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APPARATUS FOR REMOVING CORES FROM CORE MOLDS

Filed Aug. 30, 1929

3 Sheets-Sheet 1

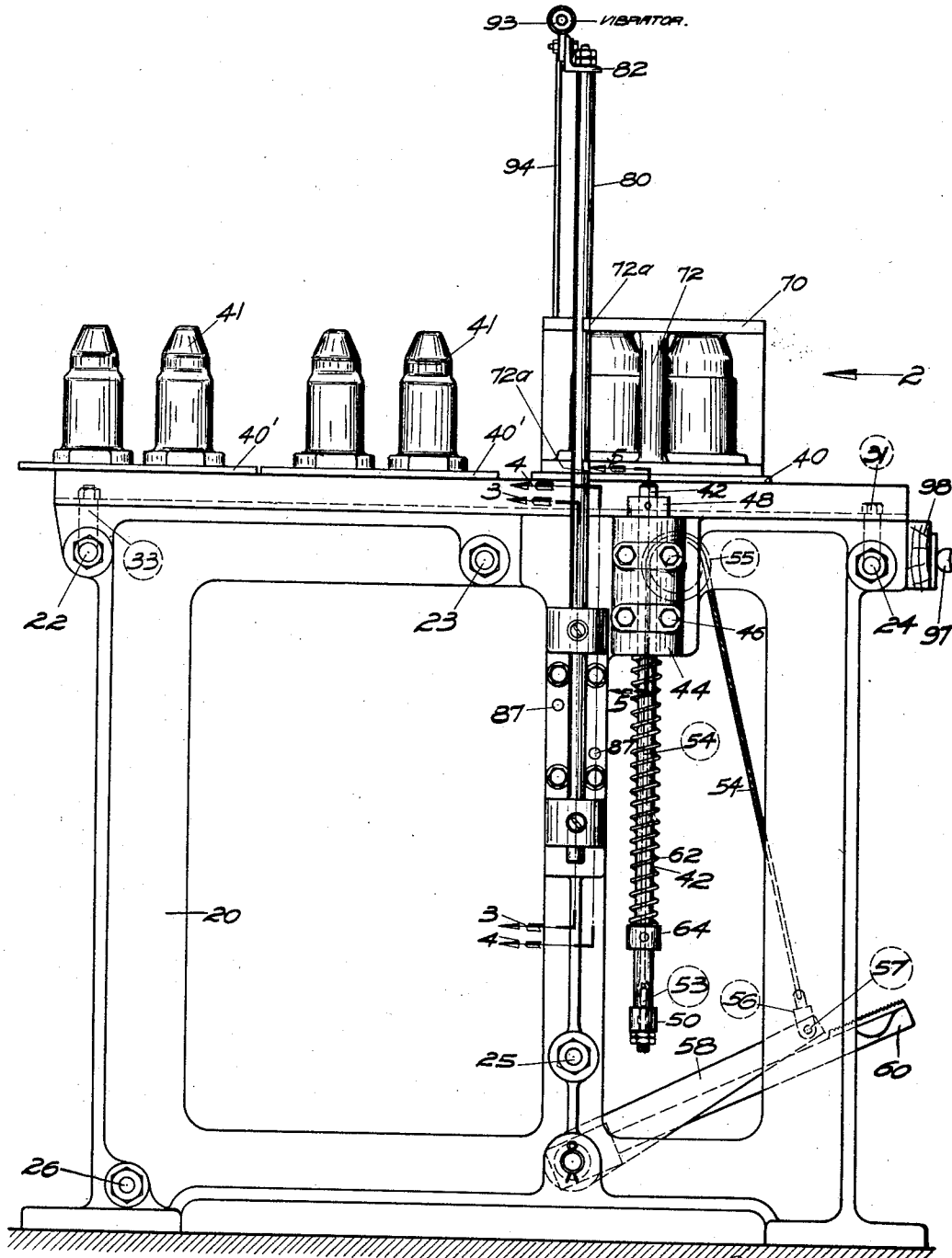


Fig. 1.

