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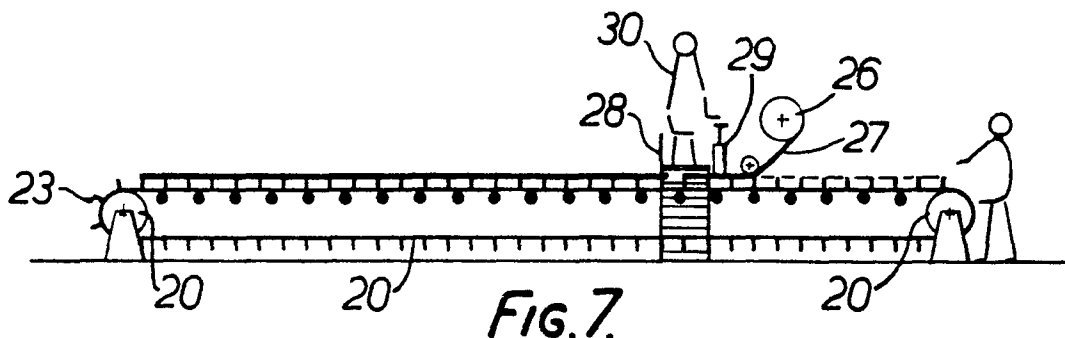
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(54) Device for manufacturing a block mat.

(57) A device for manufacturing a block mat comprising a carrying cloth and concrete blocks, fastened to said cloth with the aid of nails whereby the device has been provided with an endless belt with the aid of which the blocks having holes therein in a given pattern for receiving nails, together with the carrying cloth can be moved along means for inserting the nails into the holes concerned.



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Device for manufacturing a block mat.

The invention relates to a device for manufacturing a block mat comprising a carrying cloth and concrete blocks fastened to said block with the aid of nails.

So-called block mats composed of a carrying cloth and concrete blocks fastened to said carrying cloth are employed, for example, in water engineering for protecting banks or bottoms to prevent erosion of the subjacent ground by water streams or the like.

Such blocks of concrete can be manufactured with the aid of conventional press devices in which a plurality of concrete blocks can be simultaneously made side by side in a mould.

It has been suggested (FR-A-2.396.633) to pass also the cloth through the press device so that the blocks are formed on the carrying cloth, but this has the disadvantage that only mats of limited width can be made with the aid of the existing press devices, whilst in addition undesirable damage of the carrying cloth during compression of the concrete blocks may occur.

The invention has for its object to provide a simple device of the kind set forth in which the blocks can be fastened in a simple way to the mat.

According to the invention this can be achieved in that the device has been provided with an endless belt with the aid of which the blocks having holes therein in a given pattern for receiving nails together with the carrying cloth can be moved for inserting the nails into the holes concerned.

In view of the fact that the blocks have been provided with holes in a given pattern in the blocks can be easily brought in the correct position in order to introduce nails into the holes, by means of the endless belt, even when the cloth is lying on said blocks.

The invention will be described more fully hereinafter with reference to the accompanying figures.

Fig. 1 is a schematic plan view of a mould in which concrete blocks for a block mat can be manufactured.

Fig. 2 is an enlarged plan view of a potential embodiment of a concrete block.

Fig. 3 is a side elevation of Fig. 2.

Fig. 4 shows an embodiment of a ram plate suitable for ramming down the concrete mortar in the mould shown in Fig. 1.

Fig. 5 is a sectional view of a nail suitable for fixing a carrying cloth to a concrete block.

Fig. 6 is a sectional view of a further potential embodiment of a concrete block.

Fig. 7 is a schematic side elevation of a further embodiment of a device for manufacturing block mats.

Fig. 8 is a plan view of the device of Fig. 7.

Fig. 9 is a schematic side elevation of a further embodiment of a device for manufacturing block mats.

