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(54) **A device and method for artificially ageing stones**

(57) A device (1) for artificially ageing stones (5), the device (1) comprising impacting means (6) for impacting the stones (5) in view of knocking off pieces from the stones (5), transporting means (3) for transporting the stones (5) towards and along the impacting means (6) in a transporting direction (13) and vibrating means (4) for creating a vibrating movement of the impacting means (6) and the stones (5) in relation to each other to cause the impacting means (6) to impact the stones (5), characterised in that the impacting means (6) comprise an opening (11) for receiving the stones (5) one by one and at least one engaging member (2) for impacting at least one edge (10) of the stones (5) in view of knocking off pieces from at least one edge (10) of the stones (5).

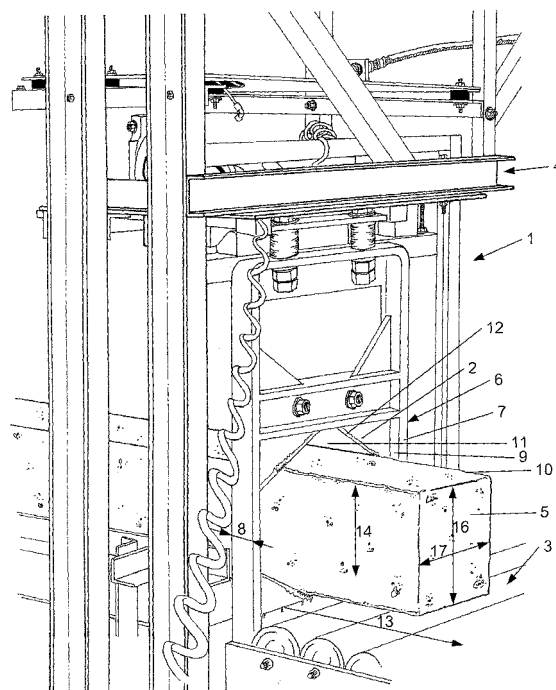


Fig. 1

Description

[0001] The present invention relates to a device for artificially ageing stones as described in the preamble of the first claim.

[0002] The present invention also relates to a method for artificially ageing stones as described in the preamble of claim 14.

[0003] EP-A1-0860258 discloses a device for artificially ageing stones. The artificial ageing of stones is done to provide new materials with a more historical or rustic style. The device comprises two parallel plates. Groups of stones are pushed through the elements on one end and are removed from between the elements on another end after they have been beaten back and forth between the two elements so that pieces are knocked off from the stones providing the stones with an older look. The back and forth movement of the stones is obtained by subjecting one or both of the elements to a vibrating movement. The plates are provided with profiles such as thickenings for impacting the stones such that pieces are beaten off the stones. The angles of the stones preferably oppose the profiles. EP-A1-0860258 further discloses that the elements may take the form of a whole such as a tube with a rectangular cross-section through which the stones are pushed while the tube is moved to and fro with a vibrating movement, diagonally to its longitudinal direction.

[0004] The device disclosed in EP-A1-0860258 however has the disadvantage that the profiles allow a migration of the stones between the plates, caused by the vibrating movement of at least one of the plates. The impacting profiles will therefore, next to impacting the angles of the stones, also impact surfaces of the stones such that pieces will be broken off. The engagement of the profiles with the surfaces of the stones causes a significant number of stones to break into several pieces, making the stones unsuitable for further use.

[0005] There is thus a need for a device for artificially ageing stones with which the risk to breaking of stones may be reduced.

[0006] Accordingly, it is the object of the present invention to provide a device with which the risk to breaking of stones may be reduced.

[0007] This is achieved according to the present invention with a device showing the technical features of the characterising portion of the first claim.

[0008] Thereto, the impacting means comprise an opening for receiving the stones one by one and at least one engaging member for impacting at least one edge of the stones in view of knocking off pieces from at least one edge of the stones.

[0009] By using an engaging member which impacts the edges of the stones, the desired nature of ageing may be achieved. In particular, ageing may be achieved by knocking off small pieces from one or more edges of the stones inducing the desired rustic appearance. When impacting the at least one edge of the stones, next to

knocking off small pieces from the edges of the stones, small pieces from the surface, in particular from parts of the surface near to the at least one edge, are knocked off as well. This provides the stones with an improved rustic appearance without increasing the risk to the breaking of stones.

[0010] The use of a device comprising engaging means which are provided to impact one or more edges of the stones, permits significantly reducing the risk to the breaking of stones. Without wanting to be bound by any theory, the inventor believes that this effect may be attributed to the fact that the engaging members no longer impact the surfaces of the stones.

[0011] Since the stones are fed one by one through the impacting means the stones are prevented from hitting each others surfaces when subjected to the vibrating movement in relation to the impacting means which further prevents impacts on the surfaces of the stones.

[0012] The device of this invention is suitable for ageing stones made of a wide variety of materials, which may have a higher or smaller brittleness and sturdiness and stones made of softer and harder materials.