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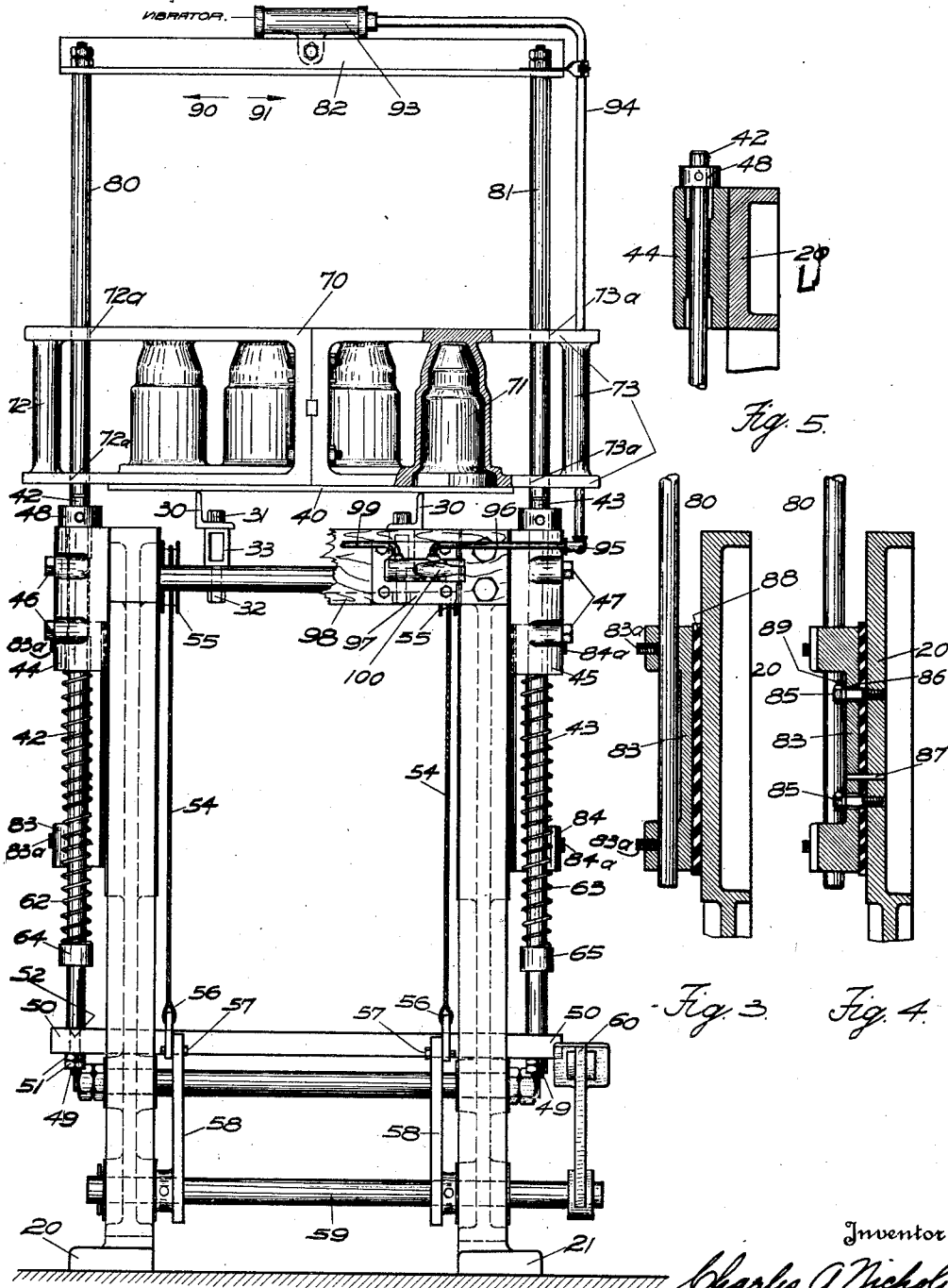


Fig. 2.

