United States Patent

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[31] **P 16 83 837.2**

[54] **APPARATUS FOR REMOVING THE EXCESS MATERIAL OBTAINED WHEN TRIMMING THE TOP SIDE OF PLASTIC FOAM CONCRETE BLOCKS**
7 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **15/303,** 15/307, 214/1, 294/64
[51] **Int. Cl.** **A47l 5/38**
[50] **Field of Search** ..... 15/301, 306, 308, 415, 418, 422; 51/273; 25/(Inquired); 125/(Inquired); 294/64; 214/1 (BS), 1 (BS)2

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ABSTRACT: A device for removing the material trimmed from the top side of plastic foam concrete blocks in which a suction box is lowered onto and travels across the concrete block. The suction box has a grid with a plurality of fine openings therein all being connected to a suction fan which generates a negative pressure in the suction box.

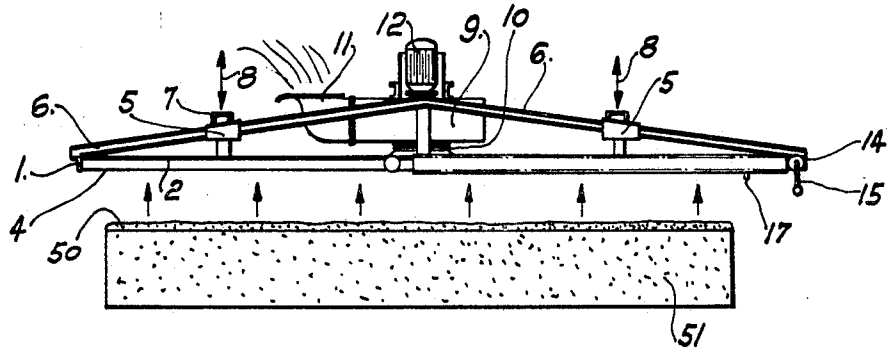

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Fig. 1

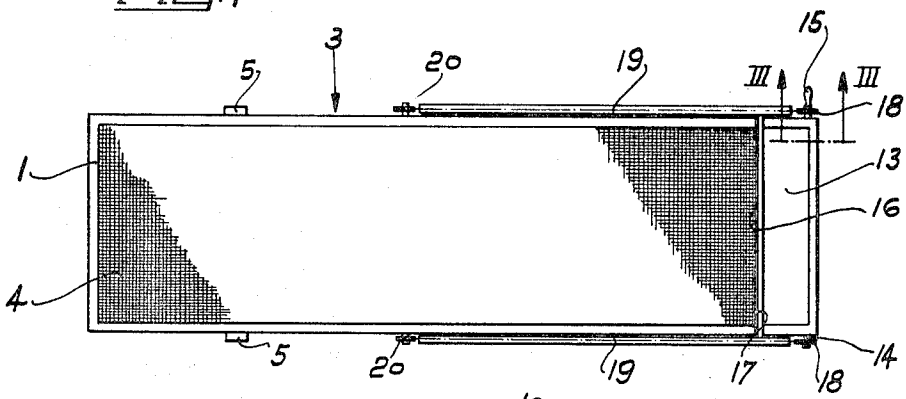


Fig. 2

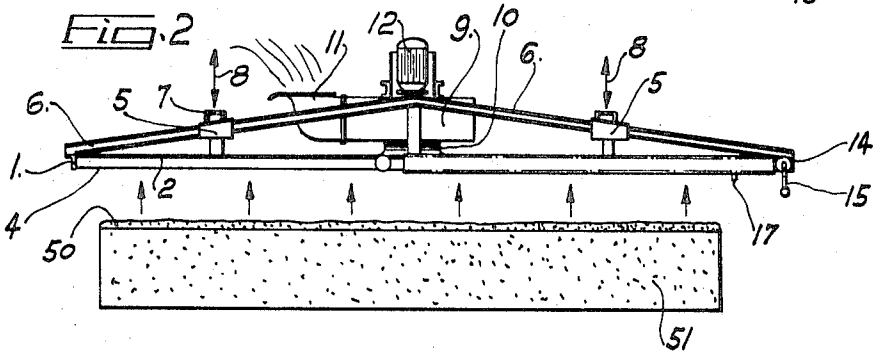


Fig. 3

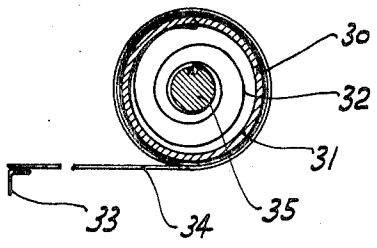
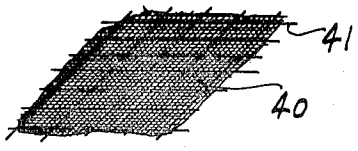


Fig. 4



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APPARATUS FOR REMOVING THE EXCESS MATERIAL OBTAINED WHEN TRIMMING THE TOP SIDE OF PLASTIC FOAM CONCRETE BLOCKS

This invention relates to an apparatus for removing the excess material obtained when trimming the top of foam concrete blocks.

