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(54) Tile press with belt charging devices

(57) Press for pressing tiles (10) comprising a pressing mold (11) into which a charging device (14) dumps powders to be pressed, the charging device (14) comprising a conveyor belt (16) onto which are dumped the powders to be dumped into the mold and which is caused to run over the mold to dump the powders from one of its ends into the mold characterized in that the belt surface for receiving the powder has ridges (23).

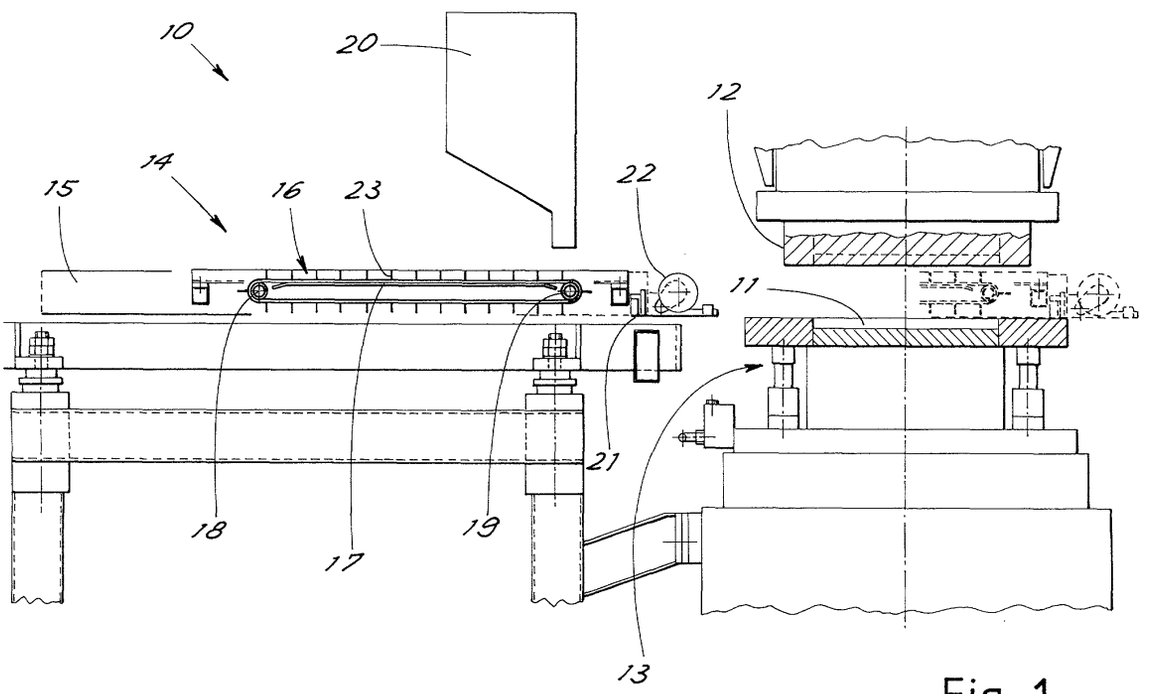

Fig. 1

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Description

[0001] The present invention relates to a press for tile pressing molds having an innovative charging device and in particular for creating colored streaks and veins in the mass.

[0002] In tile production the problem of depositing powders in the mold and in particular for creating streaks in the mass, for example to simulate the form and distribution of streaks found in natural stone, is known.

[0003] In the prior art various devices for depositing powder in the pressing mold have been proposed.

[0004] A widely used system consists of a drawer with dimensions similar to the cavity of the mold to be filled. The drawer is open at the bottom and has rods for drawing the powders to be pressed. It runs on a plane from a charging position outside the mold to a dumping position vertically above the mold where the powders are dumped.

[0005] As alternatives there have been proposed belt chargers where the drawer includes a powered belt which receives the powders and dumps them from its lead end into the mold.

[0006] All these devices have been found to have various disadvantages and especially for pressing tiles with color variations in the mass and are not entirely satisfactory. For example known systems easily destroy the color variation effects during deposit of the powders in the mold.

