United States Patent

[11] 3,581,805

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[33] **Sweden**
[31] **14854/1967**

[54] **MOULDING MACHINE WITH PARALLEL CIRCULAR WALL ELEMENTS**
18 Claims, 27 Drawing Figs.

[52] **U.S. Cl.** **164/192,** 164/39, 164/40, 164/204, 164/205, 164/209
[51] **Int. Cl.** **B22c 15/30**
[50] **Field of Search** 164/37, 39, 40, 192, 195, 196, 197, 203, 204, 205, 207, 208, 209

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Primary Examiner—J. Spencer Overholser
Assistant Examiner—John E. Roethel
Attorney—Hane & Baxley

ABSTRACT: A molding machine for compacting molding sand or other molding material in a molding box comprises two discs mounted for rotation in two parallel vertical planes. A pair of plates are mounted between the discs parallel to each other and normal to the discs. One of the plates can be moved toward the other and also vibrated or jolted for compacting molding sand in a box inserted between the plates either through openings in the discs or in the direction parallel to the discs. The discs together with a box placed between the plates are turnable either into a sand-charging position or a sand-compacting position by being supported on rollers mounted on a cradle. For the compacting operation the discs are separated from these rollers and supported by stationary supports.

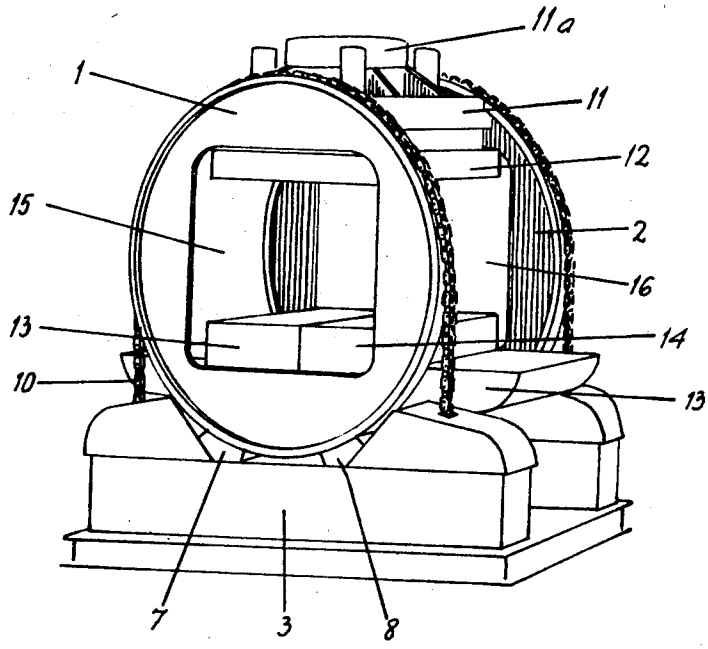

Fig. 1.

