

Feb. 26, 1929.

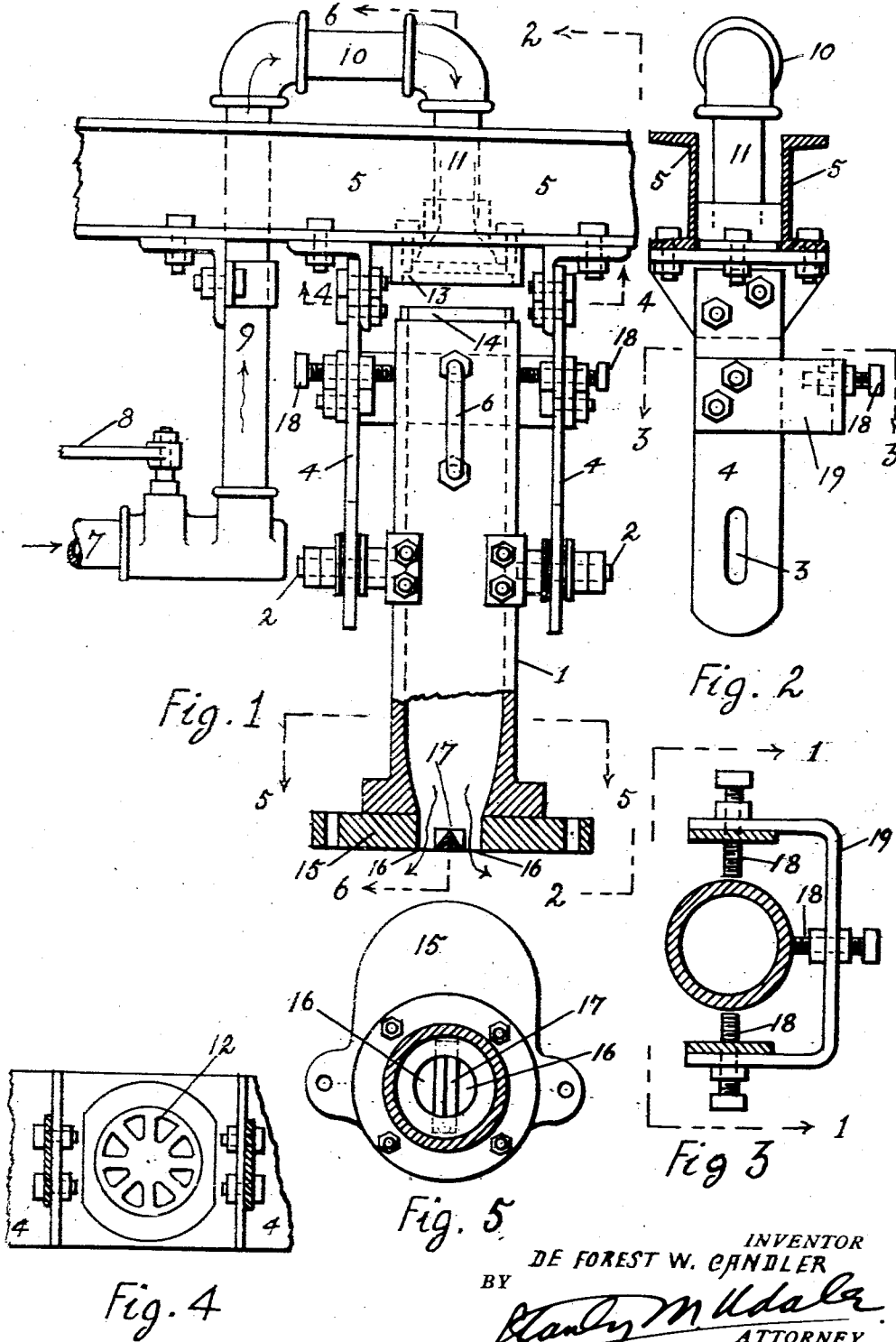
DE FOREST W. CANDLER

1,703,708

CORE MAKING MACHINE

Filed Dec. 27, 1926

3 Sheets-Sheet 1



INVENTOR
DE FOREST W. CANDLER
BY
Stanley M. Udala
ATTORNEY

Feb. 26, 1929.