[0007] The general purpose of the present invention is to remedy the above mentioned shortcomings by making available a press with a charging device allowing satisfactory powder distribution in the mold in particular when there is a plurality of powders for providing streaks and color variations in the tile mass.

[0008] In view of this purpose it is sought to realize in accordance with the present invention a tile pressing press comprising a pressing mold into which a charging device dumps powders to be pressed with the charging device comprising a conveyor belt onto which are dumped the powders to be dumped into the mold and which is caused to run over the mold to dump the powders from one of its ends into the mold characterized in that the belt surface for receiving the powder has ridges.

[0009] To clarify the explanation of the innovative principles of the present invention and its advantages compared with the prior art there is described below with the aid of the annexed drawings a possible embodiment thereof by way of non-limiting example applying said principles. In the drawings:

- Fig. 1 shows a diagrammatic side elevation view cross-sectioned along plane of cut I-I of Fig. 2 of a press with charging devices realized in accordance with the present invention,
- Fig. 2 shows a diagrammatic plan view of the press of Fig. 1,
- Figs. 3 to 5 show diagrammatic views of possible surface configurations of belts of the charging devices in accordance with the present invention,
- Figs. 6 and 7 show diagrammatic partial views of possible design details of the belts in accordance with the present invention, and
- Fig. 8 shows a plan view of a variant of the press of Fig. 2.

[0010] With reference to the figures, Figure 1 and 2 show diagrammatically a press for pressing tiles designated as a whole by reference number 10 and comprising a pressing mold 11 arranged between press plates 12, 13 and a charging device 14. The charging device comprises a charging carriage 15 powered to be movable between the charging position shown in solid lines in Fig. 1 outside the press plates and a position partially shown in hatching of dumping into the mold. On the carriage is installed a conveyor belt 16 powered to run on command, possibly on a supporting table 17, between transmission rollers 18, 19 arranged at the head and tail of the carriage in relation to the carriage's movement into and out of the press plates. The belt should be at least as wide as the mold compartment.

[0011] Above the carriage the charging device comprises a hopper feeding unit 20 which dumps the powders for making the tile onto the belt below. This feed unit is basically prior art and therefore not further described nor shown. It should include dumping hoppers for the various powders it is desired to use in making the tiles. For example, there may be provided a main hopper to dump the powder for making the tile mass and at least one secondary hopper to dump powder for making the streaks or veining in the mass. Dumping from the hoppers should take place in quantities and at intervals differing according to the specific aesthetic effect it is desired to obtain.

[0012] In front of the belt the carriage advantageously comprises a scraper 21 and a powered brush 22 for cleaning the mold while the carriage is travelling.

[0013] As shown by way of example in Fig. 1 the surface of the belt which receives the powder comprises ridges 23 protruding from the surface.

[0014] It was found that by using belt ridges the quality of the aesthetic effects reproduced by the powders improves greatly as compared with known deposit devices.

[0015] The ridges can have various forms depending on the effect it is desired to achieve.

[0016] Fig. 2 shows ridges 23 arranged on the belt along transverse lines.

[0017] Figures 3 and 5 show ridges which are, respectively, inclined and straight, inclined and wavy or directed along lines arranged variously to mutually intersect on the belt surface more or less randomly.

[0018] Figures 6 and 7 show variant embodiments of the structure of the ridges allowing the belt to turn around the transmission rollers. In Fig. 6 the ridges are broken at intervals so as to form segments which open

when the belt bends around the rollers.

[0019] In Fig. 7 the rollers are unbroken and made of relatively yielding material such as for example rubber to allow their distortion and lowering on the belt when the belt bends on the rollers. This second embodiment was found to be particularly beneficial to gain a more diffuse dumping effect of the powders and improve the aesthetic result when it is desired to obtain a shaded streaked color effect in the tile mass.

[0020] The ridges can be molded in a single piece with the belt or attached in a way readily imaginable to those skilled in the art.