For manufacturing concrete blocks suitable for use on a block mat the mould 1 shown in Fig. 1 may be employed. Said mould comprises sidewalls 2 and transverse partitions 3 arranged between said sidewalls and being orthogonal to one another, said partitions dividing the space bounded by the walls 2 into a plurality of compartments 4 having a rectangular section in this embodiment.

This mould can be arranged to form rectangular concrete blocks 5 of the kind shown by way of example in Figs. 2 and 3 in a known press device not shown in the Figures, which may be provided with a plurality of ramming plates 6 of the form shown in Fig. 4. It will be obvious that the ramming plates 6 are disposed in the press in a manner such that the number and disposition of the ramming plates 6 correspond with the number and disposition of the recesses 4 in the mould 1. Concrete mortar can then be poured into the recesses 4 and be consolidated with the aid of the ramming plates. In the embodiment shown in the Figure the ramming plate is provided with a plurality of pins 7, in this case three, so that during the manufacture of a concrete block 5 three recesses 8 are simultaneously formed in a given pattern in the concrete block.

The design of said recesses 8 will match the shape of the nails to be introduced into the recesses in a manner to be described in detail hereinafter. One embodiment of such a nail is represented in Fig. 5.

From Fig. 5 it will be apparent that the nail, preferably made from synthetic resin, has a shank 9 and a head 10 adjoining the top end of the shank. The lower end of the shank has the shape of a tip. The shank is furthermore provided along a large part of its length with at least substantially radial superjacent, continuous ribs 12. When such a pin is pressed or struck into a recess 8 having a section suitable for receiving the head 10 and the shank 9, the continuous ribs 12 will be slightly deflected upwards. When it is then attempted to draw the nail out of the opening, the ribs 12 tend to regain their radial position shown in the Figure so that firm anchoring of the nail in the concrete block 5 is ensured.

Fig. 6 shows a further embodiment of a concrete block. In this block is formed a recess 14, the lower part of which has a larger diameter than the upper part, as will be apparent from Fig. 6. Such a concrete block can be formed by a mould bearing on a bottom plate having pins the shape of which matches the design of the passage 14. In this case the ramming plate can be constructed without pins or the like. Using such concrete blocks having such passages 14 nails can be used, which are split over at least part of their length, whilst the lower ends thereof are provided with protruding lugs which can move towards one another when the nail is introduced from above and when the lugs get into the part of the larger diameter of the passage, they resiliently move away from one another and grip behind the shoulder formed at the transition between the parts of the passage 14 having different diameters. It will be obvious that in this way several variations in designs of passages and the associated nails can be conceived.

For manufacturing a block mat there can be used a device of the design shown by way of example in figs. 7 and 8.

Said device has been provided with an endless belt 20 guided along two drums 21 rotatable about horizontal axes or rotation, at least one of which can be driven by means not shown. The endless belt 20 is provided with upright ridges 22 and 23 or similar extensions or lugs extending in the direction of length and at right angles to said direction of length of the belt, said extrusions bounding compartments for depositing blocks. The deposition of the blocks may be manually carried out by persons 24, who pick up the blocks from stacks 25 and put them on the belt. As a matter of course this deposition on the belt may, as an alternative, take place automatically. It is then possible to connect the device as well as the devices to be discussed hereinafter with the device pressing the blocks so that the whole process can be substantially fully automated from the manufacture of the blocks up to the manufacture of the mats.

Fig. 7 furthermore shows that above the belt 20 is arranged a reel 26, from which the cloth 27 is wound to be placed on the blocks deposited on the belt. The device may furthermore comprise a travelling bridge 28 or the like extending transversely above the belt, along which a device 29 for inserting the nails into the blocks is movable. This device may be manually operated by a person 30 or it may be designed so that it operates automatically.