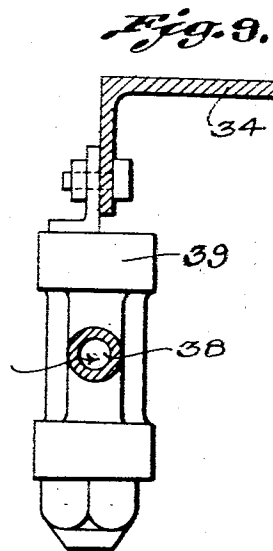
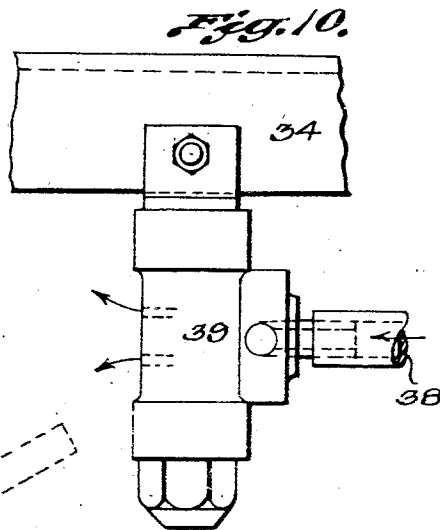
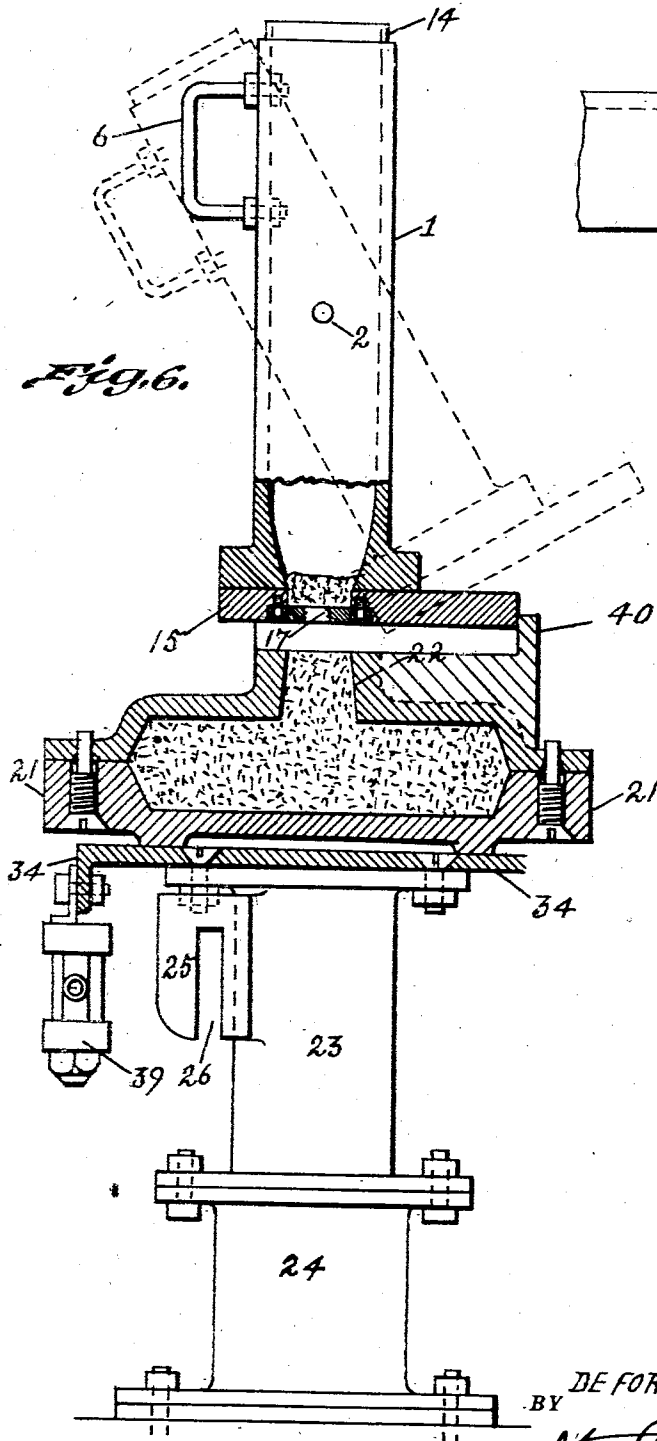
DE FOREST W. CANDLER