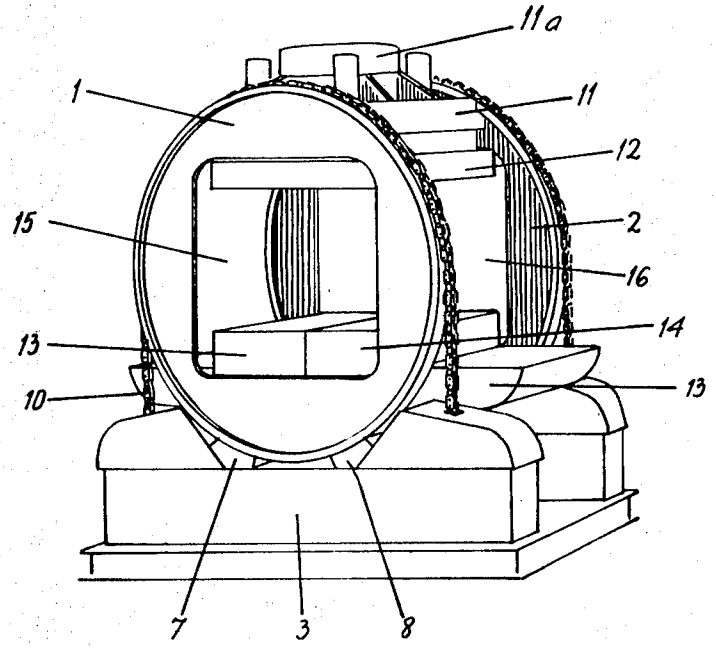

Fig. 2

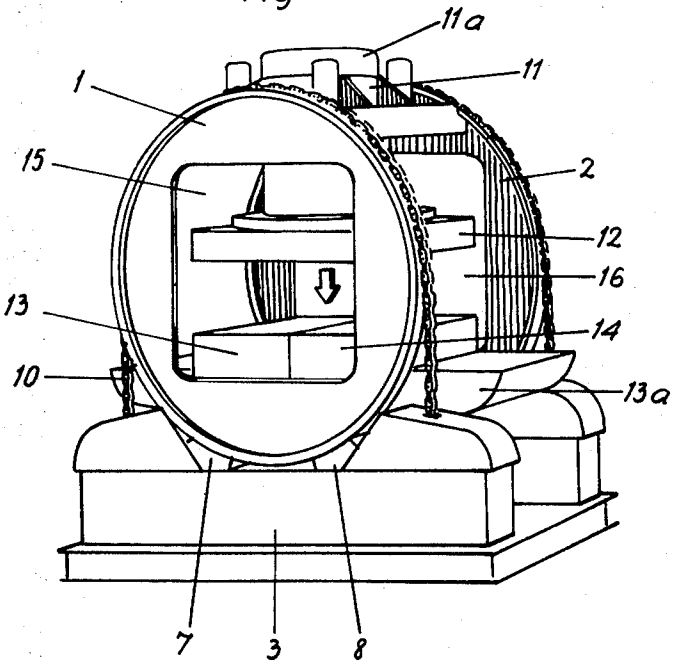

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Fig. 3

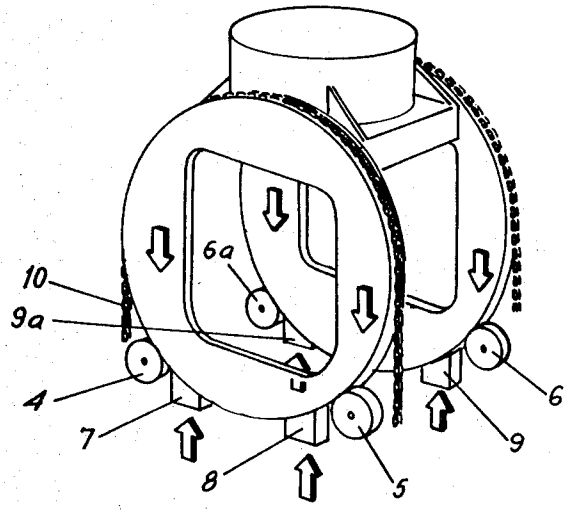

Fig. 4

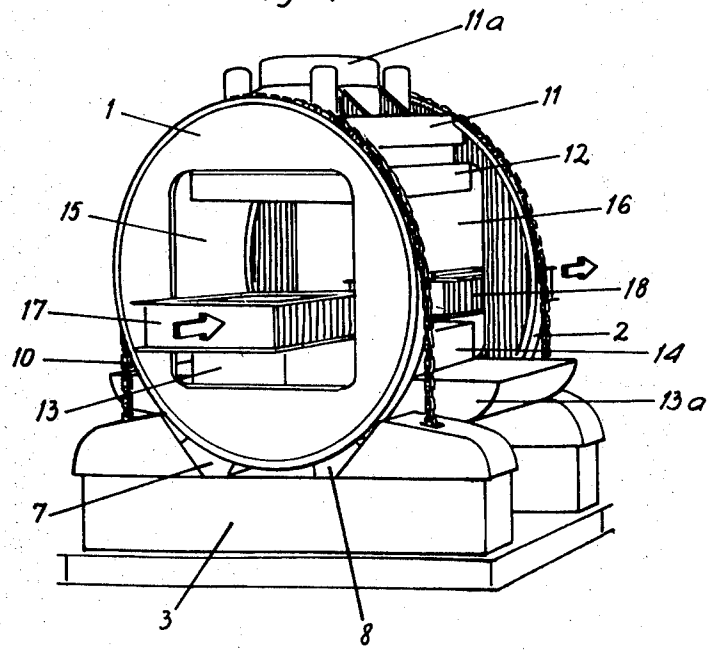

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Fig. 5

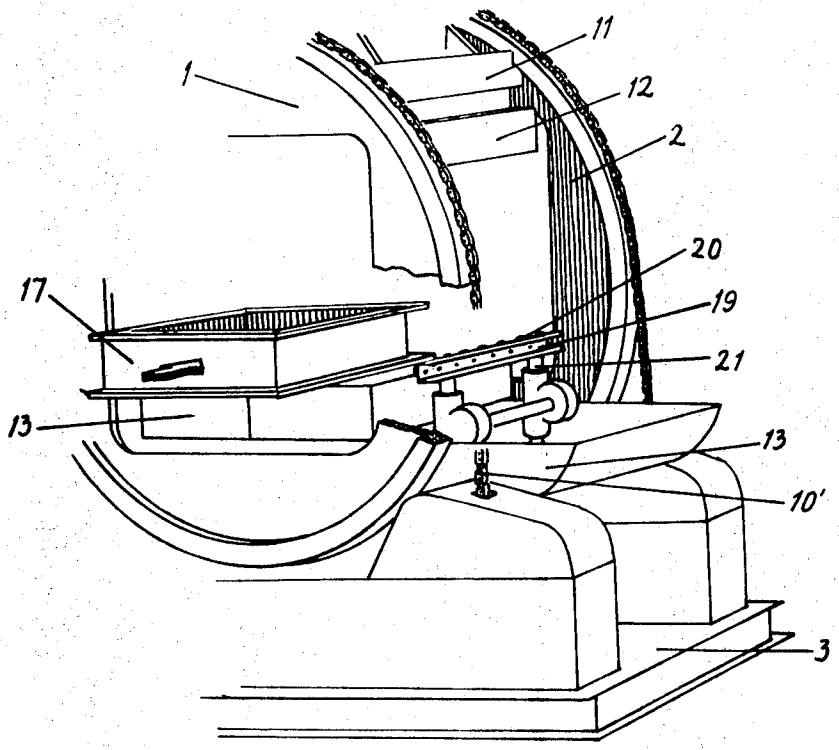

Fig. 6

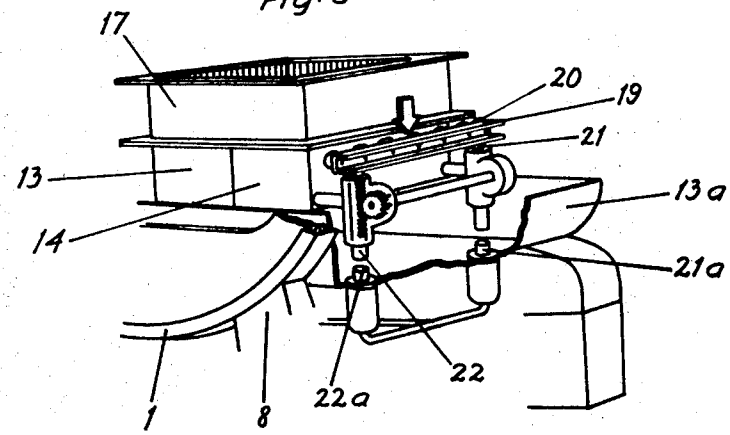

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Fig. 7a

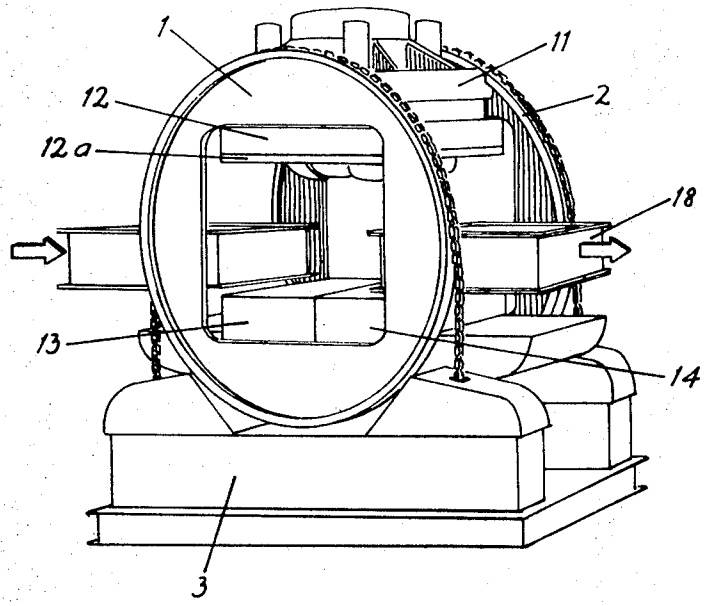

