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2,409,330

CORE MAKING MACHINE

Filed April 12, 1945

3 Sheets-Sheet 1

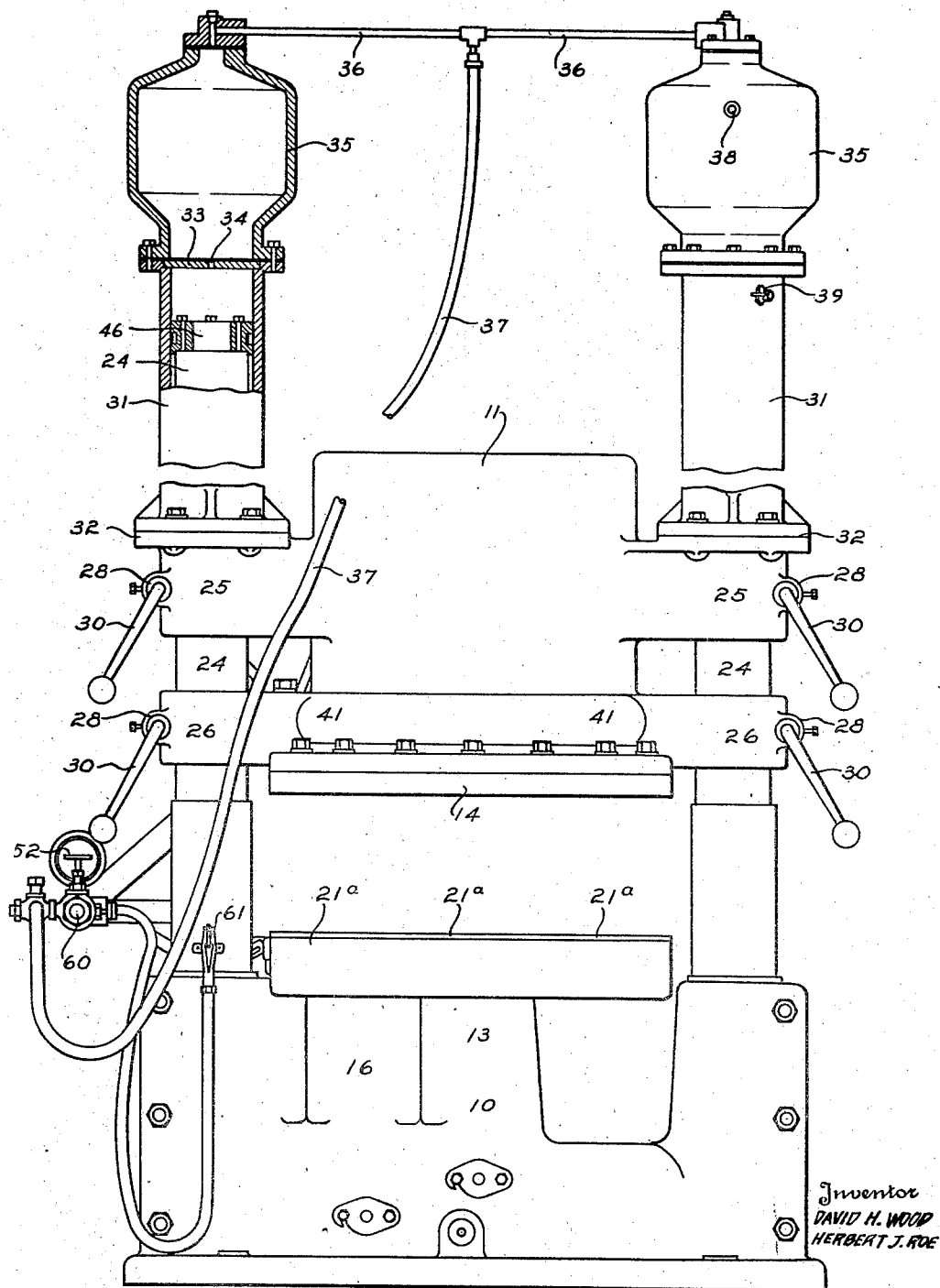


