A device for manufacturing mouldings of clay or such material, comprising at least one press (2) adapted to deliver a ribbon of clay (5) in a vertical, downward direction from a press nozzle (4), a sanding device (6) for applying sand onto the vertical faces of the ribbon of clay (5), said sanding device (6) comprising a sand pan (7) positioned under said press nozzle and having in its bottom a ribbon-passage opening, four pressing rollers being provided under said ribbon-passage opening which are adapted to get into contact with the respective sides of the ribbon (5), whereby each of the pressure rollers (20) has a length which substantially corresponds to the length of the respective side of the ribbon, the latter length being defined by the press nozzle, whereby all of the pressure rollers are mounted at the same level.
Title: Sand pressure rollers in a brick moulding machine.

The invention relates to a device as defined in the preamble of claim 1.

Such a device is disclosed in Dutch patent 161.832.

Under certain conditions mouldings produced by this well-known device may show defects, in particularly they may have edges which are unsufficiently sharp.

The invention aims at providing a device of the type above referred to, with which this drawback does not occur or to a largely reduced extent only. According to the invention this aim is achieved by the measures mentioned in the characteristic clause of claim 1. At the location of the pressure rollers the ribbon of clay will now be completely enclosed. Loose grains of sand passing along with the ribbon of clay through the passage opening in the sand pan, will be caught and pressed into the ribbon by said pressure rollers.

It has been found that the unsufficiently sharp edges of the mouldings are caused by loose grains of sand falling into the moulding cavities of the moulding trays and get into the corner areas. Of course the spaces already occupied by the sand cannot be filled by clay material anymore, so that the edges become unsufficiently sharp.

Due to the provision of the pressure rollers according to the invention, however, the major amount of the loose grains of sand will be caught and pressed into the ribbon of clay by these pressure rollers.

It has been found that the feature of claim 2 provides for an optimal operation of the pressure rollers. No drive is required for the pressure rollers.

A most favourable embodiment shows the features of claim 3. With this embodiment a uniform pressing force will be exerted by the pressure rollers. Small variations in the size of the ribbon are followed without difficulties.

By means of the preferred feature of claim 4 a desired pressing force by the pressure rollers can be obtained in a simple manner.

Furthermore, when applying the preferred measure of claim 5, the pressing force may be adjusted at wish in a very simple and reliable manner. Dependent of the properties of the clay material it may be desired to adjust the pressing force differently.

The invention will be further explained in the following description of an example of the device of the present invention,
shown in the drawings.

Fig. 1 is a partially sectional perspective view of the device according to the invention in a preferred embodiment, only that part of the device being shown which is relevant for a good understanding of the present invention;

Fig. 2 is an enlarged view of a part of the device of Fig. 1 relating to the pressure roller area, in operation and

Fig. 3 is a sectional view of the device of Fig. 1 and 2, taken just above the pressure roller level.

In Fig. 1 there is shown a part of a device 1 for producing mouldings of clay or similar material. A plurality of such parts may be placed side by side in one device 1 and operate simultaneously for filling clay into moulding trays.

The device 1 thus comprise at least one press 2, adapted to deliver a ribbon 5 of clay (indicated by dotted lines) which is expelled downwardly through a press nozzle 4. The press also comprises a supply bin (not shown) from which the clay material is pressed towards the press nozzle 4 by means of a shaft with blades 3.

Under the press nozzle 4 a sanding device 6 is provided. The sanding device 6 comprises a sand pan 7 surrounding the ribbon 5. Sand may be supplied to the sand pan 7 from a main screw conveyor 8 through a supply screw conveyor 9. A metering device 10 supplies the sand in the desired amounts into the main conveyor 8.

In case a plurality of the units shown in Fig. 1 are incorporated in one device, as herebefore remarked, the supply conveyors 9 of each sanding device are all connected to the main conveyor 8.

The sand supply into the sand pan 7 is pressed against the sides of the ribbon 5 by means of blades 11.

In order to have the blades 11 carry out the desired pressure movement they are each provided at the end of a rockingly driven shaft 12. The shafts 12 are journaled in a disc 13 which is rotatably mounted about the axis of the press 2, said disc being rotated by means of a drive mechanism 14. Actuating arms 16 are fixedly connected to the shafts 12 and carry a cam follower 17 at their free end. The cam follower 17 is kept, by spring action, in contact with a cam 15 which is fixedly connected with the device. It will be appreciated that the cam 15 has a suitable non-circular shape, so that rotation of the disc and consequently of the shafts 12 around the cam 15 will cause the cam followers 17, which are in spring contact with the cam
to move inwardly and outwardly in a regular manner. The latter
movement is transferred, through the actuating arm 16 and the shaft
12, to the respective blade 11, so that the latter, while performing a
rotational movement, will simultaneously perform the desired pressing
movement and thereby press the sand against the sides of the ribbon 5.