[0013] The device of the present invention has been found suitable for ageing stones having widely varying dimensions, for example a width or height of a few centimetres to about 10cm - 50cm or more and a length of 10cm - 20cm with a length of 100cm or even more. Moreover with the device of this invention a comparable ageing of the stones may be obtained regardless of their dimensions, the nature of the material of which they are made and/or physical properties. The device has been found particularly suitable for ageing oblong stones without increasing the risk to breaking of stones.

[0014] A preferred embodiment of the invention is characterised in that the impacting means comprise a polygonal frame surrounding at least part of the stones transverse to the transporting direction and in that the at least one engaging member connects adjacent sides of the frame. When transporting the stone along the transporting direction through the frame, the at least one edge of the stone faces and is engaged by the engaging members due to the vibrating movement of the frame which provides a uniform engagement of the edges of the stones resulting in a uniform ageing of the stones. This embodiment provides an inexpensive and reliable way for artificially ageing stones. More preferably, the vibrating means are provided to vibrate the frame providing an efficient and reliable way for artificially ageing the stones.

[0015] A more preferred embodiment of the current invention is characterised in that the length of the frame along the transporting direction is smaller than the length of the stones in transporting direction. By limiting the contact area between the impacting means and the stones, the risk that different loads, caused by the engagement of the impacting members, work on the stone, possibly in different directions on the stone, is reduced, reducing the risk to breaking of stones.

[0016] Figure 1 shows a general view to a preferred

embodiment of a device according to this invention.

[0017] Figure 2 shows a side view of a preferred embodiment of the device shown in figure 1.

[0018] Figure 3 shows a cross section of a preferred embodiment of the device shown in figure 1 and 2.

[0019] The device 1 for artificially ageing stones 5 according to the invention comprises impacting means 6 for impacting the stones 5 in view of knocking off pieces from the stones 5, preferably from the edges of the stones 5. The impacting means 6 comprise an opening 11 through which the stones 5 are passed during the artificial ageing of the stones 5. The opening 11 can have any shape and form deemed appropriate by the person skilled in the art such as oval, round, etc. but preferably is polygonal. The opening 11 preferably is delimited by a frame 7.

[0020] The frame 7 can fully or partially surround the stones 5 when impacting the stones 5 but preferably fully surrounds the stones 5. The frame 7 can have any form deemed appropriate by the person skilled in the art such as round, oval, etc. but preferably is planar and polygonal. The frame 7 preferably is removably mounted to the device 1. This allows removal of the frame 7 for repair or replacement.

[0021] Preferably, the frame 7 comprises a plurality of adjacent sides 9, delimiting the opening 11. The frame 7 preferably comprises at least three sides 9. The sides 9 can have any form deemed appropriate by the person skilled in the art, but preferably are straight. The frame 7 preferably comprises four sides 9 and more preferably has a rectangular cross-section. The sides 9 of the frame 7 can comprise any material deemed appropriate by the person skilled in the art such as plastic, wood, etc. but preferably comprises metal since the impacting means 6, and therefore the frame 7, impact the stones 5 and the solid characteristics of metal are preferred. In order to improve the solid characteristics of the frame 7, the sides 9 are connected to each other forming a whole as is shown in figures 1 to 3. The sides 9 can however be connected to each other using any means known to the person skilled in the art such as welding, bolting, gluing, soldering, nailing, screwing, etc.

[0022] In a preferred embodiment of the invention, the sides 9 of the frame 7 are adjustably mounted so that the dimensions of the opening 11 can be adapted to the stones 5 passing through the opening 11.

[0023] The impacting means 6 comprise an engaging member 2 for impacting at least one edge 10 of the stones 5 in view of knocking off pieces from at least one edge 10 of the stones 5. The engaging member 2 preferably faces the opening 11 and more preferably connects adjacent sides 9 of the polygonal frame 7. The engaging member 2 therefore preferably is situated in a corner of the polygonal frame 7. The position of the engaging member 2 is however not critical to the invention and the engaging member 2 can for example be located along one side 9 of the frame 7 or more than one side of the frame 7.

[0024] The engaging member 2 may take any shape

deemed appropriate by the person skilled in the art such as spherical, cubic, rectangular, pyramidal, tetrahedral, needle-shaped, etc. The engaging member 2 however preferably is substantially planar. The planar surface of the engaging member 2 may be curved, convex or concave but preferably is flat. The surface of the engaging member 2 can comprise openings, reducing the weight of the engaging member 2, but preferably the surface comprises an uninterrupted whole providing the engaging member 2 with an increased strength.

[0025] The engaging member 2 preferably comprises a straight, preferably sharp, edge 12 facing the opening 11 which connects adjacent sides 9 of the polygonal frame 7. The shape of the edge 12 is however not critical to the invention and can for example be curved, convex, concave, angled or any other form deemed appropriate by the person skilled in the art. The edge 12 of the engaging member 2 preferably is sharp but can also be blunt, serrated, etc. The sharp straight edge 12, the position of the engaging member 2 in the corner and especially the combination of those two allows to precisely impact the edge 10 of the stones 5 further reducing the risk to the breaking of the stones 5.