Fig. 1

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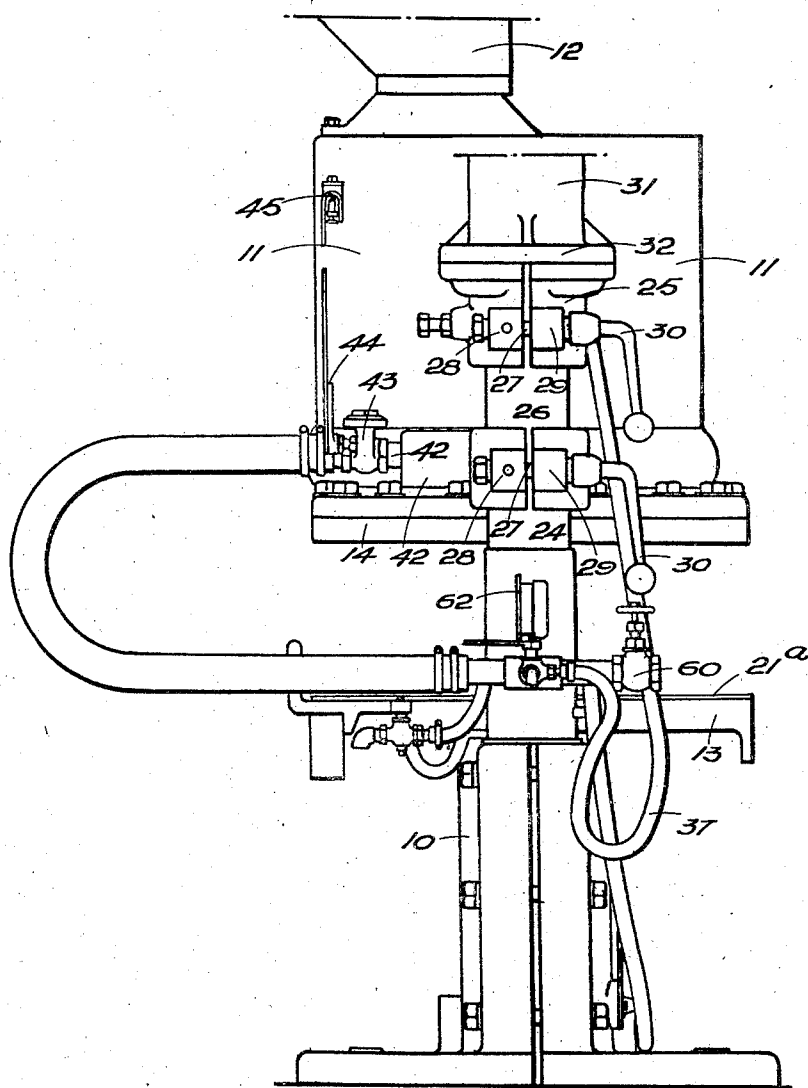
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FIG. 2