Fig. 7b

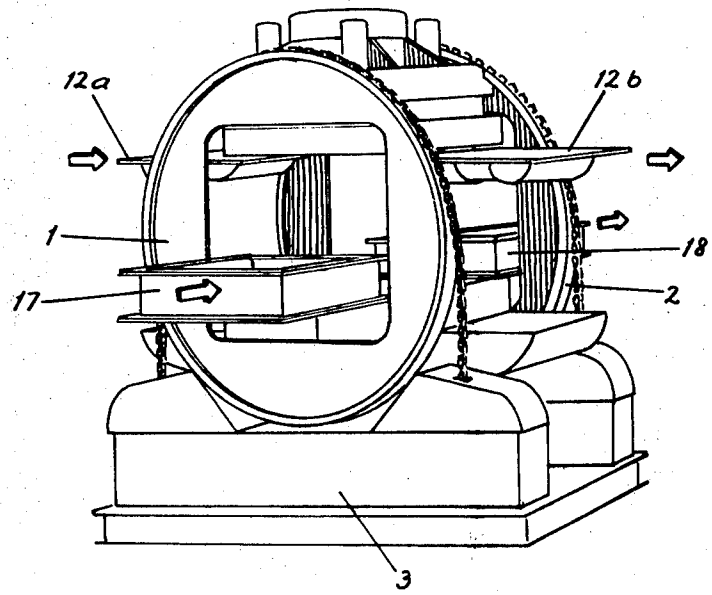

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Fig. 8

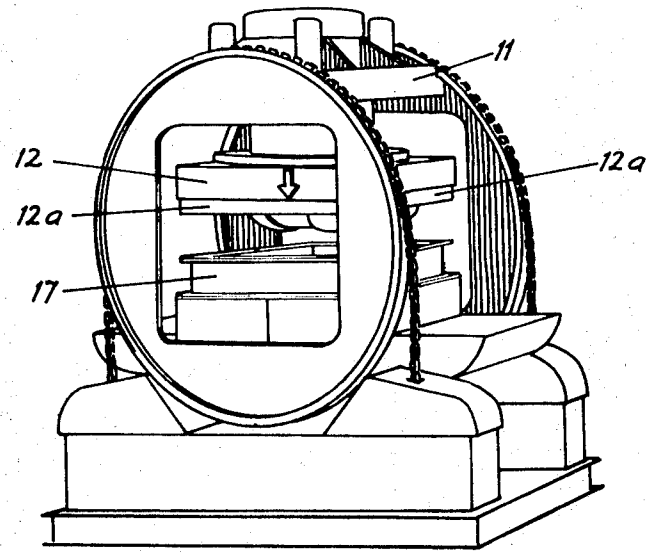

Fig. 9

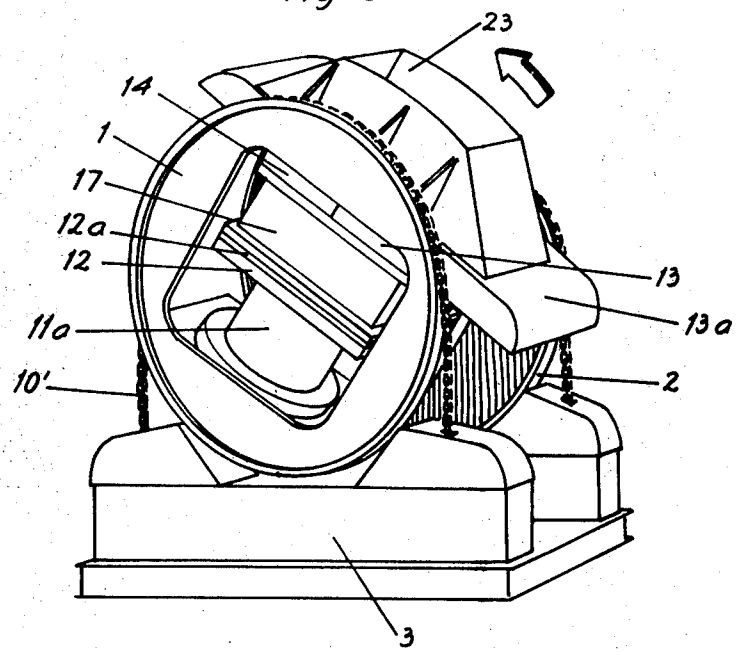

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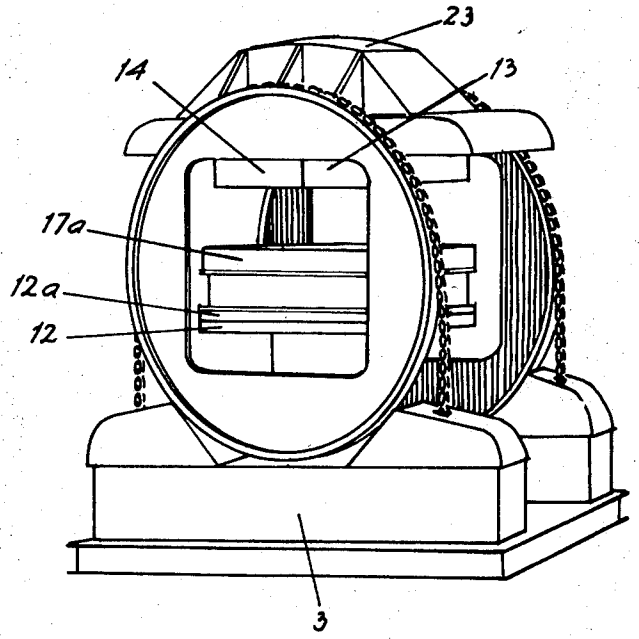
Fig. 10



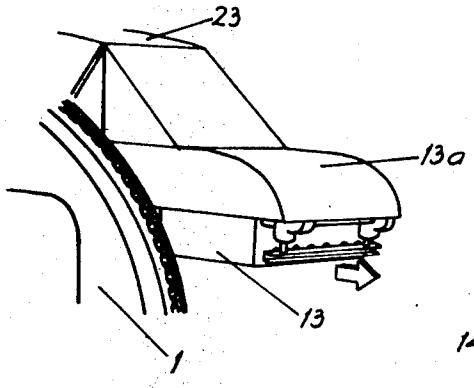
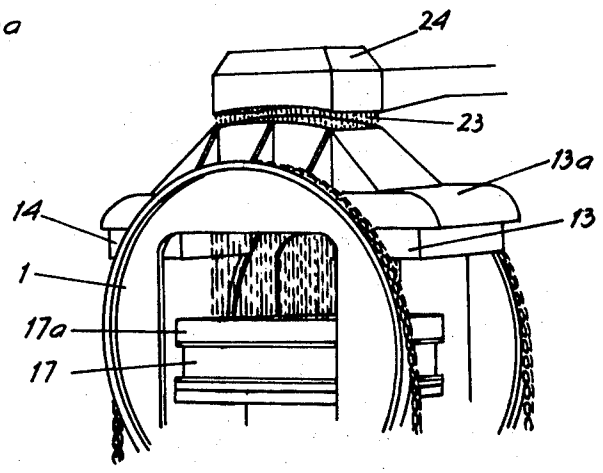


Fig. 11

Fig. 12



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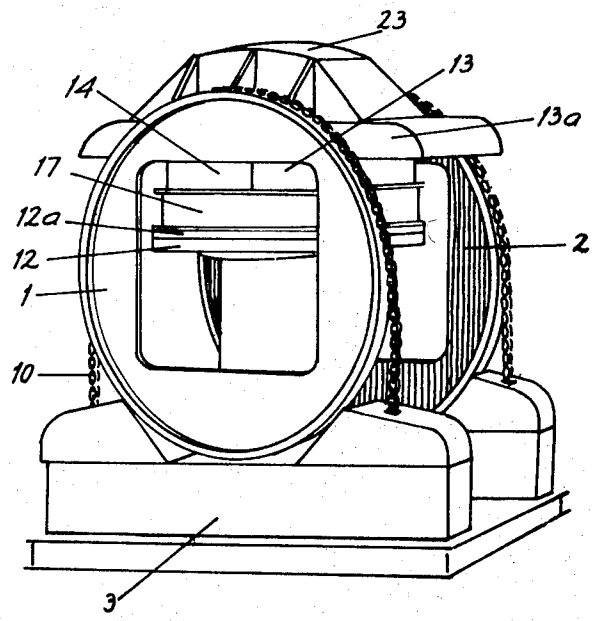