[0026] The straight edge 12 of the engaging member 2 is however not critical to the invention. In a different embodiment, the engaging member 2 is positioned along a side 9 of the frame 7 and comprises an impacting angle, which for example comprises a sharp tip impacting the at least one edge 10 of the stones 5. The angle is for example delimited by two legs originating near the corners delimiting the side 9 of the frame 7.

[0027] The engaging members 2 are preferably made off one piece, increasing the strength of the engaging member 2 for impacting the edges 10 of the stones 5. The engaging members 2 may however comprise several pieces which are removably or irremovably mounted to each other by for example bolting, screwing, nailing, gluing, soldering, welding, etc.

[0028] The impacting means 6 preferably comprise at least one engaging member 2 in at least two corners of the polygonal frame 7, more preferably in every corner of the polygonal frame 7 as discussed further on. The impacting means 6 preferably comprise only one engagement member 2 in every corner, the engaging members 2 preferably being located in the same plane, the plane more preferably comprising the plane of the frame 7. Such a configuration of the engaging members 2 limits the risk that different loads, caused by the impact of the engaging members 2, work on the stones 5, possibly in different directions on the stones 5, reducing the risk to breaking of stones 5. The frame 7, as depicted in figure 1 and 3, comprises four corners with each corner comprising an engaging member 2.

[0029] The engaging members 2 preferably are made off a material which has substantially the same, preferably a greater, more preferably a substantially greater hardness than the stones 5, such as for example metal. This way the risk to damaging the engaging member 2

is reduced, rendering the engaging members 2 reusable and increasing the reliability of the device 1. This way also a more uniform ageing of the stones 5 over a longer period of time is achieved.

[0030] The engaging member 2 preferably is removably mounted to the impacting means 6, as depicted in figure 1 and 3. This may be achieved by using mutually engaging fastening members on the frame 7 and the engaging members 2, or any other suitable means known to the person skilled in the art, for example by using bolts or nails, allowing replacement of broken or damaged engaging members 2. The engaging member 2 and the impacting means 6 can however form a whole or the engaging member 2 may be permanently mounted to the impacting means 6 by for example soldering, welding, etc.

[0031] The engaging member 2 more preferably is adjustably mounted to the frame 7 so that the dimensions of the opening 11 can be adapted by adjusting the position of the engaging members 2. The adjustable mounted engaging members 2 can for example be slideably mounted in the frame 7.

[0032] Preferably, the shape and the dimensions of the engaging members 2 are chosen to, in addition to knocking off small pieces of the edges 10 of the stones 5, knock off small pieces from parts of the surface near to the at least one edge 10. This provides the stones 5 with an improved rustic appearance without increasing the risk to the breaking of the stones 5. More preferably, the dimensions of the engaging members 2 are chosen so that the opening 11 of the stones 5 is large enough to allow the parts of the surfaces near the edges 10 of the stones 5 to be impacted by the engaging members 2 due to the vibrating movement.

[0033] The device 1 for artificially ageing stones 5 according to the invention further comprises transporting means 3 for transporting the stones towards and along the impacting means 6 in a transporting direction 13.

[0034] In a preferred embodiment of the device 1 according to this invention, the transporting means 3 comprise a conveyor belt and/or conveyor rollers supporting and driving the stones 5 in the transporting direction 13. The nature of the conveyor belt and/or conveyor rollers are not critical to the invention and any transporting means 3 known to the person skilled in the art can be used for transporting the stones 5 towards and along the impacting means 6 in the transporting direction 13. The transporting direction 13 preferably is horizontal as indicated in figures 1 and 2, which allows a precise tuning of the speed of the stones 5 along the transporting direction 13. The transporting direction 13 may however also be slanted with respect to a horizontal, using at least part of the gravitational forces working on the stones 5 to transport the stones 5.

[0035] In a further preferred embodiment of the invention the transporting means 3 comprise two parts, a first part provided to pass the stones 5 through the opening 11 of the impacting means 6 and a second part, prefer-

ably positioned linearly after the first part, provided to receive the stones 5 leaving the impacting means 6. The first and the second part preferably comprise a conveyor belt and/or conveyor rollers but any other means for transporting the stones may be used such as for example plates for slideably supporting and transporting the stones. The combination of the first and second part is also not critical to the invention and the device may comprise only a first or second part.

[0036] The device 1 further comprises vibrating means 4 for creating a vibrating movement of the impacting means 6 and the stones 5 in relation to each other to cause the impacting means 6 to impact the stones 5. Preferably the vibrating means 4 are provided to vibrate the impacting means 6, more preferably the frame 7. By vibrating the impacting means 6 in relation to the stones 5, the vibrating movement of the stones 5 remains controllable and can be restricted to a location in the vicinity of the frame 7. This way the risk to the breaking of the stones 5 is further decreased, since the risk that different loads, caused by the vibrating movement of the stones 5 in relation to the transporting means 3, work on the stones 5, possibly in different directions on the stones 5, is reduced. Vibrating means 4 vibrating the impacting means 6 also facilitate construction and maintenance of the device 1. The vibrating means 4, however, can for example also be provided to vibrate the stones 5. In that case, the vibrating means 4 can for example be provided to create a vibrating movement of the transporting means 3 and therefore of the stones 5 supported and driven by the transporting means 3. The specific embodiment of the vibrating means is not critical to the invention and can be determined by the person skilled in the art. Any means for creating a vibrating movement of the impacting means 6, more preferably the frame 7, known to the person skilled in the art can be employed and the specific embodiment of the impacting means 6 is not critical to the invention.