The device shown in Fig. 9 comprises a frame 31 supporting an endless belt not shown. For feeding the blocks 32 to the endless belt a feeding device is provided, which comprises a carrier 34 disposed above a table 33 and being reciprocatory

in the direction of the arrow A, to which are pivotally fastened latches 35 with the aid of horizontal pivotal shafts 36 extending at right angles to the direction of movement indicated by the arrow A. The design is such that the latches 35 can only turn in clockwise direction (Fig. 9) out of a position in which the latches 35 extend vertically downwards from their pivotal shafts. With the aid of the carrier 34 provided with the latches 35 blocks placed on the table 33 can be shifted in a direction towards the frame 31, in which case each concrete block is lying between two latches 35 succeeding one another in the direction of displacement indicated by the arrow A so that the latches 35 serve as setting members by means of which the blocks are moved into their desired relative positions.

When the blocks are shifted to the left as viewed in Fig. 9 onto the endless belt supported by the frame 31 with the aid of the carrier 34 provided with the latches 35, the belt is simultaneously displaced over the same distance so that the blocks maintain their desired distance between one another.

Above the frame 31 a reel 37 is arranged to feed the carrying cloth 38 to the concrete blocks. At the area of the broken line 39 means suitable for inserting the nails can be provided to put the nails in the desired manner in the blocks. When a mat of the desired length is made, the cloth can be cut, after which a new block mat can be initiated.

Although it is assumed above that the devices inserting the nails are passed along appropriate guide members, it is also possible to find the spots of the holes by the feel of the hand, when the carrying cloth is spread across the blocks, after which the nails can be driven into the appropriate holes with the aid of a suitable shooting device or of a hand hammer. It will, however, be obvious that for mass production shooting devices passed along suitable guide members will be preferred.

The invention is, of course, not limited to blocks of square or rectangular cross-section. For example, it is possible to use blocks having on the sides or within the outer circumference recesses covering the full height or part thereof of the block and/or they may have profiled or non-profiled top faces and/or they may have a tapering shape.

Claims

1. A device for manufacturing a block mat comprising a carrying cloth (27) and concrete blocks (5), fastened to said cloth (27) with the aid of nails (5) characterized in that the device has been provided with an endless belt with the aid of which the blocks (5) having holes (8) therein in a given pattern for receiving nails (9), together with

the carrying cloth (27) can be moved along means for inserting the nails (5) into the holes (8) concerned.

2. A device as claimed in claim 1, characterized in that the belt (20) is provided with projecting parts (22,23) forming locating means for the blocks (5).

3. A device as claimed in claim 1, characterized in that, viewed in the direction of movement of the upper run of the belt, a feeding table (33) is arranged in front of the belt, across which table a

carrier (34) is adapted to reciprocate, said carrier being provided with pivotable latches (35) for displacing the blocks (5).

5 4. A device as claimed in anyone of the preceding claims, characterized in that above the endless belt (20) there has been arranged a reel - (26,37) for supplying the carrying cloth (27,38).

10 5. A device as claimed in any of the preceding claims, characterized in that the device comprises a bridge (28) extending transverse over the belt - (20) and supporting a device (29) for inserting nails (9) into the blocks (5), said device (29) for inserting nails being movable along the bridge.