Fig. 13

Fig. 14

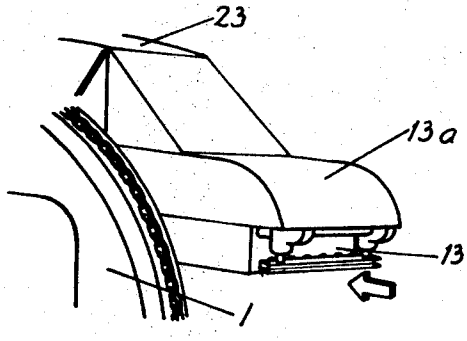

Fig. 15

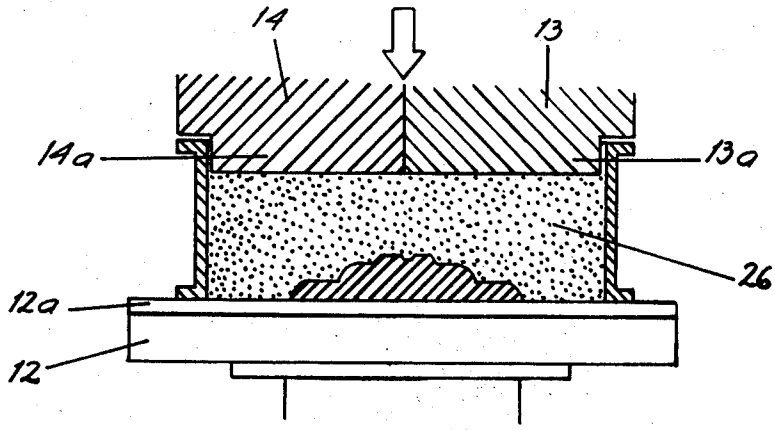

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Fig. 16

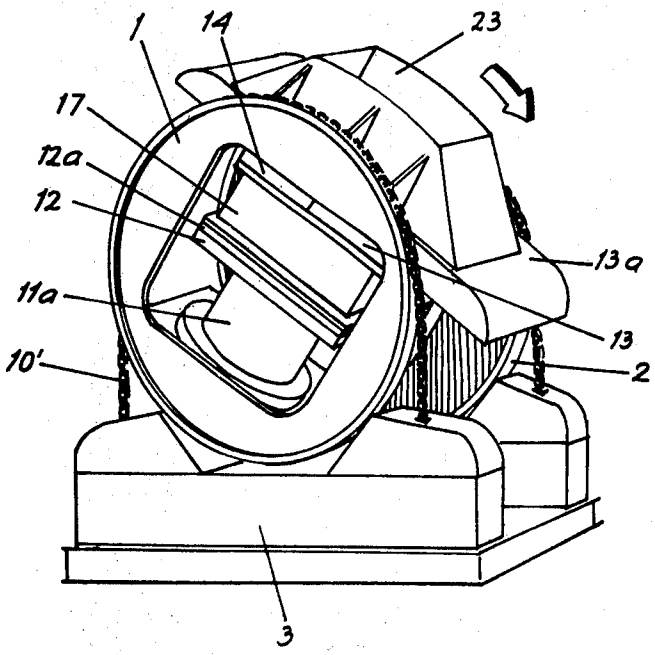
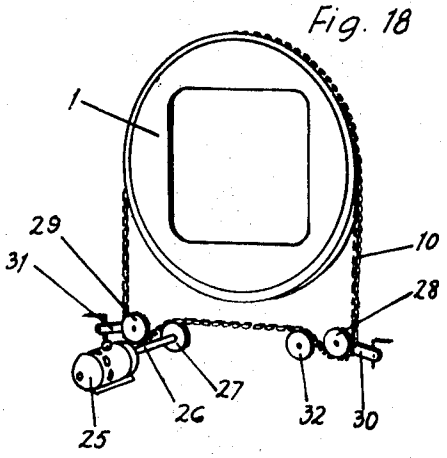


Fig. 18



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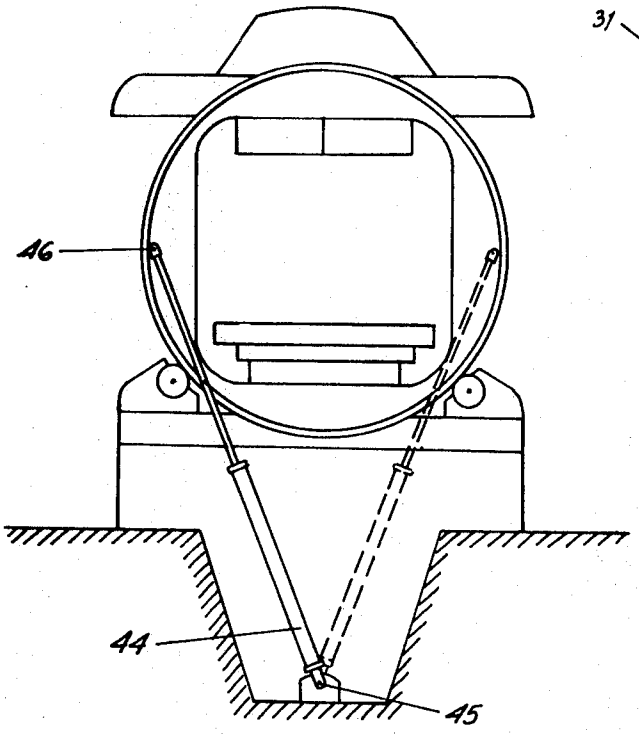

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Fig. 19

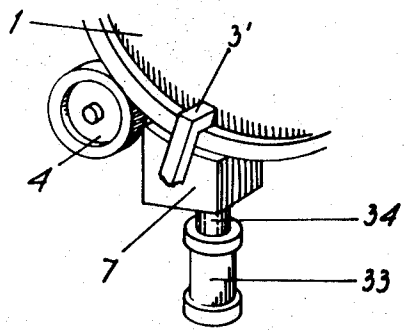
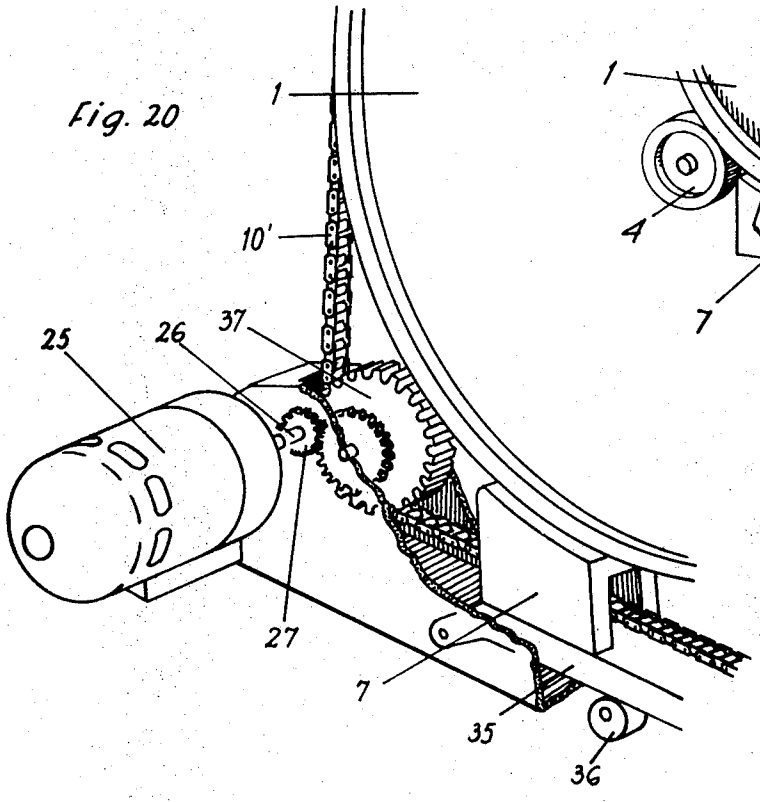


Fig. 20



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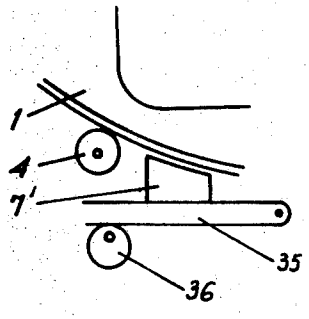

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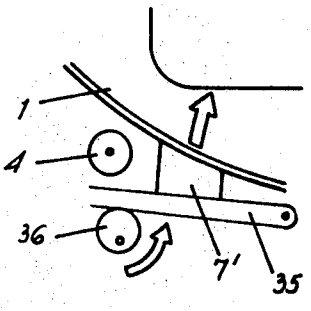