[0037] The vibrating means 4 preferably are provided to create a vibrating movement in at least one vibrating direction 14, which vibrating direction 14 preferably extends transversely to the transporting direction 13 of the stones 5. This allows the impacting means 6 to readily impact the stones 5 when they are transported along the impacting means 6 without substantially influencing their location and orientation in relation to the transporting direction 13 and without substantially influencing the speed with which the stones 5 are transported. Vibrating means 4 provided to create a vibrating movement transversely to the transporting direction 13 facilitates construction and maintenance of the device 1 and increases the reliability of the device 1. In a preferred embodiment of the device 1 of this invention, the vibrating direction 14 extends in height direction with respect to the transport direction 13, although this is not critical to the invention. When subjecting the impacting means 6 to the vibrating movement in height direction, the location and orientation of the stones 5 with respect to the transporting direction

13 and/or the impacting means 4 is maintained which increases the reliability of the device 1 and the uniform character of the ageing of the stones 5, decreases maintenance and reduces the risk to breaking of the stones 5.

[0038] The first and the second part of the transporting means 3 preferably are separated from each other, receiving the impacting means 6 between them and allowing the vibrating movement of the impacting means 6 in the vibrating direction 14 transverse to the transporting direction 13, as is shown in figure 1. While the distance between the impacting means 6 and the respective first and/or second part is large enough to allow the vibrating movement of the impacting means 6, the distance between the impacting means 6 and the respective first and/or the second part preferably is chosen that the stones 5, when passing through the opening 11, substantially maintain their original orientation and location with respect to the transporting direction 13 and/or impacting means 6 which increases the reliability of the device 1.

[0039] The transporting means 3 preferably comprise adjusting means for adapting the speed with which the stones 5 are transported along the transporting direction 13, preferably by adapting the rotation speed of the conveyor belt and/or rollers.

[0040] The vibrating means 4 preferably comprise adjusting means for controlling the frequency of the vibrating movement of the impacting means 6 and the impact force with which the engaging members 2 impact the stones 5. The impact force can for example be controlled by adjusting the amplitude of the vibrating movement of the impacting means 6. The adjusting means for controlling the impact force and the frequency are however not critical to the invention and any means known to the person skilled in the art may be used.

[0041] The frame 7 preferably is located substantially perpendicular, more preferably perpendicular, to the transporting direction 13 further minimising the influence of the impact of the engaging members 2 on the orientation and location of the stones 5 with respect to the transporting direction 13 and/or the impacting means 6 and further increasing reliability of the device 1.

[0042] The device 1 according to the invention can be used for ageing all kinds of stones 5 known to the person skilled in the art, comprising at least one edge 10, having a wide range of material characteristics such as mass, density, hardness, colour, brittleness, etc. The material of the stones 5 may be for example concrete, dry stone, etc. The stones 5 can have any dimensions and shapes such as oblong, cubic, etc.

[0043] In the device 1 according to the invention, the stones 5 are artificially aged by knocking off pieces from at least one edge 10 of the stones 5 by impacting the edge 10 with the engagement members 2 which provides the stones 5 with a rustic appearance. The stones 5 are thereto transported by the transporting means 3 towards and along the impacting means 6 in the transporting direction 13 while the vibrating movement of the impacting

means 6 and the stones 5 in relation to each other cause that the engagement members 2 impact at least one edge 10 of the stones 5 in view of knocking off pieces from the edges 10 of the stones 5.

[0044] In a preferred embodiment of the device 1 according to the invention the stones 5 pass through the frame 7 such that the at least one edge 10 lies substantially along, preferably parallel to, the transporting direction 13. The engaging member 2 preferably has engaged the entire length of the edge 10 when the edge 10 is transported past the engaging member 2 along the transporting direction 13, providing the edge 10 with an overall homogeneously aged appearance. When the longitudinal edge 10 is impacted by the engaging member 2 along its entire length, the inventor has found that the stones 5 acquire an overall rustic and aged appearance without increasing the risk to breaking of the stones 5.

[0045] The impacting means 6 thereto preferably comprise one engaging member 2 per edge 10. The polygonal frame 7 therefore preferably comprises one corner for each edge 10 of a stone, each corner comprising one engaging member 2 all being coplanarily mounted to the frame 7.

[0046] Although the individual edges 10 lying along the transporting direction 13 can each be impacted during several passes through the opening 11, the different longitudinal edges 10 preferably are all impacted by the engaging members 2 during a single pass through the opening 11 which greatly improves the efficiency of the device 1. The device 1 however may also only impact the edges 10 of the stones 5 which are visible after the stones 5 have been installed which decreases the number of edges 10 which have to be impacted further decreasing the risk to the breaking of the stones 5.