[0021] It was found beneficial that the belt ridges be virtually as high as the mold is deep.

[0022] Fig. 8 shows a plan view of a variant embodiment of the press in which a mold with multiple cavities (11a, 11b, 11c) for performing multiple pressings is provided. The charging device consequently comprises a belt conveyor 14 broad enough to feed all the side by side cavities. There can be provided multiple independent belts separated by longitudinal dividers 24 or a single belt divided in strips by longitudinal dividers 24 which can be fastened on the belt and run therewith or separate with each belt or strip serving a cavity.

[0023] Fig. 8 also shows additional ridges 25 transversal to the belt and arranged with a pitch virtually equal to the length of the mold in the direction of movement of the belt. In this case powder dumping will be synchronized with the belt movement in such a manner that the space delimited between two transversal ridges 25 will receive all the powder intended for a cavity.

[0024] In use, whether for the one-cavity or the multiple-cavity version the operational steps can advantageously be carried out as explained below.

[0025] Initially the carriage is retracted to the starting position of Fig. 1. The carriage is operated to advance towards the mold and simultaneously the feed unit 20 discharges the necessary powders with the desired arrangement for tile production. In this manner the belt passes beneath the hopper which dumps and the powder is distributed along the belt.

[0026] Discharging of the powders from the hopper terminates when the desired amount of powder is reached while advancing movement of the carriage terminates when the carriage has travelled the entire mold and the belt has reached its extreme advanced position as shown hatched in Fig. 12.

[0027] Now the carriage is commanded to return to its starting or charging position and during the return travel of the carriage the belt is made to run forward at a speed virtually equal to the carriage movement speed. In this manner the powders on the belt are dumped uniformly in the mold. As the speed of rotation of the belt is equal to the return speed of the carriage, the relative speed of the powders is practically null with the powders falling vertically into the mold to avoid the dragging effects of prior art drawer devices.

[0028] Thanks to the ridges on the belt the various aesthetic effects deposited in advance on the belt are reproduced faithfully in the mold cavity, possibly with controlled spreading effects as mentioned above.

[0029] Once charging of the mold is finished normal pressing and unloading of the pressed tile can be performed. The charging operations can then be started over.

[0030] It is now clear that the predetermined purposes have been achieved by making available a press with a powder charging device providing a precise distribution of the powders in the mold and the desired colored designs in the mass. Naturally the above description of an embodiment applying the innovative principles of the present invention is given by way of non-limiting example of said principles within the scope of the exclusive right claimed here.

[0031] For example the ridges could be obtained either by cutting the belt in low relief, molding it directly with the ridges, or adding the ridges on its surface later. The ridges cold have different forms and dimensions depending on specific requirements.

Claims

1. Press for pressing tiles comprising a pressing mold into which a charging device dumps powders to be pressed with the charging device comprising a conveyor belt onto which are dumped the powders to be dumped into the mold and which is caused to run over the mold to dump the powders from one of its ends into the mold **characterized in that** the belt surface for receiving the powder comprises ridges.

2. Press in accordance with claim 1 **characterized in that** the belt is carried by a moving carriage to cause the discharge end of the belt to run over the mold starting from a retracted carriage position in which the belt is outside the mold and in the section of movement of the carriage outside the mold with the carriage carrying the belt to run under hoppers pouring powders onto the belt.

3. Press in accordance with claim 1 **characterized in that** the belt ridges are arranged along lines transversal to the belt.

4. Press in accordance with claim 1 **characterized in that** the belt ridges are arranged along lines inclined to the belt.

5. Press in accordance with claim 1 **characterized in that** the belt ridges are arranged along lines arranged variously to intersect on the belt surface.

6. Press in accordance with claim 1 **characterized in that** the belt ridges are broken at intervals to define segments which open when the belt curves on its

transmission rollers.

7. Press in accordance with claim 1 **characterized in that** the belt ridges are made of relatively yielding material to allow their distortion and prostration on the belt when the belt curves on its transmission rollers.