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Fig. 23

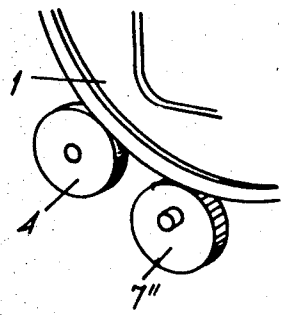


Fig. 24

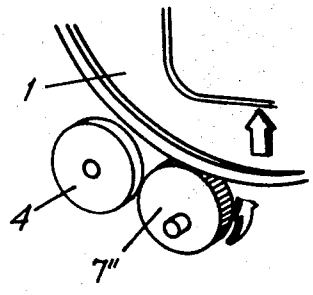


Fig. 26

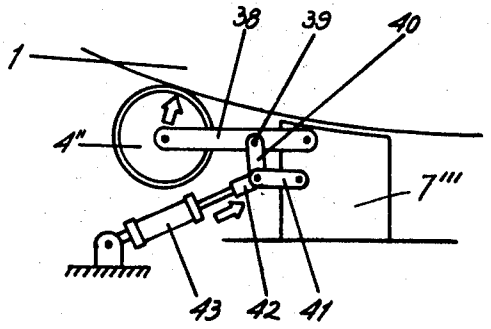
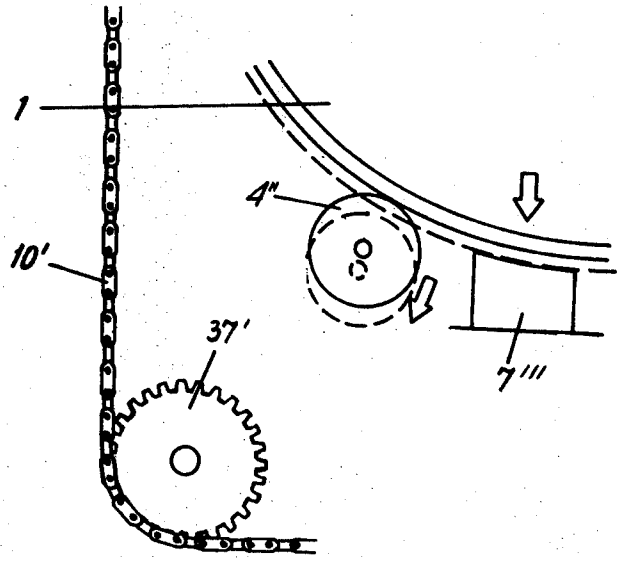


Fig. 25



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MOULDING MACHINE WITH PARALLEL CIRCULAR WALL ELEMENTS

The present invention relates to moulding machines. Such machines have been known for a long time, and a known such type consists of a vertical beam from which there is a horizontal axle, around which the beam is rotatable. At the ends of the beam there are two arms. On one of the arms a jolt table is arranged with the relevant members for imparting movement to the table parallel with the beam. On the other arm a squeeze head is arranged. The last-mentioned arm is rotatable at the beam, so that the arm can be set in a position above the jolt table and in a position where the jolt table is freely accessible from above. In such a machine a moulding box is placed on the jolt table. The mould is placed in the box, which is thereafter filled with sand. The table is subjected to a vertical reciprocating movement of a desired amplitude. Thereafter the other arm is swung in over the moulding box, after which the squeeze headplate is lowered or the jolt table is raised. The sand in the moulding box is pressed so that the sand surfaces of the moulding box coincide with the edges of the box.

The above-mentioned moulding machine functions satisfactorily, but it has proved that the arrangement of having a beam and two arms and an axle from the beam is not an ideal solution from the point of view of strength, as the design cannot be made with small dimensions in order to reduce the manufacturing costs. Moreover, the known machine is not sufficiently rapid, which is necessary as the demands for efficiency increase.

The purpose of the present invention is to create a moulding machine which, in spite of great stresses, can be made with smaller dimensions than the known machine, and also can carry out moulding very rapidly.

The characteristic feature of the present invention is that it consists of two circular discs, which are parallel to each other and located at a distance from each other. The two discs are joined together by means of two parallel transversal connection members. The pressing plate is placed in one of the connection members. The two parallel discs, in turn, are placed in a cradle, which is provided with members which can turn the two parallel discs around their own center axis.

According to the most favourable embodiment of the invention, the squeeze plate functions as blocking a member, which can open and close, for a sand pocket, and for which alternative solutions can be conceived for the opening and closing of the pocket. The pressing plate can, for instance, consist of two parts, which can be moved towards or away from each other in the same plane. The parts of the pressing plate can then move in one and the same plane, or can be rotatable around two parallel axes. Instead of having a pressing plate with two parts, it is conceivable to have the pressing plate provided with holes which coact with devices that close and open the holes so that the sand can pass through the hole.

As regards the driving of the two parallel plates, there are various alternative solutions. Thus, the two parallel plates can be driven by means of friction rollers. This involves that the peripheral surfaces of the plates must be flat. A second alternative solution is to place a belt, chain, line or the like around one or both of the peripheral surfaces of the plates, the chain or line then being fastened to the peripheral surface of the corresponding plate. The chain or belt is then connected with the driving member, for instance an electric motor or a hydraulic motor, so that the two plates can be made to rotate or turn around their center axis. Another method of causing the two circular plates to rotate is to have one or both of the peripheral surfaces provided with a gear arc, which coacts with gear wheels in the cradle. The gear wheel or wheels are then connected with said driving member. In the cradle, suitable supporting members for the two circular discs are then arranged. The supporting members are intended to coact with the peripheral surfaces of the circular plates, so that when the circular plates are turned to the position desired, the two circular plates can either be lowered down onto the supporting members or a supporting member can be raised up against the peripheral surfaces of the plates.

The two circular plates should preferably be at a distance from each other which exceeds the width of a moulding box. This involves that the boxes can be inserted between the two plates in a direction which is at right angles to the axis of the plates.

Another possibility of inserting the boxes between the two plates is by making openings in the plates, so that the boxes can be inserted in a direction parallel to the axes of the plates. By having the last-mentioned opening, the advantage is gained that the boxes can be inserted in two directions, at right angles to each other, into the moulding machine.

In the space between the two circular plates, roller guides can be arranged, so that regardless of in what direction the boxes are inserted into the moulding machine, they can easily be inserted in the moulding machine.

In a particularly favourable embodiment, it is most favourable to place roller guides adjacent to the pressing plate, and then at two diametrically opposite sides. The pressing plate should then appropriately be divided into two parts, which are movable transversally in a direction at right angles to the axis of rotation of the two circular plates.