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FIG. 4

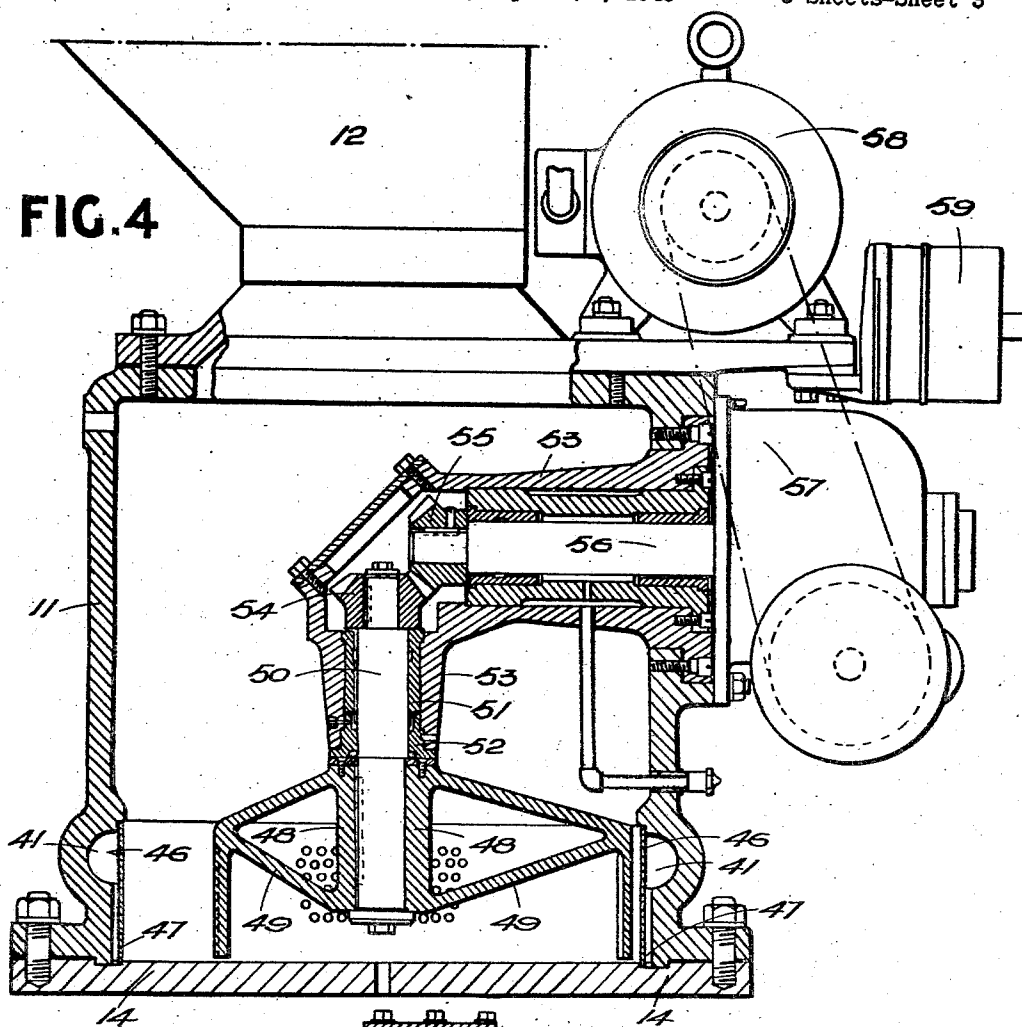
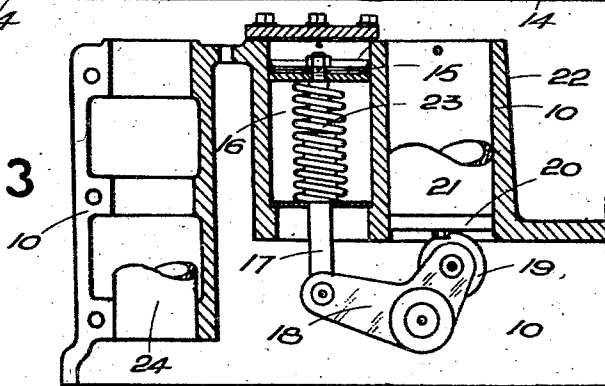


FIG. 3



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CORE MAKING MACHINE

David Howard Wood, Barnt Green, and Herbert
James Roe, Knowle, EnglandApplication April 12, 1945, Serial No. 587,988
In Great Britain November 20, 1943

2 Claims. (Cl. 22-10)

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The invention relates to core making machines or, as they are perhaps more frequently called, core blowing machines of the kind in which the divided material of which the cores are to be made; usually sand, is fed into a container or magazine above a table on which the core box is placed and an air stream is charged into the container or magazine under pressure and the sand is blown or forced through apertures in the base plate of the magazine and into corresponding apertures in the core box leading to the cavity or cavities in which the core or cores is to be formed.

The improved machine according to this invention provides a combined pneumatic and hydraulic arrangement for moving the sand container or magazine unit to any desired distance within its range from the table, which arrangement gives a very smooth and even movement.

The improved machine also has a convenient and simple means for imparting a small, even movement to the table towards the magazine for clamping the core box placed upon it securely to the underside of the container or magazine.

Other features of the machine will be pointed out in the following description of a preferred embodiment which is illustrated in the appended drawings, and the scope of the protection desired is defined in the claims hereinafter appearing:

Figure 1 is a front view of the machine with parts broken away, and a sand feed hopper and a motor omitted from the top of the figure.

Figure 2 is a side view thereof, but showing part of the hopper.

Figure 3 is a sectional view of part of the base of the machine showing the means for moving the table.

Figure 4 is a part sectional view of the blowing container or magazine.