8. Press in accordance with claim 1 **characterized in that** the belt ridges are virtually as high as the mold is deep.

9. Press in accordance with claim 2 **characterized in that** during return travel of the carriage towards the charging position the belt is made to run forward at a speed virtually equal to the carriage movement speed to discharge into the mold from the lead end of the belt the powders thereon.

10. Press in accordance with claim 1 **characterized in that** on the belt are arranged additional ridges transversal to the belt with a pitch virtually equal to the length of the mold in the direction of movement of the belt.

11. Press in accordance with claim 1 **characterized in that** it comprises multiple parallel belts of which each one discharges into a cavity of the mold.

12. Press in accordance with claim 1 **characterized in that** it comprises multiple molding cavities side by side and a belt sufficiently broad to feed all the side by side cavities with the belt being divided in strips by longitudinal dividers and each strip serving one cavity.

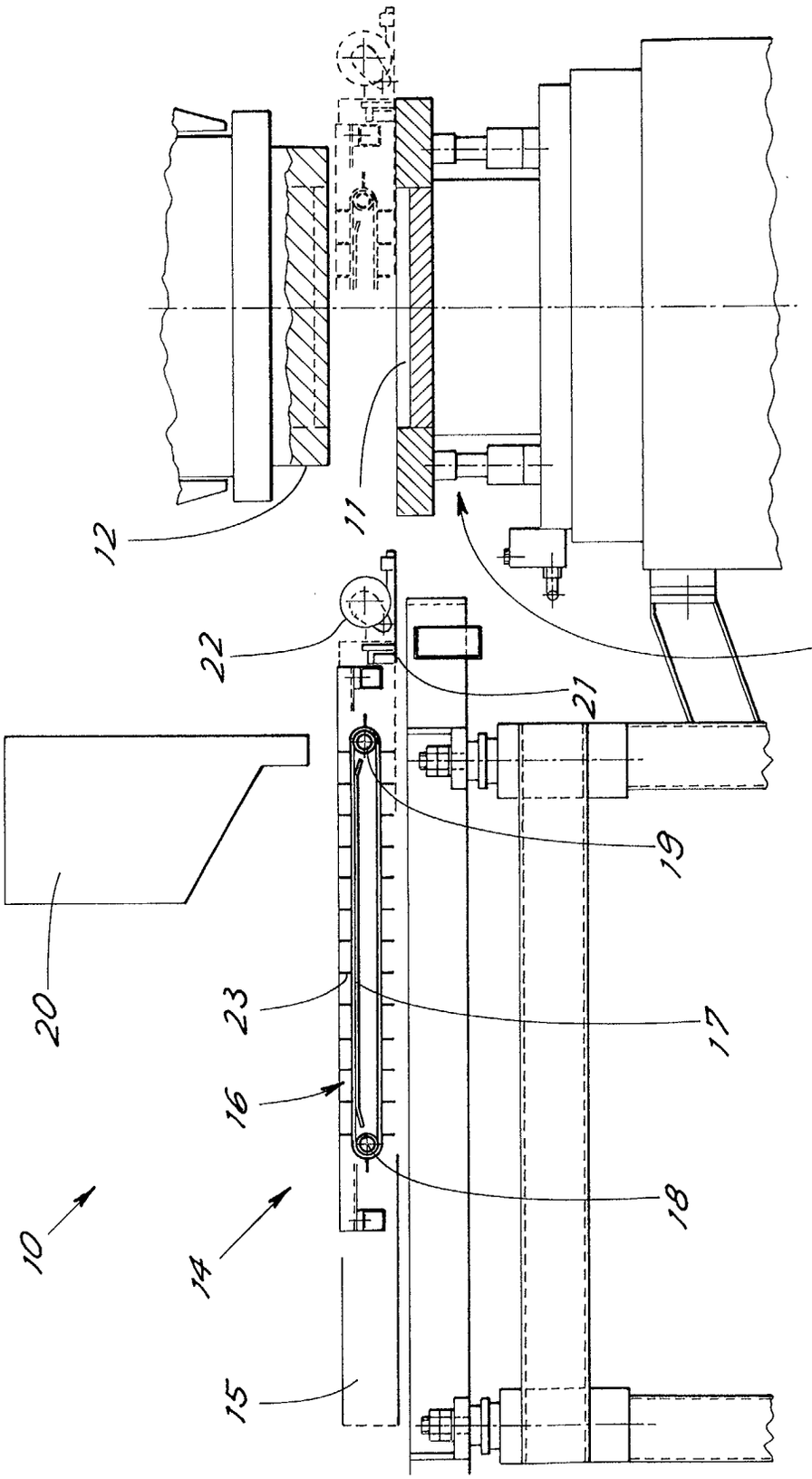