The present invention will be described in more detail in connection with the attached drawings, in which

FIG. **1** shows a moulding machine according to the invention shown in perspective and then in an open stage, in which

FIG. **2** shows the same moulding machine, in which the squeeze plate of the machine has been displaced by a hydraulic or pneumatic, combined operating, jolt and squeeze device in the machine, in which

FIG. **3** shows diagrammatically the bearing and supporting devices of the moulding machine, in which

FIG. **4** shows how the moulding machine receives and delivers moulding boxes onto and from the squeeze plate of the machine which is divided into two parts, in which

FIG. **5** shows the same device as is shown in FIG. **4**, but partly sectioned, so that a guide for facilitating the transport of a moulding box is visible, in a certain working phase, in which

FIG. **6** shows a simplified view of FIG. **5**, with the guide in another working phase, in which

FIG. **7***a* shows the moulding box according to FIG. **4**, but with the difference that the moulding boxes are inserted and delivered between the two turning discs of the moulding machine, in which

FIG. **7***b* shows examples of the input and output of pattern plates to the machine simultaneously with the input and output of moulding boxes, in which

FIG. **8** shows the moulding machine with a moulding box on the pressing plate and the squeeze plate with attached pattern plate moving towards the moulding box, in which

FIG. **9** shows the moulding box held in place between the squeeze plate and the pressing plate of the moulding machine and in which the turning disc device of the moulding machine is about to complete a 180° turn, in which

FIG. **10** shows the moulding machine in a phase of the turning disc device which is displaced 180° in relation to the phase shown in FIG. 1, and after the hydraulic or pneumatic device has lowered the moulding box in relation to the pressing plate and a filling frame has been placed on top of the moulding box, in which

FIG. **11** shows one of the halves of the pressing plate moving out from its position where it is closed with the other half of the pressing plate, so that a passage for feeding of sand to the moulding box will be formed, in which

FIG. **12** shows the moulding machine in the same working phase as in FIG. **11**, but with the difference that a sand vessel has been moved up above the moulding machine, in which

FIG. **13** shows the halves of the pressing plates returning to their initial position, shown in FIG. **10**, in which

FIG. **14** shows the moulding machine after the hydraulic or pneumatic device has again moved up the moulding box without filling frame in contact with the pressing plate, in which

FIG. 15 shows the moulding box pressed against the pattern plate on the squeeze plate and the pressing plate after the completed moulding operation, in which

FIG. 16 shows the moulding machine on the way towards its initial position according to FIG. 1, in which

FIG. 17 shows a preferred device for achieving the turning movement of the moulding machine, in which

FIG. 18 shows a schematic view of how the turning movement of the moulding machine can alternatively be arranged, in which

FIG. 19 shows an embodiment of a supporting device for the turning disc device of the moulding machine, in which

FIG. 20 shows a second embodiment of a supporting device together with a bearing device and a driving device, in which

FIGS. 21 and 22 show the supporting device according to FIG. 20 in two different working phases, in which

FIGS. 23 and 24 show a further embodiment of a supporting device in two different working phases, and in which

FIGS. 25 and 26 show a fixed, stationary supporting device coacting with a movable bearing device, schematically as well as in a practical embodiment.

FIGS. 1 and 2 show two turning or rotatable discs 1 and 2, which are circular and have cylindrical peripheral surfaces. The two discs are parallel to each other on a common axis of symmetry and are located at a distance from each other. Furthermore, they are connected with each other through elements which are described below, and rest together on a frame 3, which, among other members, contains four sliding rollers 4, 5, 6 and 6*a* and four supports 7, 8, 9 and 9*a*, as shown in FIG. 3. The two peripheral surfaces of the discs 1 and 2 rest on said rollers and are located at a certain distance from the four said supports. Around one of the peripheral surfaces of the turning discs, viz. around turning disc 1, a driving chain or rope 10 or the like is arranged. Said driving chain 10 is connected with a motor and capable of turning the two discs 1 and 2 about their common axis of symmetry.

Between the two discs 1 and 2 and at their upper end, in FIG. 1, a jolting machine 11 is arranged, in such a way that it forms a structural unit together with the discs. The jolting machine 11 comprises a well-known hydraulic or pneumatic mechanism 11*a*, which produces a movement (shown by arrow) in a common diametrical plane between and parallel to the sides of the two discs 1 and 2. The member which produces the movement is usually a piston, to which a squeeze plate 12 is fastened in a known manner. Its squeezing surface is at right angles to the direction of movement of said piston, and is arranged in a known manner to hold a pattern plate 12*a*, as shown, for instance, in FIG. 8. Parallel to said squeeze plate 12 and diametrically in relation to the jolting machine 11, between the discs 1 and 2, a pressing plate is arranged, which consists of two halves 13 and 14. The division line between the halves 13 and 14 of the pressing plate is arranged to coincide with said diametrical plane between the two turning discs 1 and 2. The two halves 13 and 14 of the pressing plate are displaceable in opposite directions along a plane normal to said diametrical plane through the two turning discs 1 and 2, as will be noted from FIGS. 11 and 12. In order to make this displacement possible, conventional bearing members are arranged at the two turning discs, as well as conventional driving mechanisms for producing said movements. The last-mentioned mechanisms are built into a yoke-formed housing 13*a*, which firmly connects the two turning discs 1 and 2 to each other at the halves of the pressing plate. The two turning discs 1 and 2 are thus firmly connected to each other at two places on the two discs which are diametrical in relation to each other.

In each of the two turning discs 1 and 2 there is an opening 15 and 16, respectively, as is clearly shown in FIG. 1.

In FIG. 2 it is shown how the squeeze plate 12, by means of the jolting machine, can be moved parallel to the two turning discs in said diametrical plane between the discs, whereby the squeeze plate can be moved towards and away from the pressing plate 13, 14. The pressing plate 13, 14, on the other hand, cannot move in said diametrical plane.

As previously mentioned, the two turning discs 1 and 2, which are firmly fixed on one side by the jolting machine 11 and on the other side by the housing 13*a*, can be turned round the common axis of symmetry of the discs. The turning discs then roll on the previously mentioned sliding rollers 4, 5, 6 and 6*a*. After the turning of the two turning discs 1 and 2 has been completed, it is desired that they do rest on the sliding rollers 4, 5, 6 and 9*a*, but instead on the four supports 7, 8, 9 and 9*a*, so that during the movement of the jolting machine 11 the two turning discs are properly supported and thus withstand the mechanical stresses which then arise. Said supports are most suitable for this. The previously mentioned sliding rollers, on the other hand, if they have to absorb the vertical forces which arise, could become damaged.

When a moulding box is to be inserted into a moulding machine, it can be inserted through the opening 15, as is clearly shown by FIG. 4, until the box is located between the turning discs and so that the box rests on the two halves 13 and 14 of the pressing plate. In order to facilitate the insertion of a box into the moulding machine, each half of the pressing plate is provided with a roller guide, consisting of a guide 19 with a number of rollers 20. The guide is connected to two arms 21 and 22 or the like which, in turn, are supported at the outer ends of the corresponding halves of the pressing plate, as is shown, in regard to the half 14 of the pressing plate, in FIG. 5. Conventional operating devices 21*a* and 22*a* in the housing 13*a* or, alternatively, in the frame 3 of the machine (not shown), actuate the arms 21 and 22, as shown in FIG. 5 whereby the two roller guides can be moved up into such a position that the box 17 will roll on the rollers of the guides so that it is located exactly above the pressing plate without being in contact with same.

It may be assumed that the moulding box 17 is brought to opening 15 by a transportation device which is located in front of the opening. When the moulding box, as previously mentioned, is located exactly under the squeeze plate 12 of the jolting machine 11, the roller guides 19 are lowered so that the box comes directly into contact with the pressing plate 13, 14, as shown in FIG. 8. Thereafter the piston of the jolting machine 11 is set in motion against the moulding box 17, as shown in FIG. 8, so that the moulding box will be squeezed between a pattern plate 12*a*, arranged on the squeeze plate and the pressing plate.

The feed of boxes to and from the moulding machine, such as it has just been described, takes place in such a way that, at the same time as a box 18 in which the moulding has been completed, as shown in FIG. 4, is removed from the moulding machine through the opening 16, an empty moulding box 17 is inserted into the machine through the opening 15. It is also conceivable to insert a box 17 through the opening 15 and to remove a box 19 which has been processed in a direction that is parallel to the two turning discs 1 and 2, i.e. at right angles to the direction of insertion of the box 17. A further conceivable alternative for the transportation of boxes is to insert and remove the moulding boxes in the direction parallel to the two turning discs, as shown in FIG. 7*a*.