1,703,708

CORE MAKING MACHINE

Filed Dec. 27, 1926

3 Sheets-Sheet 2



INVENTOR
DE FOREST W. CANDLER
BY *Harley M. Udaler*
ATTORNEY

Feb. 26, 1929.

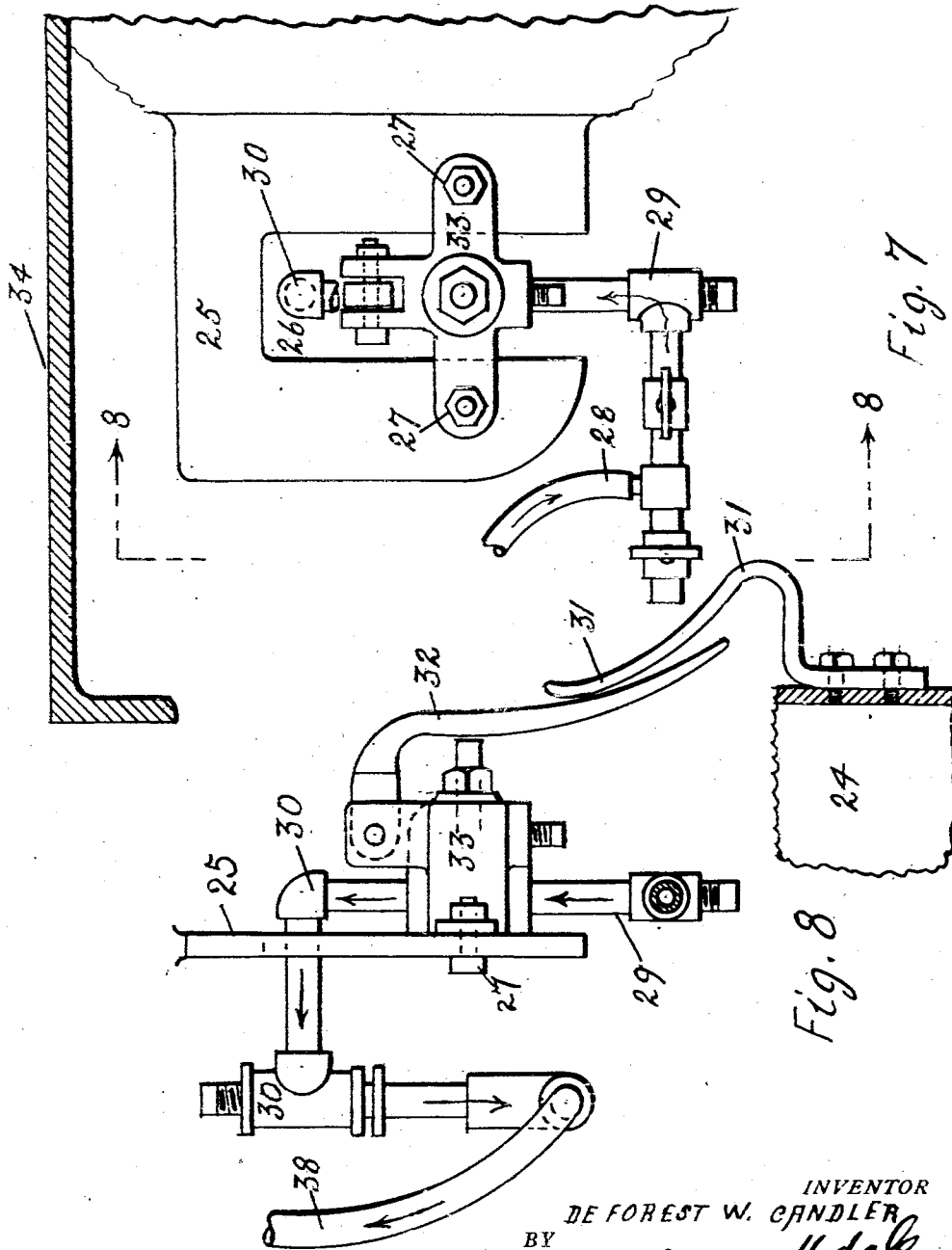
1,703,708

DE FOREST W. CANDLER

CORE MAKING MACHINE

Filed Dec. 27, 1926

3 Sheets-Sheet 3



INVENTOR
DE FOREST W. CANDLER
BY *Stanley M. Udak*
ATTORNEY

Patented Feb. 26, 1929.

1,703,708

UNITED STATES PATENT OFFICE.

DE FOREST W. CANDLER, OF DETROIT, MICHIGAN, ASSIGNOR TO EARL HOLLEY, OF DETROIT, MICHIGAN.

CORE-MAKING MACHINE.

Application filed December 27, 1926. Serial No. 157,048.

The object of this invention is to provide improved means for making sand cores with compressed air.

The specific object is to devise means of repeatedly filling a core box by forcing a charge of sand therein by means of compressed air, exactly as a shell is propelled from a gun, and thereby getting a core of uniform density and consistency. The difficulty experienced with the apparatus now in use is that the sand is not ejected uniformly. For example, referring to the patent to Anderson, #1,573,436, the receptacle from which the sand is ejected by air pressure is quite large, having a capacity equal to quite a number of cores, and although this is a convenience because it requires to be refilled only after a number of cores have been made, the action has been found in practice to be quite irregular due to the sand packing in the receptacle, and sometimes the consumption of air in proportion to the sand ejected was large, and at other times the cores were incompletely formed, and at all times the production of cores was unsatisfactory, as the degree to which the sand was compressed varied with the amount of sand contained in the chamber or hopper. The lower the sand sank in the hopper the more effective became the packing effect of the compressed air in the core box, but the greater the air loss. The more sand that