A membrane assembly 18 is provided in the bottom of the sand pan
7 and has a suitably shaped passage opening. The ribbon 5 is moving
through the latter opening, whereby the sand is pressed into the
surface of the ribbon 5 by means of the edges of the resilient
membrane assembly 18. The membrane assembly is mounted in a removable
cassette, so that for particular circumstances a suitable membrane
assembly 18 may be used.

Under the sanding device 6 an assembly of four pressure rollers
20 is provided which is adapted to further press the sand adhering to
the ribbon 5 and to catch loose sand moving along with the ribbon
through the passage opening and press such sand also into the ribbon.

By means of a cutting device which is synchronized with the
further parts of the device and in particular with the conveyance of
the moulding trays 40 to be described hereinafter, pieces of clay are
cut from the sanded ribbon of clay 5. The cutting device performing
this function comprises a cutting frame 25 which is guided by means of
rollers 26 and is mounted for a reciprocating movement within the
framework. The reciprocating movement is effected by a cylinder
device 27. A cutting wire 28 is stretched in the cutting frame 25. In

inside of a device comprising a number of press and depositing units one
common cutting frame 25 may be provided, in which all of the cutting
wires are mounted. The working is such that during each extension of
the cylinder 27 a piece of clay is cut from each ribbon supplied by
each press and the same procedure is taking place during each
retraction. Between each retraction and extension of the cylinder 27
the cutting device is in a rest position for some time.

Guide rollers 30 and 31 are mounted under the cutting device.
The guide roller 30 shown in Fig. 1 is fixedly journaled onto the
framework of the device 1, while the guide roller 31 is journaled
onto a sliding frame 32 which may be displaced by means of a cylinder
33. During normal operation of the device 1 the sliding frame 32 with
the roller 31 is taking a position displaced to the left as compared
with that of Fig. 1, in which the roller 31 is spaced from the roller
30 to such an extent, that the cut piece of clay may readily pass
therebetween. In this stage of the procedure the guide rollers 30 and 31 ensure that the cut piece of clay, which might be given a certain lateral movement due to the movement of the cutting wire, will be brought in the correct position above the depositing device 35.

In the position of the sliding frame 32 shown in Fig. 1 the guide roller 31 is kept within the path of the ribbon of clay 5. In a rest position of the device 1 the guide roller 31 is kept in this position in order to avoid that pieces which have become separated from the ribbon 5 could get into the depositing device 35 or might pass through the latter onto the moulding tray 40 in an uncontrolled manner.

The depositing device 35 comprises the set of two juxtaposed pairs of a drive roller 36 and an underlying idle roller 37, a belt 34 being trained around each pair of rollers 36, 37. The rollers 36 are driven such, that the mutually facing runs of the belts 34 between the drive rollers 36 and the idle rollers 37, are both moving downwards. A piece of clay 38 supplied from above will thus be taken between the belts 34 and driven downwardly at a certain depositing speed. As a result of this the clay 38 will be thrown into the moulding cavity 39, allowing the clay to spread a little so that the moulding cavity 39 of the moulding tray 40 will be completely filled. It is to be remarked that in general the deposited piece of clay 38 will have a larger volume than the moulding cavity 39, and that the excess of clay will contribute to a complete filling of the moulding cavity 39. The excess of clay is removed in a later stage of the procedure.

As remarked before, a device of this type may comprise a number of the press and depositing units described so far. As an example such a device may comprise two rows of three units, said rows being mutually offset through half the spacing between two adjacent units.

With such a sixfold device moulding trays 40 having twelve moulding cavities 39 may be filled in four steps. The mutual spacing of the moulding cavities in a moulding tray will preferably correspond with a quarter of the spacing between two units in a row.

In the first step the moulding tray may e.g. be positioned such that the moulding cavities of the order 1, 5 and 9 are being filled by the units of the first row. The moulding tray will then be displaced in longitudinal direction through a distance which is equal to the spacing between two moulding cavities, so that the moulding cavities of the order 2, 6 and 10 will then be filled.
For the third step the moulding tray is displaced in transversal direction until under the second row of units, whereby, as a result of the offset position of this second row relative to the first row, the moulding cavities of the order 4, 8 and 12 will get positioned under the respective units and filled by the same. At last the moulding tray is returned in the longitudinal direction through a distance corresponding to the spacing between two moulding cavities in the moulding tray, so as to have the last three moulding cavities, viz. those of the order 3, 7 and 11 filled.

It will be appreciated that the moulding tray conveyance is controlled in such a way, that at each time a moulding tray will be positioned under each row of units.

The loaded moulding trays are discharged, by a conveyor not shown, to a device in which the excess of clay is removed. Thereafter the mouldings will be transferred, in an inverting device, onto a drying shelf for further processing. This further processing will generally comprise the steps of drying and firing, so that fired products such as bricks or tiles will be formed from the mouldings.