In a similar way as described above as regards the input and output of moulding boxes 17, 18 onto the pressing plate 13, 14, changing of pattern plates 12*a*, 12*b*, can be arranged, when required, on the squeeze plate 12 of the machine. The feeding and removal of pattern plates to the squeeze plate then take place simultaneously with the transportation of the moulding boxes, either through the openings 15 and 16 or between the turning discs 1 and 2. Due to the spacing between the planes of the squeeze plate 12 and the pressing plate 13, 14, when the machine is open, there are various possibilities for a flow of pattern plates 12*a*, 12*b* to and from the squeeze plate in directions with, against or at right angles to the flow described above of moulding boxes 17, 18 to and from the pressing plate. An example of a flow at right angles is shown in FIG. 7*b*. Changing of pattern plates, as described, is used when different molds are required for a mixed production.

Particularly when moulding for large series of products, it is advantageous to have the tops and bottoms of the moulding

boxes fed out alternatingly from a moulding plant. In such a case, the feed of pattern plates to the machine can take place with a shuttle device (not shown), which before a forming cycle feeds a pattern plate **12***a* for the top part of the moulding box from one side of the machine to the squeeze plate and at the same time removes a pattern plate used in the preceding moulding cycle for the bottom part of a moulding box from the other side of the machine, and thereafter, when the next moulding cycle commences, changing of the pattern plates takes place in the opposite direction, etc.

After a moulding box **17** has been squeezed in place between the pattern plate **12***a* on the squeeze plate **12** and the pressing plate **13**, **14**, the two turning discs of the moulding machine are turned 180° by means of the chain **10**. FIG. **9** shows the moulding machine on its way into this position, and FIG. **10** shows the moulding machine in this position. From FIGS. **9** and **10** it will be clearly noted that the two halves **13** and **14** of the pressing plate at the two turning discs **1** and **2** are arranged directly under a sand intake **23**. As previously mentioned, the two halves **13** and **14** of the pressing plate can be displaced in a direction parallel to the plane of the two turning plates. When the two halves of the pressing plates are pushed together, a pressing plate of the kind shown in FIG. **1** is obtained. The two halves of the pressing plate can assume this position or a position in which they are separated from each other, i.e. the half **13** of the pressing plate has been moved towards the right and the half **14** of the pressing plate towards the left so that there is no bottom in the sand intake **23**. When the two halves of the pressing plate are in contact with each other, they function both as a pressing plate and as a bottom of the sand intake. The sand intake **23** can be provided in a conventional way with a sand agitator, for spreading and separating the particles of sand which is fed.

In the working phase shown in FIG. **10**, the squeeze plate **12** is lowered so that there is a certain space between the upper edge of the moulding box and the pressing plate **13**, **14**. A filling frame **17***a* can then be placed on top of the moulding box **17**. The moulding box can also have an extra height, so that it constitutes a filling frame itself. Thereafter the two halves of the pressing plate are separated from each other, and a sand supply vessel **24**, as shown in FIG. **12**, is placed above the sand intake. Sand will then, as shown in said figure, be fed to the moulding box. During the filling the moulding sand is prejolted or shaken in the moulding box, by the functioning of the jolting machine. When the filling of the moulding box and, possible, a filling frame, has been completed, the sand intake is closed by the two halves of the pressing plate being returned to the initial position according to FIG. **13** and by coming into contact with each other function as a pressing plate again. At the same time the prejolting process is discontinued. The filling frame is them removed from the moulding box and the squeeze plate is raised, so that the sand in the moulding box comes into contact with the pressing plate. In this position the jolting machinery is started anew. The jolting machine imparts to the squeeze plate a motion, the amplitude of which can be varied as required, as is usual, between 1 mm. and 30 mm. With simultaneous jolting, the squeeze plate is further raised, so that the moulding box becomes pressed between the squeeze plate and the pressing plate. The pressing plate is shouldered in such a way that it has a central part which fits in and can be inserted to a certain extent into the moulding box, as is clearly shown in FIG. **15**. The halves **13** and **14** of the pressing plate thus each have a raised part **13***a* and **14***a*, and the two raised parts together have a cross-sectional surface corresponding to the size and form of the internal cross section of a moulding box. Due to the raised parts **13***a* and **14***a*, efficient compression of the sand **26**, with which the moulding box is filled, is obtained. In FIG. **15**, on the pattern plate **12***a*, the pattern of the part which is subsequently to be cast is shown. When the predetermined pressing force on the sand in the moulding box has been obtained, the jolting procedure is discontinued.

FIG. **14** shows the moulding machine in its state, when the moulding box after the completed moulding procedure is pressed between the pattern plate **12***a* on the squeeze plate **12** and the pressing plate **13**, **14**, as shown in FIG. **15**. With the moulding box still retained between the squeeze plate and the pressing plate, the two turning discs are turned back to their initial position in FIG. **1**. FIG. **16** shows the moulding machine during this movement and FIG. **17** shows the moulding machine when the squeeze plate, after the pressing force has been released, is being raised, after the moulding machine has returned to the position first shown in FIG. **1**. In this position the completely processed box is removed from the pressing plate, and a new moulding box is fed to it, after which the above-mentioned working cycle is repeated.

Although it has not been mentioned in the foregoing, there is a blocking device for securing the two turning discs **1** and **2** when they are in the position shown in FIG. **1**, as well as when they are in the position shown in FIG. **11**.

As previously mentioned, driving chain **10** is used to turn the two turning discs. FIG. **1** shows two driving chains **10** for turning the discs, but it should be obvious that one chain may be used for turning both discs. In FIG. **18** a solution is shown, schematically, how the turning of the disc **1** may be accomplished. A chain is laid around the periphery of the disc **1**, so that there is a strong friction force between the peripheral surface and the chain. The chain is driven by a motor **25**, which has a shaft **26**, provided with a driving pulley **27**, which bears against the chain **10**. The chain is kept taut against the driving pulley **27**, and a tension or idling pulley **32** is supported at a fixed position at a distance from the driving pulley **27** with the aid of two tension or idling pulleys **28** and **29**, which are each arranged in a fixed position on arms **30** and **31**, respectively. The arms **30** and **31** each have one end supported in a fixed position, and are actuated by a pressure force, for instance supplied by a spring (not shown) so that the driving chain **10** is kept bearing with an appropriate tension against the disc **1** as well as against the driving pulley **27** and the idling or tension pulley **32**. Instead of using a chain **10** it is also conceivable to use a link chain **10'**, as shown in FIG. **20**. The chain coacts with a sprocket **37**, which is driven by a gear wheel **27'**, which coacts with a gear arc on said sprocket **37**. The gear wheel **27'** is fixed to the shaft **26'** of a driving motor **25'**. The chain **10'** coacts with teeth on the peripheral surface of the turning disc **1**. Chain operation for turning disc **1** is also shown in FIG. **5**. The chain is placed in a different way, which is shown in more detail in FIG. **25**, and coacts with a sprocket **37'**, which is connected with the previously mentioned motor **25'**.

Instead of using a chain or rope, it is also conceivable to have a driven gearwheel which coacts directly with a gear arc on the peripheral surface of one or both of the turning discs.

A further alternative for driving the turning disc unit is that the peripheral surface of one or both of the turning discs has such properties that it can coact with driving rollers acting upon the peripheral surface.