[0047] The device 1 and the method of this invention present the advantage that homogeneous and constant artificial ageing of the stones 5 may be achieved with respect to the different edges 10 of the stone 5 impacted by the engaging members 2. This provides the stones 5 with a more rustic and aesthetical appearance. The homogeneously aging of the stones 5 presents the advantage that the stones 5 can be employed without having to take a preferred orientation into account, which renders the process of installing the stones 5 easier and faster. Thereto, the engaging members 2 impacting the different longitudinal edges 10 preferably are identically and/or symmetrically mounted to the frame 7 around the opening 11.

[0048] However, if so desired the device 1 and the method of this invention can also subject the stones 5 to an inhomogeneous artificially ageing process by for example changing the frequency, impact force, transporting speed, characteristics of the engaging members 2, etc. during the ageing of one stone 5, a batch of stones 5, etc. Another possible embodiment for obtaining an inhomogeneous ageing of the stones 5 can be obtained by subjecting different part of the impacting means 6 to different vibrating movements for example having a differ-

ent frequency and impact force.

[0049] The inventor has found that the device 1 is particularly suitable for ageing oblong stones 5, more particularly beam-shaped stones 5, preferably with a rectangular cross-section, since it has been found that the risk that oblong stones break when subjected to the artificial ageing process of the device according to the invention is reduced.

[0050] When subjecting beam-shaped stones 5 with a rectangular cross-section to the artificial ageing process, the four longitudinal sides of the stones 5 preferably are simultaneously subjected to impacts of the engaging members 2 while being transported with their longitudinal sides 10 along the transporting direction 13 through the frame 7, while the frame 7 is subjected to a vibrating movement. The frame 7 preferably is provided with four engaging members 2 each located in a corner of the rectangular frame 7. In another embodiment of the invention, the frame 7 comprises two engaging members 2 situated in two adjacent corners of the frame 7 for impacting two adjacent longitudinal sides of the stones 5, reducing the risk to the breaking of the stones 5 and increasing the efficiency of the device 1, as discussed earlier on.

[0051] The oblong stones 5 preferably are put on the transporting means 3 with their longitudinal edge 10 substantially along, preferably parallel to, the transporting direction 13. The stones 5 more preferably rest with one face of their surface on the transporting means 3.

[0052] The material and/or shape of the engaging members 2 can be adapted to the material characteristics, dimensions and/or shapes of the stones 5 by the person skilled in the art. The engaging members 2 however are preferably slanted with respect to the edge 10 of the stones 5 allowing a homogeneous ageing of the stones 5 while reducing the risk to the breaking of the stones 5. The material and shape of the engaging members 2 can also be chosen in relation to the desired ageing of the stones 5, the frequency of the vibrating movement, the impacting force of the engaging members 2, the speed of the stones 5 along the transporting direction 13.

[0053] The dimensions of the opening 11 preferably are chosen in function of the height 16 and the width 17 of the stones 5 passing through the opening 11. In a preferred embodiment of the invention, the dimensions of the opening 11 can be adjusted to the stones 5 passing through the opening 11 by replacing the frame 7, by adjusting the position of the sides 9 of the frame 7, by adjusting the mounting of the engaging members 2 and/or by replacing the engaging members 2. The length 8 of the frame 7 along the transporting direction 13 preferably is smaller than the length 15 of the stones 5 in the transporting direction 13. This is however not critical to the invention and a tunnel-shaped frame 7 can be used, although the inventor has found that when using a tunnel-shaped frame 7 the number of pieces which break-off from the surfaces near the edges 10 of the stones 5 is reduced when impacting the stones 5 with an equal impact force.

[0054] The vibrating means 4 and the transporting means 3 preferably are independently driven. More preferably, the adjusting means for adjusting the speed of the stones 5 along the transporting direction 13 and the adjusting means for adjusting the impact force and the frequency of the vibrating means 4 preferably are also independently driven.

[0055] The speed of the stones 5 along the transporting direction 13 and the frequency of the vibrating movement affect the degree of ageing applied to the stones 5. Increasing the speed of the stones along the transporting direction or decreasing the frequency of the vibrating movement, which creates stones 5 which are less impacted by the engaging members 2 and which therefore are less artificially aged. By increasing the speed of the stones along the transporting direction 13 and accordingly increasing the frequency of the vibrating movement, the efficiency of the ageing of the stones can be increased without decreasing the artificial age of the stones 5.

[0056] Since the speed with which the stones 5 are transported through the impacting means 6 along the transportation direction 13 is governed by the transporting means 3 and the frequency and amplitude of the vibrating movement is governed by the vibrating means 4 and since the vibrating 4 and transporting 3 means preferably are independently driven, the speed can be adapted without changing the ageing of the stones 5 by accordingly adapting the frequency and/or amplitude of the vibrating movement. Likewise, the ageing of the stones 5 can be adapted without adapting the speed of the stones 5.

[0057] The impact force and characteristics of the material affect the ageing of the stones 5. By adapting the impact force of the engaging members 2, the degree of ageing can be controlled and can be adopted to the nature of the material. The impact force of the engaging members 2 is therefore adjusted in relation to the material characteristics of the stones 5 and the desired artificial age of the stones 5.