As shown in Fig. 2, the four pressure rollers 20 proposed by the present invention are mounted at the same level. The pressure rollers 20 are provided just below the ribbon-passage opening in the membrane assembly 18 of the sand pan 7.

Each pressure roller 20 is journaled in a swingeable frame 65. This frame 65 is pivotally connected to brackets 73 of the frame of the device, in such a way, that the swinging axis defined by the pivots 26, is positioned above the axis of rotation 67 of the pressure roller 20.

On the side turned away from the ribbon 5 the frame 65 carries a weight, the centre of gravity of which is laying beyond the plane through the axis of rotation 87 and the swinging axis 66. This weight 68 urges the frame 65 together with the pressure roller 20 mounted therein, to turn about the swinging axis 66 towards the ribbon 5. Due to this the roller 20 will be pressed against the ribbon 5 with the desired pressing force.

As shown in the drawing, the weight 68 is ring-shaped and slid onto a pin 70 projecting from the swingeing frame 65. By means of a set screw (not shown) the weight 68 may be clamped in a desired position on the pin 70. The pressure exerted by the roller 20 will be larger in proportion to the weight 68 is fixed in a more outwardly directing
As is clearly shown in Fig. 3 the four pressure rollers 20 mounted at the same level and each having a length corresponding to the length of the respective side of the ribbon, constitute an enclosure for the ribbon. Loose sand coming along with the ribbon 5 on its path through the ribbon-passage opening in the membrane assembly 9, if any, will drop onto the rollers 20 and will be guided by the downwardly curved roller surface towards the ribbon 5 so as to be pressed into the respective side face of the ribbon 5.

In Fig. 3 dash-dotted lines indicate the passage opening of the membrane assembly within the cross-sectional area of the ribbon, in untensioned condition (i.e. when no ribbon is extending through said passage opening). The membrane assembly 18 comprises a stiff lower membrane recessed at 71, and a flexible upper membrane on top of the former and recessed at 72. In operation the thus shaped tongues will be pressed laterally downwardly by the ribbon 5. Due to the resilience of the membrane material said tongues apply a pressing force onto the ribbon 5, due to which the sand taken along will be partially pressed into the ribbon. Any sand which might not have been sufficiently pressed, will be caught and ultimately pressed into the ribbon by means of the pressure rollers 20.

Fig. 2 also shows that a stiff stretching wire 69 is provided on each frame 65, which wire is bearing on the surface of the roller 20 at a location below the plane of contact with the ribbon 5. Any material adhering to the roller 20 will be stripped by means of this wire 69.
CLAIMS
CLAIMS

1. A device for manufacturing mouldings of clay or such material, comprising at least one press adapted to deliver a ribbon of clay in a vertical, downward direction from a press nozzle, a sanding device for applying sand onto the vertical faces of the ribbon of clay, said sanding device comprising a sand pan positioned under said press nozzle and having in its bottom a ribbon-passage opening, four pressing rollers being provided under said ribbon-passage opening which are adapted to get into contact with the respective sides of the ribbon, characterized in that each of the pressure rollers has a length which substantially correspond to the length of the respective side of the ribbon, the latter length being defined by the press nozzle, whereby all of the pressure rollers are mounted at the same level.

2. A device according to claim 1, characterized in that the pressure rollers are idly rotating rollers.

3. A device according to claim 1 or 2, characterized in that each pressure roller is rotatably mounted in a swingeable frame which is pivotally connected to the frame of the device about a swinging axis positioned above the rotational axis of the pressure roller, whereby load means are provided for urging the pressure roller to turn about the swinging axis towards the ribbon.

4. A device according to claim 3, characterized in that said load means comprise a weight connected with the swingeable frame, the centre of gravity of said weight being positioned beyond the plane through the rotational axis and the swinging axis on the side turned away from the ribbon.

5. A device according to claim 4, characterized in that said weight is adjustably connected with said swingeable frame.
INTERNATIONAL SEARCH REPORT

International Application No PCT/NL 89/00076

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) 1

According to International Patent Classification (IPC) or to both National Classification and IPC:

IPC: B 28 B 11/06

II. FIELDS SEARCHED

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Minimum Documentation Searched?

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched.

III. DOCUMENTS CONSIDERED TO BE RELEVANT 2

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<tr>
<th>Category</th>
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<td>Y</td>
<td>US, A, 4065238 (H. SINNEMA) 30 December 1977, see the whole document, in particular column 2, lines 24-27</td>
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IV. CERTIFICATION

Date of the Actual Completion of the International Search: 31st January 1990
Date of Mailing of this International Search Report: 23 FEB 1990

International Searching Authority: EUROPEAN PATENT OFFICE
Signature of Authorized Officer: T.K. WILLIS

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For more details about this annex: see Official Journal of the European Patent Office, No. 12/82
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