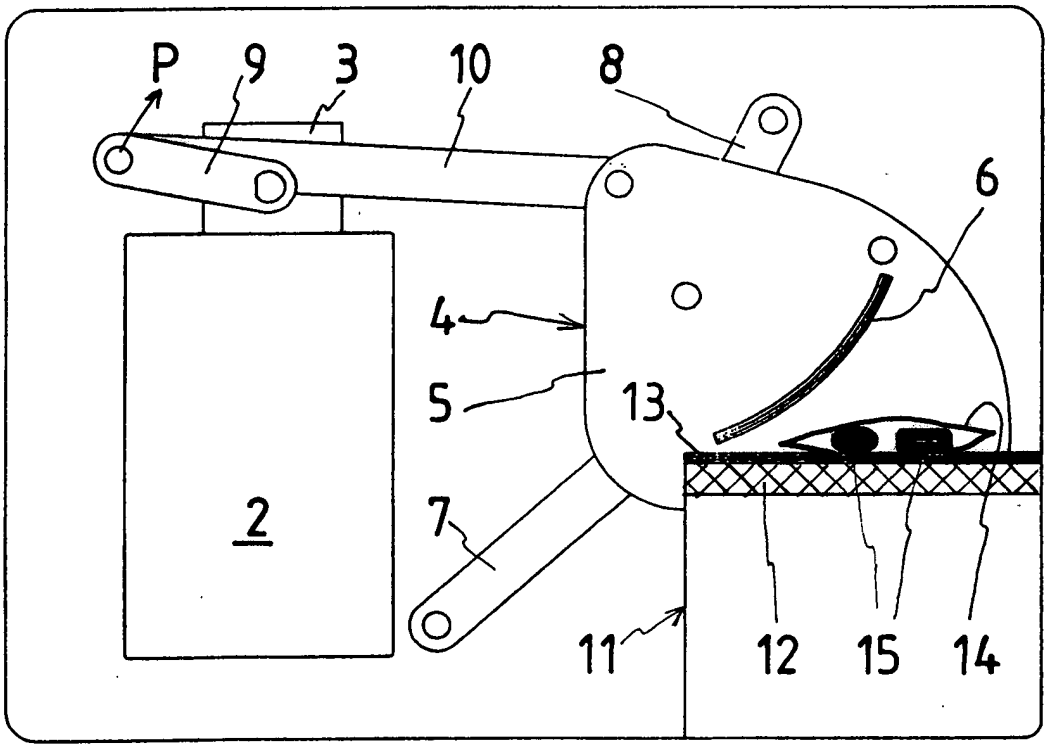

FIG. 1

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Description

[0001] The present invention relates to a portable device for crushing or pulverizing pills. In particular in nursing homes, where patients often have to take several pills at once, the pills and tablets are often crushed to facilitate ingesting thereof; the powder obtained is in this case mixed with for example a liquid food. For the carers, crushing the pills is an awkward and tiring activity, as physical force is also necessary for this.

[0002] A large number of portable devices are known in the art for crushing pills and tablets. These known devices generally operate using a vertically movable ram. Examples of this include US patent specification 5,067,666 from which a portable device is known for crushing pills. In this case, the pills are first introduced into a receptacle which is placed below a vertically movable ram of the device. The ram performs a downward movement, as a result of which the pills present in the receptacle are pulverized. The receptacle is subsequently taken away, after which the end of the ram is cleaned using an alcohol soaked swab to remove any powder which may have been left behind.

[0003] Now, it is an object of the present invention to provide a portable device for crushing pills, which device is lightweight, easy to handle, and wherein no additional operations are necessary for cleaning the device between two successive crushing operations.

[0004] The invention is based on the idea that the pills are first introduced into a bag made of a suitable plastics material film and are pulverized in this bag to form powder. This obviates the need to clean the device at all times and any risk of soiling of the device by medicinal remnants is avoided. The device must therefore be embodied in such a way that the plastics material bag does not run the risk of tearing or otherwise breaking during crushing.

[0005] Starting from a device for crushing pills and the like, comprising a frame with a movable crushing element which can be brought into contact with a substrate on which pills to be crushed are placed, and also a power source and an electric motor for driving the aforementioned crushing element, the foregoing objects are achieved, according to the invention, by the features specified in Claim 1.