Foam concrete blocks are cast in large boxes. Each block is then transferred to the table of a cutting machine where it is cut into slabs and the like by means of a cutting device. During this procedure a layer, which has a thickness of between approximately 3 to 10 cm. (1.2 to 4 inches), is cut off, by means of a horizontal cutting wire, from the surface of the foam concrete block while still in a plastic state.

Hitherto this so-called excess material was swept off or withdrawn by cleaning apparatus from the top after the concrete block had been cut into slabs or bricks. In this cleaning procedure the excess material falls, for example, onto conveyor belts which are arranged in pits extending laterally of the cutting installation. These conveyor belts remove the material away from the cutting installation and transport it to a processing plant.

In this known method of cleaning the top of the block the danger exists that the block may be damaged, particularly at the edges, thus making the cut slabs partly or totally unusable.

A further disadvantage consists in that the sweeping or removal procedure is time consuming, requires several workmen and in addition does not result in complete cleaning of the top surface of the block.

The object of the present invention is to provide an apparatus of the type mentioned above by means of which, with the least possible use of implements and in a single operation, all excess material can be removed from the top surface of the block, while, at the same time, avoiding any damage to the delicate foam concrete block.

This object is achieved, according to the invention, by a suction box which can be lowered onto and be moved across the top of the concrete block, the lower surface of the said suction box which faces the concrete block consisting of a suction grid having a plurality of fine openings and being connected via connecting pipe lines to a suction fan or the like which generates a negative pressure.

The suction box may have roughly the same shape in plan as the largest concrete block which can be cast in a particular works and is preferably of relatively flat construction, since, for a given suction fan output, the negative pressure in the suction box required to lift the excess material is more rapidly reached the smaller is its volume. The lowest limits for the height dimensions of the suction box are therefore only determined by requirements of strength as well as the requirement that the air current caused by the suction fan is not subject to large losses.

The necessary negative pressure in the suction box depends essentially upon the weight to be carried, that is upon the specific gravity and the volume of the excess layer. With a specific gravity of approximately 1 and an average thickness of the layer of between 3 and 10 cm. (1.2 to 4 inches) a pressure difference between the outside atmosphere and the interior of the suction box of only 0.03 kg./cm.^{2}, corresponding to 0.03 atmospheres (.427 pounds per sq. inch), has proved to be sufficient to aspirate and effectively hold the excess material. With this negative pressure comparatively large excess material up to approximately 15 cm. (6 inches) can be aspirated and held.

The size of the opening as well as the width of the webs remaining between them should be small as possible as the excess material breaks up during cutting and also during the suction procedure and partially into very small individual pieces. Suction grids have proved to be satisfactory in which the openings have a width of approximately 1 mm.(0.04 inch).

In order also to be able to use the apparatus on those cement blocks having a smaller plan area than that of the suction grid, there is provided, according to the invention, means by which that part of the exposed suction grid which extends beyond the concrete block can be covered.

Further characteristics and advantages of the invention are explained in more detail below by means of the embodiment illustrated in the accompanying drawings in which:

FIG. 1 is a suction box seen from below;

FIG. 2 is a side elevation of a flat suction box arranged on a supporting frame, before being lowered onto a trimmed concrete block;

FIG. 3 is a view of a winding device for winding up a roller blind cover taken along the line III–III of FIG. 1; and

FIG. 4 shows the details of a suction grid.

In the drawings (FIGS. 1 and 2) a rectangular suction box 3 is illustrated by way of an example. This suction box is made up of an angle iron frame 1 and a cover plate 2 and is closed at the bottom by means of the suction grid 4. The suction box 3 is suspended from reinforcing struts 5 from a support frame 6 of rooflike construction. On top of the reinforcing struts 5, loops or eyelets 7 are arranged by which the supporting frame 6 may be suspended and moved by a lifting crane in the direction indicated by the two arrows 8.

The supporting frame 6 also accommodates a suction fan 9 arranged above the suction box 3, the suction side of the said fan being connected by a pipeline 10 which passes through the cover plate 2 to the inside of the suction box 3, its exhaust outlet 11 leading to atmosphere. In the illustrated embodiment the fan 9 is driven by an electric motor 12.