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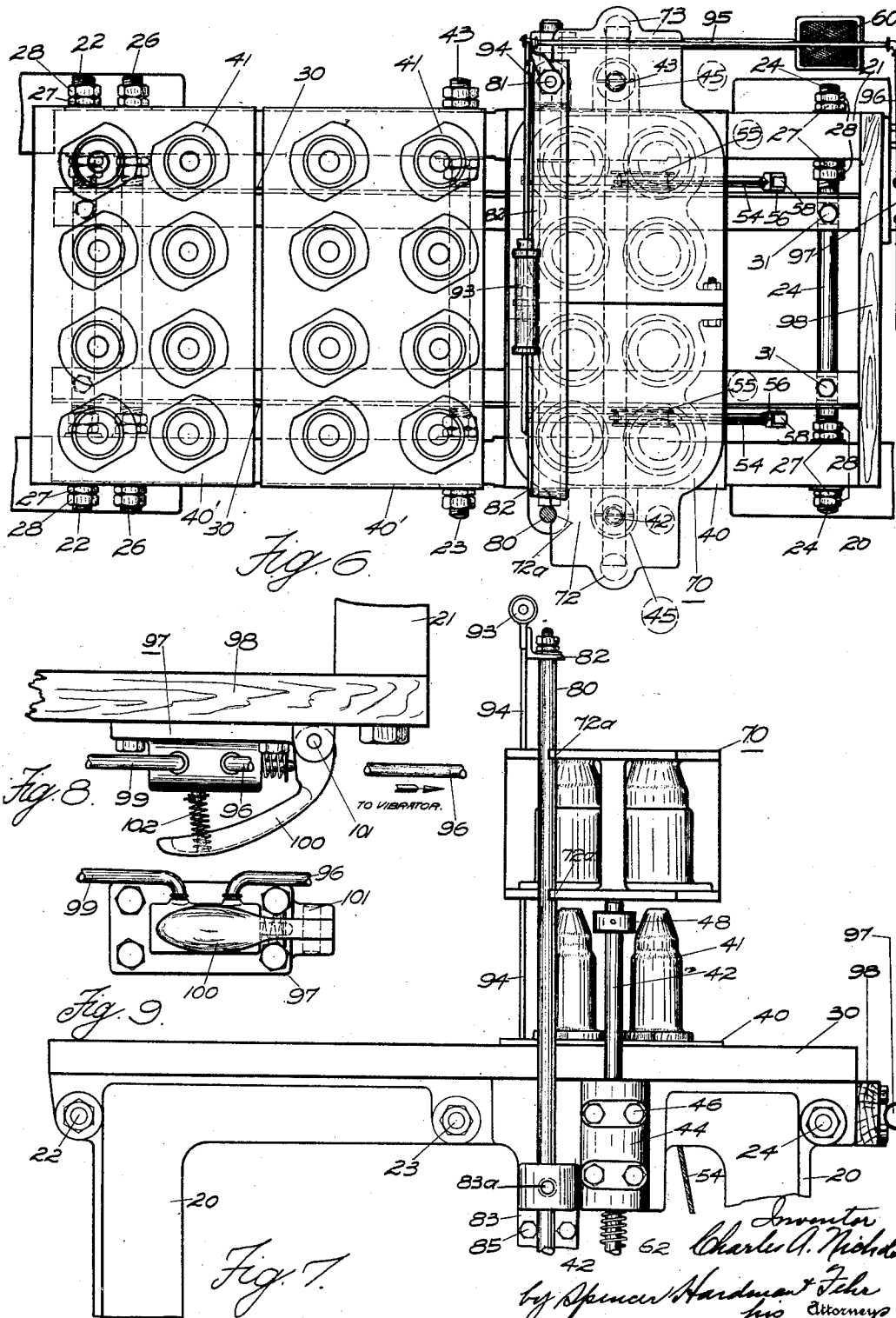
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

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APPARATUS FOR REMOVING CORES FROM CORE MOLDS

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This invention relates to apparatus for making cores used in the manufacture of castings and more particularly to devices for facilitating the removal of cores from the core molds.

One of the objects of the present invention is to provide an apparatus of simple and durable construction for shaking or vibrating the core mold loose from the cores without in any way damaging the cores. In order to accomplish this object the present invention provides a table upon which the cores may rest, a pedal operated mechanism for elevating the core mold above the core table, and a vibrating frame against which the core mold is placed while being elevated in order that the mold will be shaken loose from the cores. The vibrating frame is supported in a manner such that its vibrations will not be transmitted in a substantial way to the core supporting table thereby minimizing the possibility of damage to the cores while the core mold is being vibrated.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a side elevation of apparatus embodying the present invention.

Fig. 2 is an end view looking in the direction of the arrow 2 in Fig. 1, a portion of the core mold being shown in section.

Figs. 3, 4 and 5 are sectional views taken respectively on the lines 3—3, 4—4, and 5—5 of Fig. 1.

Fig. 6 is a plan view of the apparatus.

Fig. 7 is a fragmentary side elevation showing the core mold elevated above the core table.