[0006] As the surface, which is curved as a segment of a circle, of the crushing element rolls over the substrate, the pills in the bag are as it were flattened without significant friction occurring between the surface which is curved in the shape of a segment of a circle and the plastics material bag.

[0007] Preferably, the substrate consists, according to the invention, of a plate resting on a resilient member. The resilient plate, which forms the substrate, thus prevents an excessively high pressure from being exerted on the bag during crushing; this could break the bag.

[0008] The invention is thus also embodied in a method for using the device, which method is distinguished in that the pills are introduced into a bag made of transparent flexible plastics material film and this bag is placed by hand on the substrate in the initial position of the crushing element, and the crushing element performs during switching-on of the device a crushing operation consisting of a predefined number of revolutions of the drive motor. Each revolution of the drive motor corresponds in this case to a back-and-forth movement of the crushing element.

[0009] The invention will be commented on in greater detail with reference to the appended drawings, in which:

Fig. 1 is a schematic side view of the device according to the invention in the initial position of the crushing element; and

Fig. 2 is a view corresponding to Fig. 1 with the crushing element in an intermediate position during crushing.

[0010] As may be seen in Figures 1 and 2, the device consists of a frame 1 which is for example formed by a block-shaped housing, with a floor and two vertical side walls. This frame contains a power source 2 in the form of a battery and an electric motor 3 connected thereto. Attached movably within the housing is a crushing element which is denoted in its entirety by reference numeral 4 and consists of two parallel plates 5 which are set apart from each other and between which is fastened a plate 6 which is curved as a segment of a circle. The vertical plates 5 of the crushing element are each connected to the adjoining side wall of the housing via two rods 7, 8. On the other hand, the two plates 6 are each connected to the electric motor 3 via a crank/connecting rod mechanism. The crank/connecting rod mechanism consists in this case of a crank rod 9, which is driven by the electric motor so as to rotate in the direction indicated by the arrow P, and a connecting rod 10, which connects the end of the crank rod 9 to the vertical plate 5 of the crushing element 4.

[0011] Attached to the floor of the housing is an elevation 11, attached to the upper face of which is a layer 12 made of a suitable yielding rubber-like material to which is attached, in turn, a flat metal plate 13 which forms the aforementioned substrate and of which the upper surface forms a surface which interacts with the segment of a circle-shaped plate 6 of the crushing element and on which a bag 14 containing the pills 15 to be crushed is placed. The plate 13 extends in this case between the vertical plates 5 of the crushing element and can be pressed downward to a limited extent by the resilient layer 12 which is made for example of a suitable foamed synthetic rubber.

[0012] The crushing element 4 is guided in the housing by the two rods 7, 8 in such a way that when this element is driven by the crank mechanism 9, 10, the outer surface of the segment of a circle-shaped plate 6 rolls over the upper surface of the plate 13. In other words, the outer surface of the segment of a circle forms part of a notional

circle which touches the plate 13 or if appropriate the extension thereof.

[0013] Figure 1 represents the device in the initial position. In this case, the segment of a circle-shaped plate 6 is at a certain distance above the plate 13. In this state, the pills 15 to be crushed, which are introduced into a bag 14 made of transparent plastics material film, are placed on the plate 13. When the crank rod 9 performs one single revolution, the segment of a circle-shaped plate will roll over the plate 13 and roll back again to the initial position. As a result, the pills which are present in the bag will be crushed, between the segment of a circle-shaped plate 6 and the flat plate 13. Optionally, each crushing operation can consist of a predefined number of times that the segment of a circle-shaped plate rolls back and forth over the substrate, that is to say, that the crank rod 9 of the drive motor 3 performs a predefined number of revolutions for each crushing operation.

[0014] The fact that the segment of a circle-shaped plate 6 rolls the crushing element over the plate 13 has the consequence that no friction occurs between the outer surface of the segment of a circle-shaped plate 6 and the plastics material bag 14, so that there is no risk of the bag tearing. In addition, the flexible layer 12 helps to prevent the pressure on the bag from becoming too great at the location of the pills and breaking of the bag is avoided. As a result, the design according to the invention has the major advantage that the pills can be pulverized in bags, so that it is no longer necessary to clean the device after each crushing operation.