can be ejected for a given amount of air the cheaper the device can be operated, and from one point of view the efficiency of the device can be measured by the amount of sand ejected per cubic foot of compressed air consumed. A compromise solution, which gave the best cores for the least money, was therefore sought.

I have discovered that by increasing the length, decreasing the diameter, properly forming the mouth, as well as by restricting the volume of sand in the cylinder thus formed to the amount of sand necessary to fill one core, plus a reasonable margin of safety, I am able to eject the sand with the minimum consumption of compressed air and to produce cores with the least labor cost. In other words, I eject the sand from the device very much as a shell is ejected from a gun and thus every charge is ejected under like conditions, which renders the quality of the product uniform and controllable.

By arranging oscillating means to facilitate the refilling of this elongated cylinder, I am able to produce cores at a minimum expense. Furthermore, the oscillating cylinder permits an automatic hopper to be associated with the device so that the entire process becomes practically automatic.

Figure 1 shows the general arrangement of the device in elevation.

Figure 2 shows a partial section on the plane 2—2.

Figure 3 shows a plan view taken on the plane 3—3 of Figure 2.

Figure 4 shows a plan view looking upwards on Figure 1.

Figure 5 shows a cross sectional plan view taken on the plane 5—5 of Figure 1.

Figure 6 shows a partial cross sectional elevation taken on the plane 6—6 of Figure 1, showing the elongated cylinder and core box in position, the broken lines indicating the position of the cylinder assumed when it is being refilled.

Figures 7, 8, 9, and 10 show the automatic means for vibrating the table upon which the core box is mounted to facilitate the filling of the core box.