Fig. 8 is a fragmentary plan view on a larger scale than the other views and shows a valve for controlling a pneumatic vibrator.

Fig. 9 is a side elevation of the valve shown in Fig. 8.

The core supporting table is constructed of side frames 20 and 21 tied together in spaced relation by cross tie rods 22, 23, 24,

25 and 26. As shown particularly in Fig. 6 each tie rod passes through the side frames and each frame is clamped between pairs of nuts 27 locked in position by pairs of lock nuts 28. The rods 22 and 24 support parallel rails 30 comprising angle bars attached to the rods 22, 23 and 24 by bolts 31, nuts 32 and spacers 33 through which the bolts pass. The rails 30 receive plates 40 each adapted to support a plurality of cores 41 and also the core box 70 in which these cores are molded.

The pedal operated mechanism for elevating the core box 70 above the core supporting table comprises parallel rods 42 and 43 located adjacent the outsides of the frames 20 and 21 and guided for vertical movement by brackets 44 and 45 respectively attached to the frames 20 and 21 respectively by screws 46 and 47. Each rod is limited in its downward movement by a collar 48 pinned to it and engageable with a rod guiding bracket. Each rod is provided at its lower end with a threaded portion 49 of reduced diameter passing through a hole adjacent an end of a bar 50. Nuts 51 are threaded upon the end 49 and clamp the bar 50 against a shoulder 52 provided by the rod. The bar 50 is attached by eye bolts 53 to cables 54 which pass around pulleys 55 pivotally supported by the side frames 20, 21. Cables 54 are attached to members 56 which are pivotally connected by pins 57 with levers 58 which are pinned to a shaft 59 pivotally supported by the frames 20, 21 and carrying a pedal lever 60 located adjacent the outer side of frame 21. The core box 70 provides mold cavities 71 into which the core material is tamped to form the molds 41, and provides handles 72 and 73 which are located vertically above the rods 42 and 43 respectively when the core box 70 is placed upon a plate 40 which rests upon the rails 30 and is located between and adjacent the rods 42 and 43. When the pedal 60 is pressed downwardly the rods 42 and 43 will move upwardly to engage the handles 72 and 73 respectively of the core box 70 in order to lift it above the plate 40 upon which it has been resting. Upward movement of the rods 42 and 43 is resisted by springs 62 and 63 re-

spectively which surround these rods and are located between guide brackets 44, 45 and shoulders 64, 65 associated respectively with the rods 42, 43. Consequently, downward movement of the rods 42 and 43 is assisted by the springs 62 and 63.

The means for vibrating the core box 70, while it is being elevated above the plate 40 upon which it has been resting in order to free the core box from the cores which have been molded therein, comprises a vibrating frame consisting of upright rods 80 and 81 connected at their upper end by an angle bar 82 and attached at their lower ends by set screws 83a and 84a to brackets 83 and 84, respectively, which are attached to side frames 20 and 21, respectively, in a manner such that the vibration of the vibrating frame will not be transmitted to any substantial degree to the core supporting table. Referring to Figs. 3 and 4 it will be seen that the bracket 83 is attached by screws 85 to the side frame 20 and that these screws pass loosely through holes 86 in bracket 83. The bracket 83 is located with respect to the frame 20 by dowel pins 87. Between the bracket 83 and the frame 20 there is located a plate of vibration absorbing material 88 such as rubber. Between the heads of the screws 85 and the bracket 83 are located washers 89 which may be made of vibration absorbing material. In a similar manner bracket 84 is attached to side frame 21. The vibrating frame is caused to vibrate in a plane transverse to the rails 30 as indicated by arrows 90 and 91 in Fig. 2 by a pneumatic vibrator 93 attached to the angle bar 82 and connected by pipes 94, 95 and 96 with a valve 97 which is attached to a front board 98 attached to the frames 20 and 21. Valve 97 is connected with a source of fluid pressure by pipe 99 and is operated by lever 100 pivotally connected with the valve at 101 and urged by a spring 102 into valve closing position.