[0015] It will be clear that the present invention is not limited to the embodiment represented and described here, but that within the scope of the appended claims a large number of variants will be obvious to a person skilled in the art. Thus, instead of the rod guide, use may be made of any other guide ensuring the same movement of the segment-shaped plate.

[0016] The plate 13, which forms the substrate, does not per se have to be a flat horizontal plate, as represented in the drawings, but can for example be arranged at an angle with respect to the horizontal. A variant is also possible wherein the plate 13 has a hollow curved shape with a radius of curvature which is substantially larger than that of the segment-shaped plate 6.

Claims

1. Device for crushing pills and the like, comprising a frame with a movable crushing element which enters into contact with a substrate to which pills to be crushed are attached, and also a power source and an electric motor for driving the aforementioned crushing element, **characterized in that** the crushing element (4) contains a plate (6) which is curved in the shape of a segment of a circle, which element on the one hand is connected to the frame (1) via a guide (7, 8) and on the other hand is connected to a drive (3), in such a way that the segment of a circle-shaped plate performs a rolling movement over the substrate (13).

2. Device according to Claim 1, **characterized in that** the substrate consists of a plate (13) resting on a resilient member (12).

3. Device according to Claim 2, **characterized in that** the resilient member consists of a layer (12) made of an elastically yielding plastics material.

4. Device according to the preceding Claim 1-3, **characterized in that** the guide of the crushing element is formed by a system of rods (7, 8) and the drive is formed by a rotating electric motor (3) which is connected to the aforementioned crushing element via a crank/connecting rod mechanism (9, 10).

5. Device according to one or more of the preceding Claims 1-4, **characterized in that** the crushing element is formed by two vertical plates (5) which are set apart from each other and between which a plate (6), which is curved as a segment of a circle, is fastened, the vertical plates each being connected to the frame and to the connecting rod (10) of the crank mechanism via a number of rods, the plate (13), which forms the substrate, being positioned on an elevation (11) and extending between the aforementioned vertical plates (5).

6. Device according to one of the preceding Claims 1-5, **characterized in that** the segment of a circle-shaped surface (6) of the crushing element is arranged in such a way that the notional circle of which this surface forms part touches the aforementioned plate (13) or the notional extension thereof.

7. Device according to Claim 6, **characterized in that** the segment of a circle-shaped surface of the crushing element has dimensions such that said surface is positioned, in the initial state of the crushing operation, with the bottom end at some distance above the aforementioned plate (13).

8. Device according to one or more of the preceding Claims 1-7, **characterized in that** the plate (13), which forms the substrate, forms an angle with respect to the horizontal.

9. Device according to one or more of the preceding claims, **characterized in that** the plate (13) has a hollow curved shape with a radius of curvature which is substantially larger than that of the segment-shaped plate (6).

10. Method for using the device according to the preceding Claims 1-7, **characterized in that** the pills (15)

to be crushed are introduced into a bag (14) made of transparent flexible plastics material film, which bag is placed on the plate (13) in the initial position of the crushing element, and the device performs during switching-on a crushing operation consisting of a predefined number of revolutions of the drive motor (3).