In this embodiment of the machine 10 is the base casting, 11 is the blowing container or magazine for the sand and 12 is the hopper by which the sand is fed in the desired amounts to the container or magazine 11. The table which supports the moulding boxes of various sizes is referred to by the numeral 13, and the substantial pressure plate and sand delivery plate at the base of the magazine, which is opposite the table and co-operates with it in the clamping of the box, is marked 14.

For this purpose of clamping the box the table 13 is adapted for a small upward movement with respect to the substantial bed or casting 10 the means for this purpose comprising a piston 15 moving in a cylinder 16 above which compressed

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air may be forced to drive down the piston so that its rod 17 will rock a bell-crank 18 to one arm of which it is connected and the other arm of the bell-crank is preferably equipped with a roller 19 and engages an end disc 20 closing a tubular plunger 21 in a guide 22, and the top of this plunger is flanged and bolted to the underside of the table 13. A spring 23 around the piston rod in the cylinder 16 assists the weight of the table in returning the parts and the piston 15. The surface of the table is preferably provided with removable, hard steel plates 21^a bolted in position.

On each side of the table 13 rigidly secured in the bed or base casting 10 is an upstanding pillar rod 24 and upon these two pillars 24 is suitably guided the sand container or magazine 11. The guiding means comprise a pair of split bearings 25 projecting laterally from the sides of the body of the magazine and a second pair of split bearings 26 near the lower part of the magazine, both pairs being capable of sliding on the pillars 24 and both being equipped with clamping means so that they can be fixed on the pillars in order to set the magazine at the desired height.

The clamping means shown comprises a screw rod 27 anchored in a lug 28 of a split bearing and working in a tapped bore in a second lug 29 to draw the two together when the handle 30 is appropriately turned. The sand magazine 11 is directly over the table 13 and the pressure plate 14 which also acts as a sand delivery plate, at the base of the magazine is opposite the table surface so that a core mould box placed on the table can be clamped securely between the table and the bottom of the sand containing magazine by the forcing of the table upwardly by the piston and bell-crank means already described. This upward movement need only be small since the sand container will be set to suit the depth of the box, and it is only the clamping and sealing of the box against the pressure and delivery plate of the sand magazine that has to be effected by the table movement.

The upper part of each pillar 24 is enclosed in a cylinder 31, the lower end of which is bolted to a stout flange 32 on the upper guide bearing 25 of the sand container or magazine 11, and this cylinder 31 is closed above the top of the pillar by a plate 33 through which a small orifice 34, or more than one, will be provided. Above this perforated closure plate an enlarged pressure chamber 35 is provided, the purpose of which is to receive a suitable fluid such as oil and provide an air space above the fluid to which compressed air

can be led. The enlarged, ballon-like chamber 35 gives effective storage without increasing head room demands, and the restricted orifice ensures a slow, smooth movement and a dashpot effect, when pressure is released.

As there are two cylinders 31, one on each pillar 24 there are two enlarged pressure chambers 35 and a common connecting air pipe 36 between them can be provided with a compressed air lead 37 so that the pressures in the two chambers will be equalised above the level of the fluid therein. The oil may be inserted through a cock at 38 and drained when necessary by a tap 39 below the orifice 34 and above the point of maximum entry of the pillar 24.

The upper end or face of each pillar 24 is provided with a suitable removable piston face 40 to act as a piston against the walls of the cylinder 31. If compressed air is admitted to the upper parts of the pressure chambers 35 when the clamping means on the sand container or magazine guides 25, 26, have been released, the air pressure will drive the oil through the small orifice 34 in the closure plate 33 of each and against the piston face 40 of the fixed pillar 24. By the reaction of this fluid between the piston face and the apertured plate 33 across the cylinder 31 each cylinder will be raised so as to lift the whole of the sand container or magazine assembly bodily on the pillars 24 to any height required above the table. The assembly will then be clamped in the desired position by the clamps on the guides of the container or magazine 11.

The pressure plate 14 at the lower part of the sand container or magazine is bodily removable and bolted in place, and this plate will be provided with the necessary opening or openings through which sand may be driven by compressed air admitted to the container to blow the sand into the shaped cavities in the core box to fill the latter with the core sand and so mould the cores required.