Mode of operation

After the mold cavities of the core box 70 have all been filled with core material the core box and its contents are inverted upon a plate 40, are placed with the plate 40 upon the table rails 30 and are located vertically above and between the elevating rods 42 and 43. The operator, who stands in front of the cross bar 98, then pushes the core box against the rods 80 and 81 of the vibrating frame. The handles 72 and 73 of the core box are provided with notches 72a and 73a which receive the rods 80 and 81 respectively. While the core box 70 is maintained against the rods 80 and 81 the operator leans against the valve handle 100 in order to move it inwardly toward the cross bar 98 thereby admitting air to the vibrator 93 to cause it to vibrate the rods 80 and 81 in a manner described. While the core box 70 is

thus being vibrated the operator will press the pedal 60 downwardly to cause the core box 70 to be elevated above the plate 40 as shown in Fig. 7. The vibration of the core box 70 having caused the cores 41 to be released from the core box, the cores 41 will remain upon the plate 40 while the box is being elevated. Before the pedal 60 is released, the core box 70 is removed from above the rods 42 and 43. Then the pedal 60 may be released to permit the rods 42 and 43 to descend to their normal position; and the valve lever 100 may be released to permit the spring 102 to return the lever to valve closing position whereupon the vibrator 93 will cease to shake the vibrating frame. Then the plate 40 supporting the cores 41 may be moved from a position such as shown in Fig. 7 toward the left into positions indicated at 40' in Figs. 1 and 6. From these positions the plates supporting the cores are removed to a suitable drying oven (not shown). Since the brackets 83 and 84 are supported by the table in a manner such that the transmission of vibrations has been minimized, the cores 41 will not be shaken to any substantial degree while the core box 70 is being shaken. By providing the core box handles with the notches 72a and 73a respectively for receiving the rods 80 and 81 respectively the vertical upward movement of the core box 70 will be guided by the rods 80 and 81 in a manner such that the walls of the mold cavity 71 will not come into contact with the cores 41. In this way the cores 41 will not be damaged while the core box 70 is being removed from the cores.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Apparatus for facilitating the removal of cores from core molds comprising, in combination, a table for supporting a core box and contents in inverted position, mechanism for elevating the core box above the table and means for vibrating only the core box while it is being elevated.

2. Apparatus according to claim 1 further characterized as having a vibratory frame against which the core box is pushed while being elevated, means for vibrating the frame, and a vibration absorbing support for attaching the frame to the table.

3. Apparatus according to claim 1 further characterized as having a vibratory frame against which the core box is pushed while being elevated, said frame having provisions for guiding the upward movement of the core box so as to prevent lateral shifting thereof relative to the cores, and means for vibrating the frame.

4. Apparatus for facilitating the removal of cores from core molds comprising, in combination, a table comprising spaced side frames and means supported thereby along which may be slid a plate supporting a core box and its contents in inverted position, the core box having handles extending beyond the side edges of the plate, vertically movable rods supported by the side frames and adapted to move up under the handles of the core box, pedal operated mechanism for moving the rods upwardly to elevate the core box above the plate resting on the table, a vibratory frame constructed and arranged to vibrate the core box while it is being elevated, vibration absorbing supports for the frame and means for vibrating the frame.

5. Apparatus according to claim 4 in which the vibratory frame comprises parallel vertically extending rods against which the core box is pushed while being elevated and the vibration absorbing supports comprise means connecting the rods with the side frames of the table, and means attached to the upper ends of the rods for vibrating the rods.

6. Apparatus for facilitating the removal of cores from core molds comprising, in combination, a table comprising spaced side frames connected together by tie rods, parallel rails supported by certain tie rods and adapted to receive a plate supporting a core box and its contents in inverted position, the core box having handles extending beyond the side edges of the plate and overhanging the side frames, vertically movable rods supported by the side frames and adapted to move up under the handles of the core box, a cross bar connecting the lower ends of the rods, a cable connected at one end with the cross bar and passing therefrom upwardly over a pulley attached adjacent the upper portion of a side frame and thence downwardly from the pulley to a position adjacent a lower portion of a side frame, a pedal lever pivotally supported by a side frame and operatively connected with the other end of the cable in a manner such that downward movement of the pedal produces upward movement of the vertically movable rods, brackets each attached to a side frame and vibrationally insulated therefrom, parallel rods extending upwardly from the brackets and above the table and adapted to be received by notches provided in the handles of the core box, a bar attached to the upper ends of said parallel rods, a vibrator attached to said bar for shaking the rods laterally with respect to the side frames, whereby the core box may be vibrated while being elevated to release the core box from the molds which remain upon said plate.

In testimony whereof I hereto affix my signature.