In Figures 1 and 6, 1 is the elongated cylinder in which the ratio of bore length is approximately 5 to 1. This cylinder is mounted so as to oscillate freely on trunnions 2 2. These trunnions are supported in slots 3 3 of the brackets 4 4, which permit the cylinder a limited movement in a vertical direction. These brackets 4 4 are bolted to a frame 5 5, which is part of the machine. The cylinder 1 is provided with a handle 6 so that it can be freely oscillated on the trunnions 2. Compressed air is supplied through a pipe 7 manually controlled by a valve 8, which admits air to the vertical pipe 9 connected with the horizontal pipe 10 and the vertical pipe 11. This admits air to the mouth piece 12, see Figure 4. This mouth piece 12 serves to distribute the air uniformly into the cylinder 1, there being eight openings in the distributor. A groove or lip 13 is provided to the mouth piece 12. This fits into a corresponding lip 14 on the end of the cylinder 1. It is important that this joint should be reasonably close as otherwise the loss of compressed air therethrough will be considerable.

To the lower end of the cylinder there is bolted a mouth piece 15, see Figure 5. The

mouth piece 15 is provided with two outlets 16 16, formed by a triangular hardened steel piece 17 which is arranged to be easily replaceable. (See Fig. 6.)

- 5 The core box 21 has an opening 22 adapted to match with the two openings 16 alongside the triangular piece 17 of the sand cylinder 1. Suitable means, such as the lip 40 is provided to insure that the mouths 16
10 16 alongside the dividing piece 17 shall register accurately with the mouth or opening 22 of the core box 21.

- In order to guide the cylinder 1 accurately in place so that the lip 14 will engage with
15 the lip 13, an adjustable guide is provided as shown in Figure 3, comprising three adjustable stops 18 mounted on a suitable bracket 19, see Figure 2. The slight amount of unbalance provided by the lip 15 ensures
20 that the cylinder 1 will contact with the rear stop 17. The bracket 19 carrying these stops 18 is supported by 4, 4, which also support the cylinder 1, see Figures 1 and 2.

- Figure 6 also shows the general arrangement of the entire mechanism. A table 34 is arranged which serves as a support for the core box 21. A piston 23, sliding in a cylinder 24, is adapted to raise and lower this table 34 by the application of compressed air in a well known manner. In
30 order that the core box shall be filled without any unnecessary manual labor, at the left of the table 34, a vibrator 39 is provided. In Figures 7, 8, 9, and 10 the details of this
35 vibrator are shown in detail.

- To the cylinder 24, in which slides the piston 23, a curved bracket 31 is attached. (See Figure 8.) This bracket is suitably curved so as to contact with lever 32, which
40 is also curved and which has its fulcrum on the valve 33, which valve 33 is bolted by the bolts 27 to the cylinder 23 by means of the bracket 25 provided with a slot 26 (see Figures 6, 7, and 8), and which therefore moves with the table 34. The valve
45 33 is thus unseated whenever the bracket 31 strikes the lever 32, when the table 34 rises. This admits compressed air from the pipe 29 and connection 30 to the pipe 38, which is connected to the vibrator 39, which
50 is bolted to the table 34, see Figures 6, 9, and 10. The compressed air is admitted to the valve 33 from the hose 28 connected with the piping 29. (Figs. 7 and 8.)

- 55 Operation:—Assuming that the cylinder 1 is full of sand, of such a consistency that it is maintained full despite the openings 16 16 of Figure 1, which of course is adjusted by having a suitable binder or body
60 to the sand, and by the shape of the replaceable piece 17 (Figs. 1 and 6), the core box 21 is placed on the table 34 and aligned with the cylinder by means of the lip 40. Compressed air is admitted to the cylinder
65 24, which raises the piston 23 and table 34,

and thus makes a tight connection (13—14) for the compressed air flowing from the pipes 9, 10, 11 and distributor 12 into the cylinder 1.