[0058] The person skilled in the art is capable of adapting and determining the parameters determining the degree of ageing such as the transport speed, the frequency of the vibrating movement, the amplitude of the vibrating movement, the material of the engaging members, etc. so that a minimum risk to breaking of the stones 5 is achieved while maintaining efficiency.

[0059] The method of this invention is suitable for the ageing of new, old or used stones, regardless of their dimensions and the nature of the material of which they are made. The method of this invention permits achieving a comparable and reproducible age for these stones if so desired or any degree of ageing envisaged. In case relatively new stones are used in the process of this invention, the quality of the stones can still be guaranteed and can be maintained substantially constant unlike recycled stones originating from, for example, the demolition of old buildings, while having exactly the same rustic

appearance as the recycled stones. Because any type of stone can be processed with this device 1 it is of particular interest for restoration or renovation purposes. When stones of matching nature, dimensions and/or physical properties are found they can be treated by the device 1 of the present invention to obtain stones with a comparable age as the existing stones, but with a supreme quality. Construction is thus no longer bound to the supply of recycled stones found at a certain moment. To the contrary, stones of a broad spectrum of natures, dimensions and/or physical properties, in opposition to the state of the art, and the age of those stones can be chosen in advance for an acceptable price thus adding to the materials that can be used in construction.

Claims

1. A device (1) for artificially ageing stones (5), the device (1) comprising impacting means (6) for impacting the stones (5) in view of knocking off pieces from the stones (5), transporting means (3) for transporting the stones (5) towards and along the impacting means (6) in a transporting direction (13) and vibrating means (4) for creating a vibrating movement of the impacting means (6) and the stones (5) in relation to each other to cause the impacting means (6) to impact the stones (5), **characterised in that** the impacting means (6) comprise an opening (11) for receiving the stones (5) one by one and at least one engaging member (2) for impacting at least one edge (10) of the stones (5) in view of knocking off pieces from at least one edge (10) of the stones (5).
2. A device (1) according to claim 1, **characterised in that** the vibrating means (4) and the transporting means (3) are independently driven.
3. A device (1) according to claim 1 or 2, **characterised in that** the at least one engaging member (2) is provided to impact the at least one edge (10) of the stones (5) lying along the transporting direction (13).
4. A device (1) according to claim 3, **characterised in that** the at least one engaging member (2) slants with respect to the at least one edge (10) of the stones (5) extending along the transporting direction (13).
5. A device (1) according to any one of claims 1 - 4, **characterised in that** the impacting means (6) comprises means for adapting the dimensions of the opening (11).
6. A device (1) according to claim 5, **characterised in that** the means for adapting the dimensions of the opening (11) comprise means for changing the position of the engaging member (2).
7. A device according to any one of claims 1 - 6, **characterised in that** the engaging members (2) are removable mounted to the impacting means (6).
8. A device (1) according to any one claims 1-7, **characterised in that** the impacting means (6) comprise a polygonal frame (7) surrounding at least part of the stones (5) transverse to the transporting direction (13) and **in that** the at least one engaging member (2) connects adjacent sides (9) of the polygonal frame (7).
9. A device (1) according to claim 8, **characterised in that** the vibrating means (4) are provided to vibrate the frame (7).
10. A device (1) according to claim 8 or 9 **characterised in that** the length (8) of the frame (7) along the transporting direction (13) is smaller than the length (15) of the stones (5) in the transporting direction (13).
11. A device (1) according to any one of claims 1 - 10, **characterised in that** the vibrating means (4) are provided to create a vibrating movement in at least one vibrating direction (14), which vibrating direction (14) extends transverse to the transporting direction (13) of the stones (5), in transporting direction (13) of the stones (5) or in height (16) direction of the stones (5).
12. A device (1) according to any one of claims 1 - 11, **characterised in that** the engaging member (2) comprises a sharp edge (12) (10) engaging the stones (5).
13. A method for artificially ageing stones (5) comprising the steps of transporting stones (5) towards and through an impacting device (1) in a transporting direction (13), causing a vibrating motion between the stones (5) and the impacting means (6), **characterised in that** the stones (5) are passed through an opening (11) in the impacting means (6) one by one, and **in that** at least one edge (10) of the stones (5) is impacted by at least one engaging member (2) in view of knocking off pieces from at least one edge (10) of the stones (5).
14. A method for artificially ageing stones (5) according to claim 13, **characterised in that** the at least one edge (10) of the stones (5) lies along the transporting direction (13).
15. A method for artificially ageing stones (5) according to claim 13 or 14, **characterised in that** the engaging member (2) has impacted the entire length of the edge (10) when transported past the engaging member (2) along the transporting direction (13).