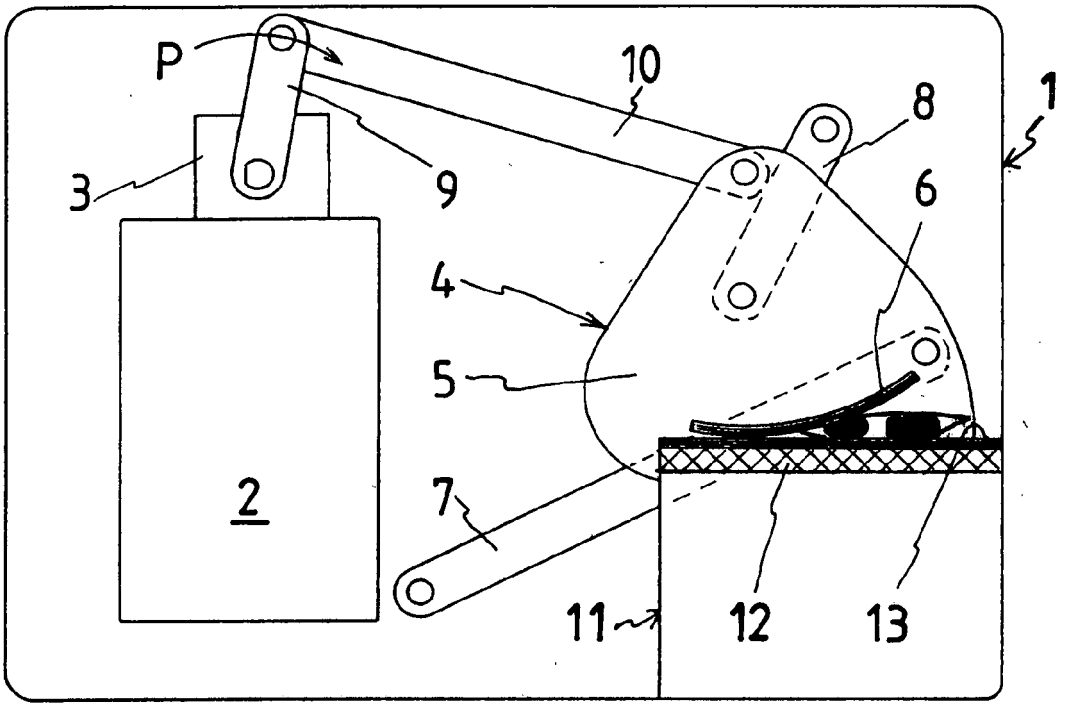

FIG. 2

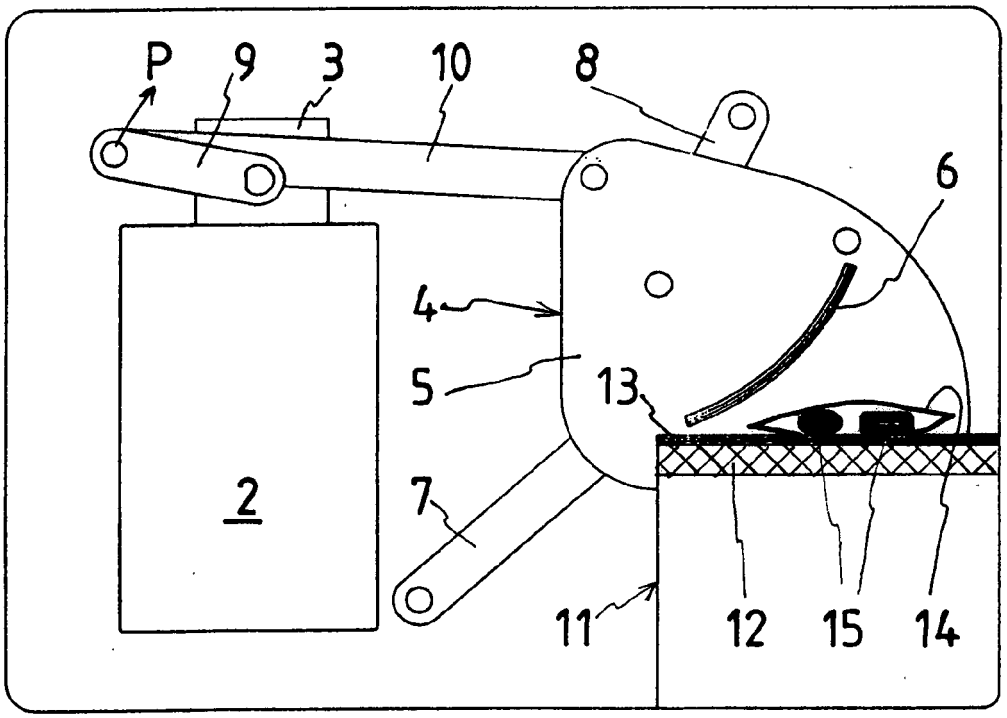

FIG. 1

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5067666 A **[0002]**