The lower part of the container has an annular chambered part 41 in its wall to which the compressed air connection is made at 42, Figure 2, and provided with an inlet valve 43. The handle 44 of this valve may be coupled to an air exhaust valve at 45 in the magazine so that when the inlet valve is closed the exhaust from the magazine is opened, and vice versa. Within this annular air belt 41 is arranged a perforated cylindrical plate 46 covered with a wire gauze or like sleeve 47 so that the air is split up into many fine streams or jets, and a thorough mixture of the compressed air with the sand takes place as the sand is agitated within the container by the mechanical agitator.

The agitator may consist of a hub 48 with skeleton arms 49 and paddles projecting from the hub and the hub is secured on a drive spindle 50 which is enclosed in bearing bushes 51, 52, carried and enclosed by a stout elbow casting 53 which can be bolted securely against the side wall of the container or magazine bore, see Figure 4. The drive spindle 50 is provided with a bevel gear 54 driven by a similar bevel 55 on gear shaft 56 projecting from a speed reduction gear box 57 of a suitable kind in which the input shaft is driven from an electric motor 58.

The motor 58 and its starter 59 is arranged above the magazine 11 on a suitable platform and also secured on top of the magazine is the sand hopper or chute 12 from which the magazine is supplied with sand.

After the oil pressure chambers or "balloons" 35

at the top of the pillar cylinder 31 have been subjected to air pressure to raise the sand magazine 11 to a given height for a particular box, or series of boxes, and the magazine bearings 5 have been clamped securely in that position, a core box has been inserted, and the table raised by admitting compressed air in the cylinder 16 above the table piston 15 to clamp the box and make a sandtight joint between the openings in the pressure plate 14 and those in the core box, the air pressure is admitted to the annular chamber 41 above the pressure plate and the motor 58 is started to drive the agitator arms 49 and paddles and the core or cores in the box is/are rapidly blown and so formed. The table cylinder 16 is then exhausted and the table 13 moves down under gravity reinforced by the spring 23 and returns the bell crank 18 and piston 15. The filled box is then removed.

If the box height is to be varied the air pressure above the oil in the pressure chambers or "balloons" 35 is released and, after the clamps are slackened, the sand magazine with its agitator and motor unit will return slowly down the pillars 24, the oil being forced up through the restricted passages 34, in the closure plates 33 in the cylinders 31.

The control of the machine may be made very simple by arranging the compressed air supply leads to be brought to a suitable multi-way control cock 60 for distribution to the table cylinder, the pressure chambers or "balloons," and the annular chamber 41. This point is arranged adjacent to the agitator motor switch so that the controls for the table or base, and the motor, may be all assembled within easy reach of an operative. The part seen at 61 is a free jet for cleaning purposes. 62 is a pressure gauge.

We claim:

1. Core making or blowing machine having a container for sand, means including a table for supporting a core box below the container, an apertured pressure and sand delivery plate at the base of the container, means for supplying air under pressure to the container for forcing sand through said apertured plate into the core box, a pair of pillars disposed one at each end of the table, means for guiding the container on the pillars and means for clamping it thereon, a pair of cylinders secured to the container and capable of sliding on the pillars each of which pillars is adapted to act as a fixed piston in one of said cylinders, combined pneumatic and hydraulic means whereby fluid pressure may be admitted to the cylinders above the piston faces of the pillars for raising said container thereon, and means fixedly mounted in each cylinder above the pillars to form a restricted passageway for the passage of fluid from the upper part to the lower part of the cylinder, which means act as dashpots to give a smooth and slow action during ascent and descent of the cylinders and the container.

2. Core making or blowing machine having a container for sand, means including a table for supporting a core box below the container, an apertured pressure and sand delivery plate at the base of the container, means for supplying air under pressure to the container for forcing sand through said apertured plate into the core box, a pair of pillars disposed one at each end of the table, means for guiding the container on the pillars and means for clamping it thereon, a pair of cylinders secured to the container and capable of sliding on the pillars, each of which

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pillars is adapted to act as a fixed piston in one of the cylinders, an enlarged vessel containing a supply of liquid arranged above each of said cylinders, each of said vessels being provided with a fixed apertured closing plate between the vessels and the top of the cylinder which serves as a dashpot to give a smooth and slow action during ascent and descent of said cylinders, and

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means for supplying air under pressure to each vessel above the liquid therein whereby fluid pressure in the cylinders above the fixed piston faces therein is caused to raise the cylinders and the sand container upon the pillars.

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