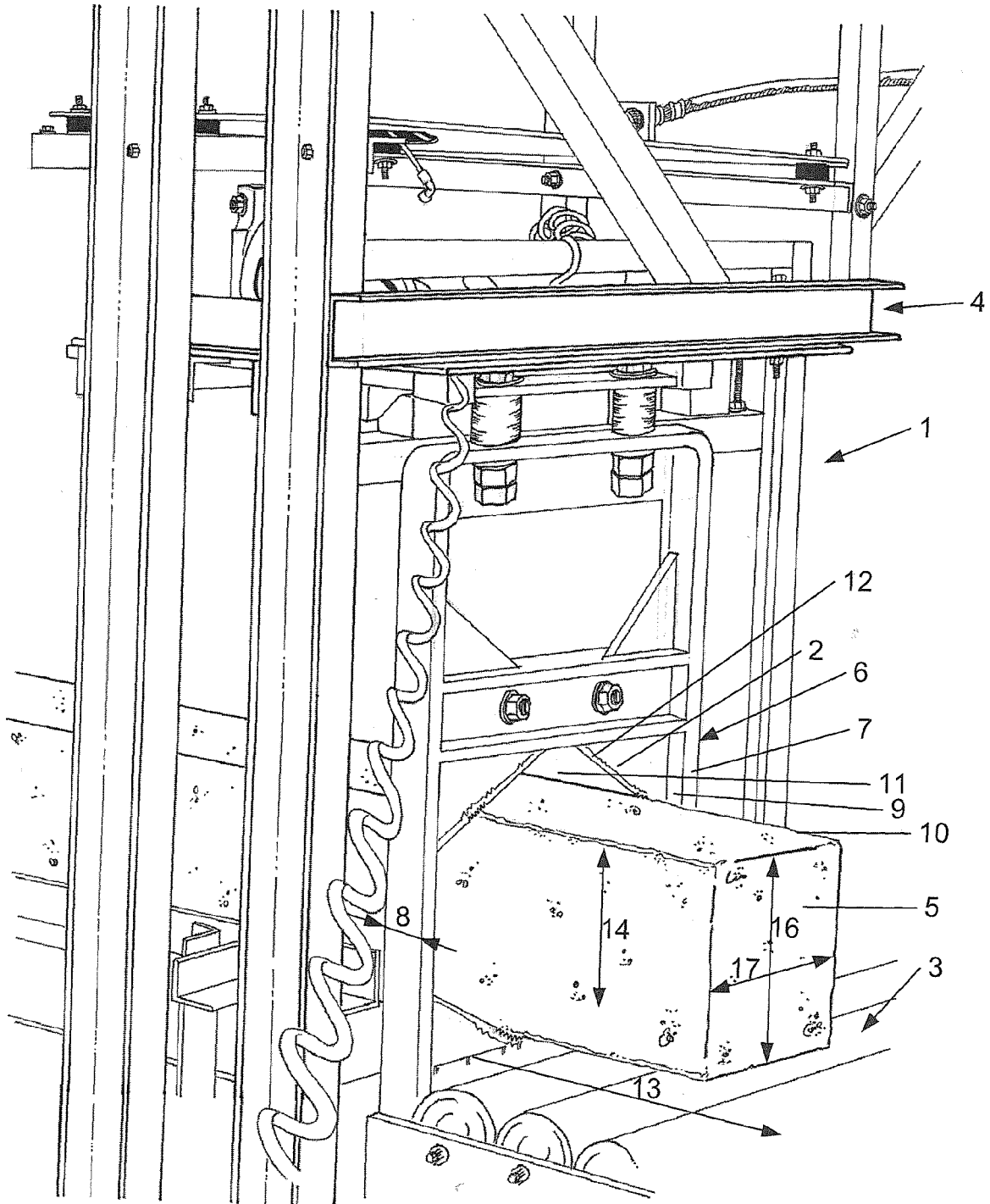


Fig. 1

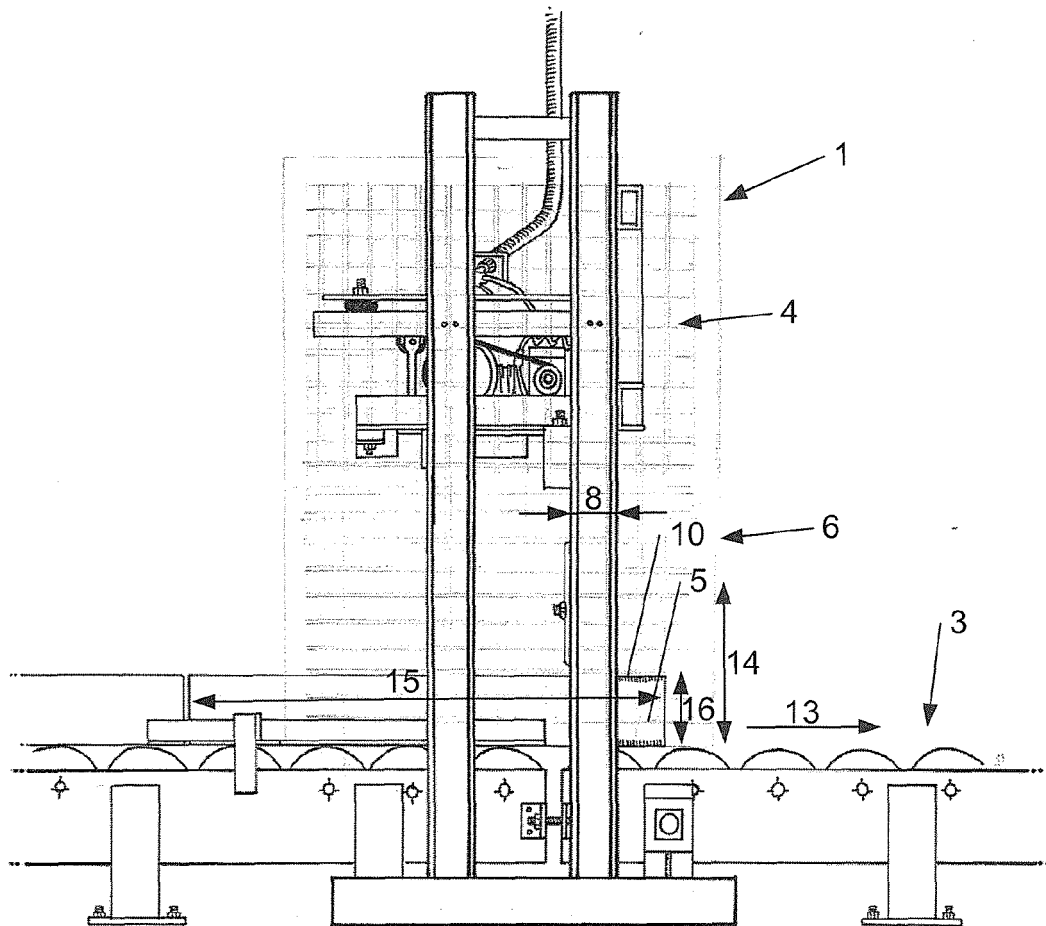


Fig. 2

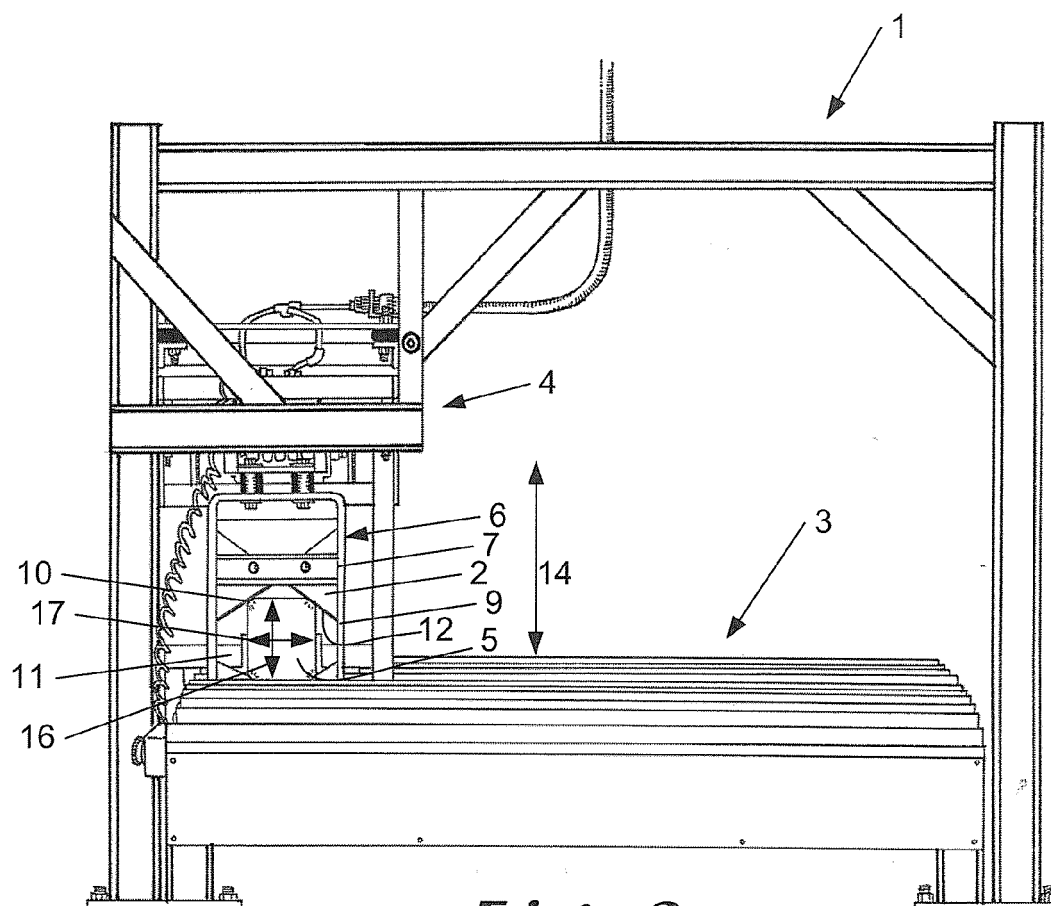


Fig. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 10 0319

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Place of search Munich		Date of completion of the search 25 May 2007	Examiner Frisch, Ulrich
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