A particularly favourable alternative is, in accordance with FIG. **17**, to drive the turning discs by means of a hydraulic or air cylinder **44**, which has one end of the cylinder supported so that it can pivot on a pivot journal **45** which has a fixed position in relation to the turning discs and has the end of the piston rod supported on a pivot journal **46** which is fixed to the inside or the outside of a turning disc near its periphery and on a horizontal diameter of same when it is in its two fixed working positions. In FIG. **17** such a turning device is shown acting upon the turning disc **1**, but it will be understood that, at the same time, the turning disc **2** can also be arranged for turning in the same way. It will also be obvious that, although the turning cylinder **44**, in FIG. **17** is shown anchored by a pivot journal **45** in the base under the machine, the anchoring can be arranged both at the side of and above the machine.

As previously mentioned, particularly with reference to FIG. **3**, it is necessary that the vertical forces which the two turning discs transfer when the jolting machine is in motion are absorbed by members suitable for this purpose, and it has

been mentioned that it is appropriate to have the two turning discs in direct contact with four supporting members **7**, **8**, **9** and **9***a*, so that these four supporting members can absorb the vertical forces. The members which drive the two turning discs around their common axis of symmetry are out of contact, in order that they shall not be damaged.

FIG. **19** shows supporting member **7**, which is arranged on a piston **34**, which is movable in a hydraulic cylinder, and also sliding roller **4**. Before said jolting machine **11** is set in motion, the hydraulic cylinder is caused to work so that the piston **34** is raised sufficiently so that the supporting member **7** comes into direct contact with the peripheral surface of the turning disc **1**, at the same time as the sliding roller loses its contact with said surface. In this situation the jolting machine can function without the sliding roller **4** being damaged.

As a limitation for the upwards movement of the supports **7**, **8**, **9** and **9***a*, stopping members, for instance the stopping member **3'**, indicated in FIG. **19**, can be arranged. The stopping member should then appropriately, as shown in the figure, act against a protrusion in the periphery of the turning disc, for instance a peripheral flange so that turning disc is clamped between the support and said stopping member. Alternatively, a yoke-formed fixed connection (not shown) can be arranged peripherally between the two turning discs **1** and **2** in their lowermost parts, when they are in the position for the jolting phase of the moulding cycle. Said yoke then coacts with a stopping member (not shown) fixed to the base and protruding up between the turning discs, for instance a column provided with a head, in such a way that when the supports **7**, **8**, **9** and **9***a* and together with these the turning discs **1** and **2** are raised before the jolting phase, the discs are stopped in a predetermined vertical position in which said yoke will be arrested against the head of said column. The stopping members described can, of course, be provided with stopping buffers in a common, known way.

In FIGS. **20**, **21** and **22** a further alternative of a support, similar to the one in FIG. **19**, is shown. In these three figures the support has been given the reference designation **7'**. The support is arranged on an arm **35**, which has one of its ends fixed and between its ends is actuated by an eccentrically supported wheel **36**. In the position which the wheel **36** has assumed in FIG. **21**, the support **7'** is not in contact with the turning disc **1**, but the turning disc is in contact with the sliding roller **4**, while on the other hand, in the position in which the wheel **36** is shown in FIG. **22**, the support is directly in contact with the turning disc **1** in such a way that the turning disc is out of contact with the corresponding sliding roller so that the jolting machine can begin to function.

In FIGS. **23** and **24** another embodiment of the support is shown. In said two figures, the support **7''** consists of an eccentrically supported wheel. In the position which the wheel **7''** has in FIG. **23**, it is out of function, and the turning disc is resting on the sliding roller **4**. In the position which the wheel **7''** has in FIG. **24**, it is functioning as a supporting member and the sliding roller **4** is out of function.

Although it is not shown, it will be realized that the supports according to FIGS. **20—24** can be combined with supporting devices as in the case of what is described in conjunction with FIG. **19**.

FIGS. **25** and **26**, finally, show a fixed support **7'**, with which sliding rollers **4''** coacting with the turning disc can be moved towards or away from the turning disc in such a way that in one position the turning disc is in contact with the sliding roller at the same time as the turning disc is out of contact with the support **7'** and in another position out of contact with the turning disc **1**, the turning disc then being in contact with the support. FIG. **25** shows with solid lines the roller in contact with the turning disc **1**, the turning disc **1** then being out of contact with the support **7'**, and in dashed lines the sliding roller **4''** out of contact with the turning disc **1**, the turning disc then being in contact with the support **7'**.

FIG. **26** shows an arrangement for moving the roller **4''** into and out of contact with the turning disc according to the foregoing. The roller **4''** is supported in one end of an arm **38**, which has its other end supported at the support **7'**. Between the two ends of the arm **38** one end of an arm **40** is supported, and the other end is connected with one end of a movable part **42** of a hydraulic device **43**, which is supported in a fixed position. The arm **41** is also movable supported on the support **7'**. When the part **42** moves owing to the hydraulic member **43** being subjected to a pressure or a reduction of pressure, the sliding roller **4''** can be moved towards or away from the turning disc **1**.

Although the above-mentioned specific functioning cases and parts of the design have been described in order to give a clear account of the invention, it will be realized that, within the scope of the concept of the invention such as it is indicated by the claims filed, a plurality of modifications and alternatives are conceivable, both as regards the constructive embodiment and as regards the functioning consequences and application.

I claim:

1. A molding machine for compacting loose molding material in a mold box, said molding machine comprising in combination:

a pair of spaced-apart circular discs mounted for rotation in parallel vertical planes about a common rotational axis;

a cradle for supporting said discs rotatable relative thereto;

a first drive means coacting with at least one of said discs for rotating the same about said common rotational axis either into an angular position for compacting molding material in a mold box or into an angular position for charging a mold box with molding material;

a pair of plates supported between said discs parallel to each other and normal to said vertical planes, said plates being mounted for displacement relative to each other between a position for placing a mold box between the plates and a compacting position for clamping the mold box between the plates thereby compacting molding material in the box;

a second drive means coacting with said plates for selectively moving the same into either one of said positions; and

vibrating means coupled to one of said plates and operable for imparting vibrations to said one plate.

2. The molding machine according to claim **1** wherein said cradle includes rollers rotatably engageable with a lower peripheral portion of at least one of said discs.

3. The molding machine according to claim **2** wherein said first drive means is coupled to at least one of said rollers to drive the same, said driven roller being in rotation-transmitting engagement with the peripheral wall of at least one of said discs.

4. The molding machine according to claim **1** wherein said first drive means comprises a transmission means encompassing a major portion of the peripheral wall of at least one of said discs, and a power-driven member drivingly coupled to said transmission means.

5. The molding machine according to claim **1** wherein said first drive means comprises a gear train including a power-driven gear and a chain in mesh with said gear and encompassing a part of the peripheral wall of at least one of said discs in rotation-transmitting engagement.

6. The molding machine according to claim **1** wherein said first drive means comprises a hydraulically operated drive means including a cylinder pivoted at one end to a stationary support and a piston rod reciprocating in said cylinder, the free end of said piston rod being hinged to at least one of said discs thereby imparting to the discs an angular movement as the piston rod reciprocates.

7. The molding machine according to claim **1** wherein said cradle includes rollers engageable with a lower peripheral portion of the discs for rotatable supporting the same, means for selectively raising and lowering said rollers into and out of engagement with said discs, and fixed support means on the cradle, said support means being positioned to support the discs when the rollers are lowered relative to the discs and the support means.