As the piston 23 forces the core box 21 70 into engagement with the sand cylinder 1, compressed air is admitted to the valve 33 by means of the stationary cam 31, which engages with the curved lever 32, thus opening the valve 33 and admitting compressed 75 air from the pipes 28, 29 through the pipe 38 to the vibrator 39. The vibration of the table 34 thus takes place simultaneously with the filling of the core box, located on the table, and ensures the complete filling of the 80 core box 21 without any rapping of the box by the operator.

Meanwhile compressed air, admitted past the valve 8 through the pipes 9 10, down 11, past the distributor 12, is forcing the 85 sand out of the cylinder 1, just as a bullet is propelled from a gun by the explosion of the charge. The sand, thus propelled, sweeps past the replaceable triangular piece of hardened steel 17, which divides the 90 stream of sand into two equal streams, and which distributes the sand uniformly in the core box 21. By the means herein disclosed a very substantial increase in the rate of production of cores has been achieved. 95

The exact method of operating the device, from the operator's point of view, is as follows:—

The mechanic lines up the core box 21 with the cylinder 1, causing 15 to engage 100 with 40. He then admits air to the cylinder 24, by means of a valve (not shown) operated by his right foot. This, of course, starts the vibrator 39 in operation. He then, with his left hand, opens the valve 8, admitting 105 compressed air from 7 to the piping 8, 9, 10, and 11, where it is distributed at 12 and thus discharges the sand from the cylinder 1. He releases the pressure in 24, the table 34 falls by gravity, he removes the 110 core box and rocks the cylinder 1 into the position shown in Figure 6, in broken lines, and then refills, either by hand or from a sand chute (not shown). The cycle of operation is then repeated. 115

An automatic hopper, not shown, may be applied to the machine, so that upon oscillating the cylinder 1 the cylinder is automatically refilled with sand.

What I claim is:—

1. In a core blowing device, comprising a moveable table, a core box located thereon, a substantially vertical cylinder adapted to contain one charge of sand, and to engage with said core box, means for supporting 125 said cylinder so that it is free to move in a vertical direction, means for admitting compressed air to the upper part of said cylinder, whereby on the admission of compressed air the substantially entire contents 130

thereof is discharged into said core box, means for oscillating said cylinder on a horizontal axis to facilitate the refilling of said cylinder between each operation.

5 2. A core making device, comprising a core box, an oscillating elongated cylinder containing sand and adapted to be clamped into engagement with said core box when substantially in the vertical position, said
10 cylinder having a relatively small bore and a relatively great length, means for admitting compressed air to the upper end of said cylinder, thereby discharging sand from said cylinder into said core box from
15 the lower end.

3. A core making device, comprising a moveable table, a core box having a mouth in its upper portion adapted to rest on said table, a moveable oscillating elongated cylinder containing sand, the lower end of
20 which is adapted to engage with said core box and supported above said table, a hollow fixed abutment adapted to engage with and to make a tight connection with the upper end of said cylinder, means for raising
25 the table, core box, and cylinder, whereby the cylinder is clamped between the abutment and the core box, means for admitting compressed air through said abutment to
30 eject the sand into said core box.

4. A core making device, comprising a moveable table, a core box having a mouth

in its upper portion adapted to rest on said table, a moveable oscillating elongated cylinder containing sand, the lower end of
35 which is adapted to engage with said core box and supported above said table, a fixed abutment adapted to engage with the upper end of said cylinder, means for raising the table, core box, and cylinder, whereby the
40 cylinder is clamped between the abutment and the core box, means for admitting compressed air through said abutment to eject the sand into said core box, means, operable by raising the table, for vibrating the table
45 during the period the cylinder is clamped in place.

5. In a core blowing device, comprising a moveable table, a core box located thereon, a cylinder adapted to contain one charge
50 of sand, and to engage with said core box, means for supporting said cylinder so that it is free to move in a vertical direction, means for clamping said cylinder to said core box, means for admitting compressed
55 air to the upper part of said cylinder, whereby on the admission of compressed air the substantially entire contents thereof is discharged into said core box, means for oscillating said cylinder on a horizontal axis to
60 facilitate the refilling of said cylinder between each operation.

In testimony whereof I affix my signature.

DE FOREST W. CANDLER.