At one end of the suction box 3 there is fitted a roller blind cover 13 which can be pulled in a longitudinal direction over the lower side of the suction grid 4. The roller blind cover is retractable by means of the winding device 14 actuated by the crank handle 15. The free end 16 of the roller blind cover is reinforced by the strap 17 which is conveniently of L-shaped cross section. The strap 17 is secured at either end to one of two endless chains 19 arranged on both sides of the suction box and driven by the crank handle 15. For this purpose on both ends of the winding device and coaxially therewith, sprockets 18 are provided over which the chains 19 run on the one end of the device. On the other end the chains run over freely rotatable guide sprockets 20 which are arranged on both sides of the suction box. These sprockets also serve as tensioners for the chains 19.

In FIG. 3 an embodiment of a winding device 30 is illustrated by means of which a continuous and even tightening effect and thus a perfectly tight fitting of the roller blind against the suction grid may be achieved. A hollow winding drum 30 is fitted concentrically with and freely rotatably on a central shaft 35 and connected thereto by means of spiral springs 32. The guide sprockets 18 for the endless chains are arranged on the shaft 35. For reasons of clarity this latter arrangement is not illustrated in FIG. 3. The roller blind cover which is wound onto the winding drum and provided with an angle section strap 31 secured to the chains 19 which are also not illustrated is equally prestressed by the tensioned spiral springs in any position of the roller blind cover.

FIG. 4 shows a suitable arrangement of the suction grid. A fine mesh sieve 40 manufactured, for example, of stainless steel wire with a mesh of approximately 1 mm. (0.04 inches) forms the suction grid proper against which the aspirated excess material abuts. As such fine sieves generally do not have sufficient rigidity, a stronger supporting grid 41 of stronger wire and a larger mesh size is secured to the sieve 40 at several points distributed over the sieve surface, for example by means of binding wire. As suction grids, fine nylon nets or expanded metal nets are also suitable.

The top cover of the suction box preferably consists of a plastic covered fabric so that it is impervious to air and unaffected by the foam concrete material.

The mode of operation of the apparatus is as follows: After cutting off the excess material 50 (FIG. 2) the suction box 3 which has a breadth corresponding to the breadth of the concrete block, is lowered, with the suction fan running, over the concrete block 51 in such a manner that it is a short distance above the block. Care should be taken that the left end of the suction box terminates at the corresponding end surface of the concrete block.

On the other end the effective surface of the suction grid is adjusted to correspond to the length of the concrete block by appropriately pulling out the roller blind cover. By the negative pressure produced by the suction fan the excess material is lifted onto the suction sieve where it adheres in position. With the suction fan running the support frame 6 is lifted, for example, by lifting a crane and conveyed to the position where the excess material can be offloaded, possibly to a hopper situated adjacent the cutting machine, where a conveyor or the like is located below the said hopper which transports the foamed concrete bulk to a processing plant. After the suction fan is switched off, the excess material drops off and the suction box is again ready for use.

As the apparatus according to the invention is not lowered onto the foamed concrete block, but rather to a distance of about 3 cm.(1.2 inches) above it, it does not make any contact at all with the concrete block so that any damage to the block during the removal of the excess material is thus effectively avoided.

We claim:

1. Apparatus for removing the excess material obtained from cutting the top side of foamed concrete blocks, comprising:

a suction box adapted to be lowered into close association with the concrete block and be moved across the top surface thereof, the underside of the suction box which is adapted to face the concrete block having a plurality of openings therein;

a suction fan connected to the suction box for generating a negative pressure;

a drum rotatably supported on the suction box; and

a flexible cover foil, one end of which being wound onto the rotatable drum, the other free end thereof being guided along both longitudinal sides of the suction box and adapted to cover selected ones of the openings.

2. Apparatus according to claim 1, including spring means for maintaining the cover foil tensioned.

3. Apparatus according to claim 2, wherein the free end of the cover foil is guided for movement along the suction box by two pairs of longitudinally spaced chain wheels on each side of the suction box, one of the chain wheels in each pair being operatively connected in association with the rotatable drum, a chain guided by each of said two pairs of longitudinally spaced chain wheels, the free end of the cover foil being attached to the chains for movement toward and away from the rotatable drum to cover selected ones of the openings, and a hand crank drivingly connected to said rotatable drum for drivingly rotating same.

4. Apparatus according to claim 3, wherein said rotatable drum is freely rotatably supported on a shaft, said shaft being adapted to be rotatably driven by a crank handle, the pair of chain wheels operatively connected in association with the rotatable drum being fixedly mounted to said shaft, said shaft and said drum being interconnected by spiral springs.

5. Apparatus according to claim 1, wherein the cover foil consists of a fabric coated with plastic.

6. Apparatus according to claim 1, wherein the openings in the underside of the suction box are defined by a suction grid consisting of a wire sieve.

7. Apparatus according to claim 6, wherein the suction grid consists of a fine meshed wire sieve and a coarse support grid arranged thereabove and connected at several places to the wire sieve.