Fig. 1

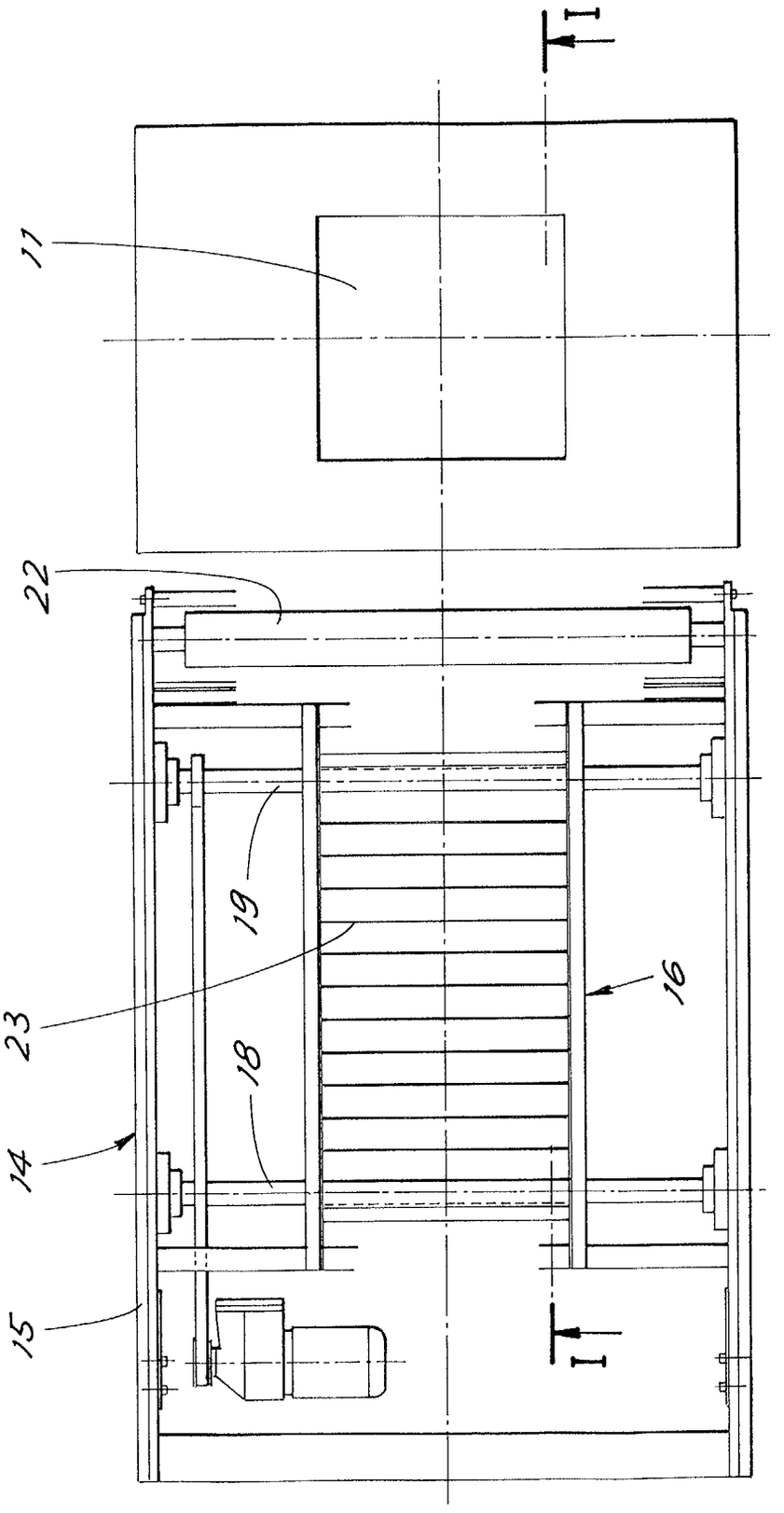

Fig. 2

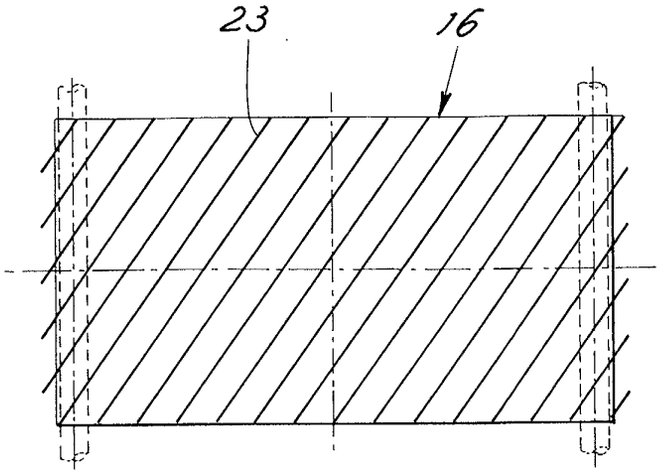

Fig. 3

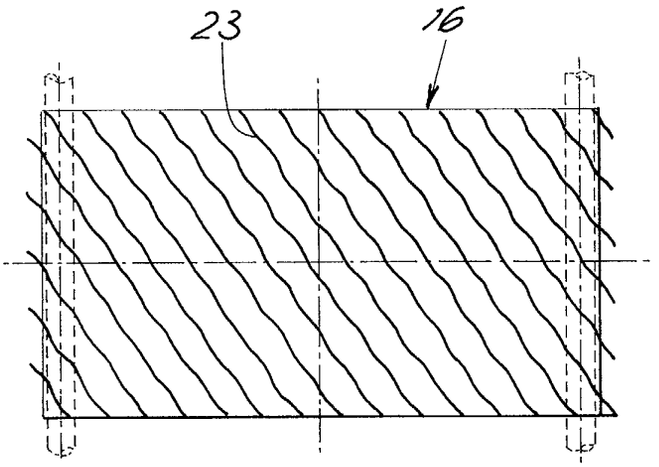

Fig. 4

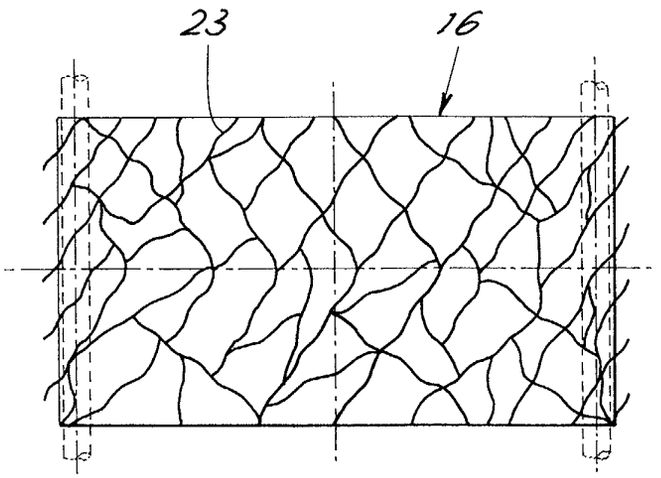

Fig. 5

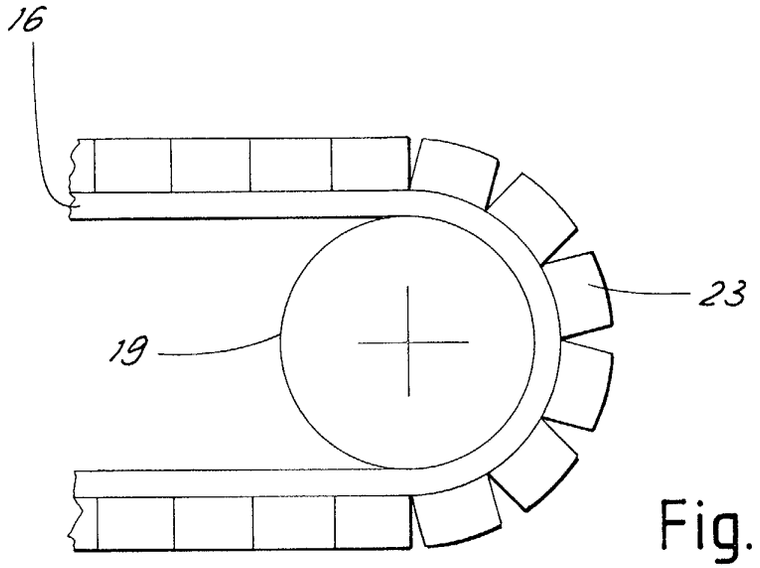

Fig. 6

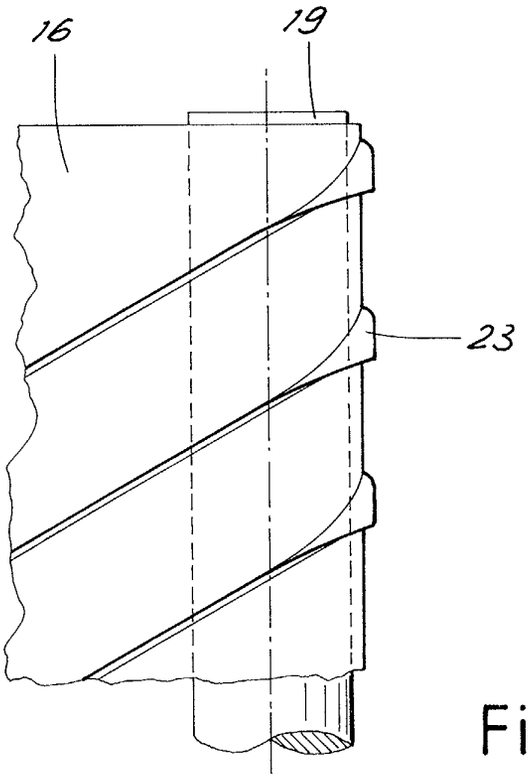

Fig. 7

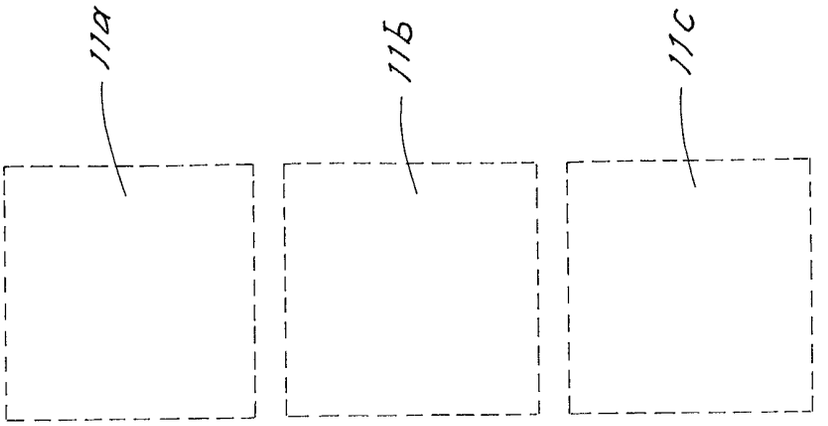

Fig. 8