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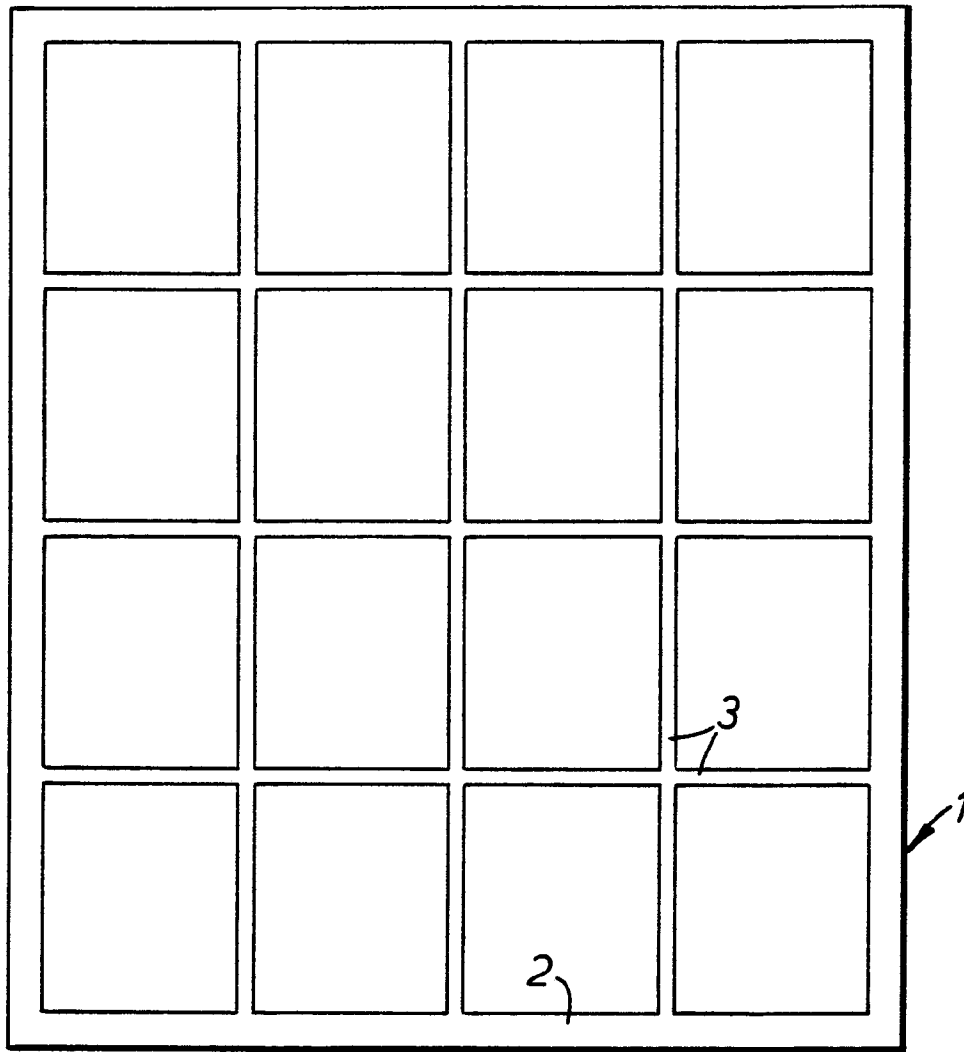


FIG. 1.

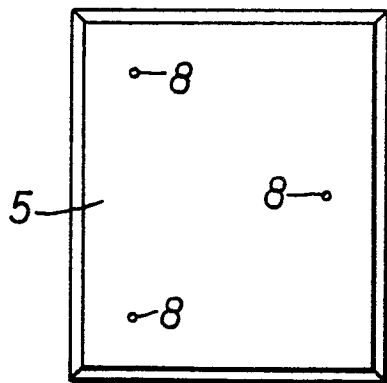


FIG. 2.



FIG. 3.

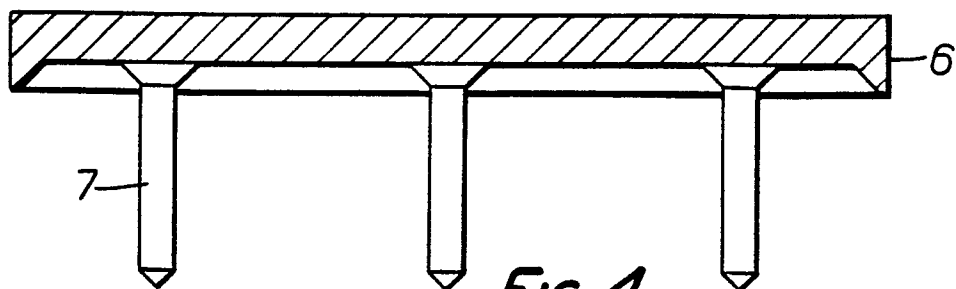


FIG. 4.

