

Feb. 24, 1953

C. H. MILLER  
CORE GRINDING MACHINE

2,629,209

Filed June 23, 1950

2 SHEETS--SHEET 1

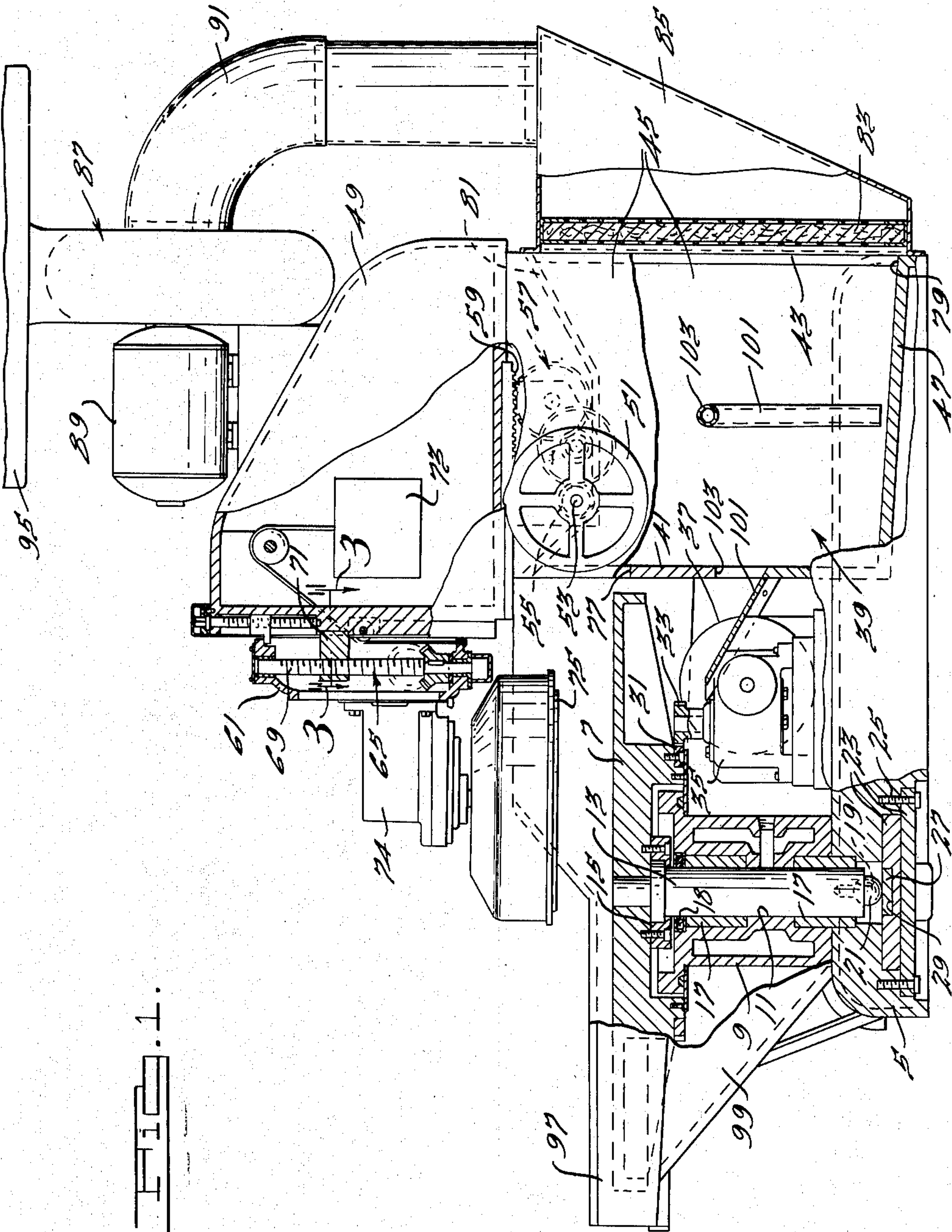


Fig. 1.

INVENTOR.  
Clarence H. Miller.  
BY  
Harness, Dickey & Pierce.  
ATTORNEYS.

Feb. 24, 1953

C. H. MILLER  
CORE GRINDING MACHINE

2,629,209

Filed June 23, 1950

2 SHEETS--SHEET 2

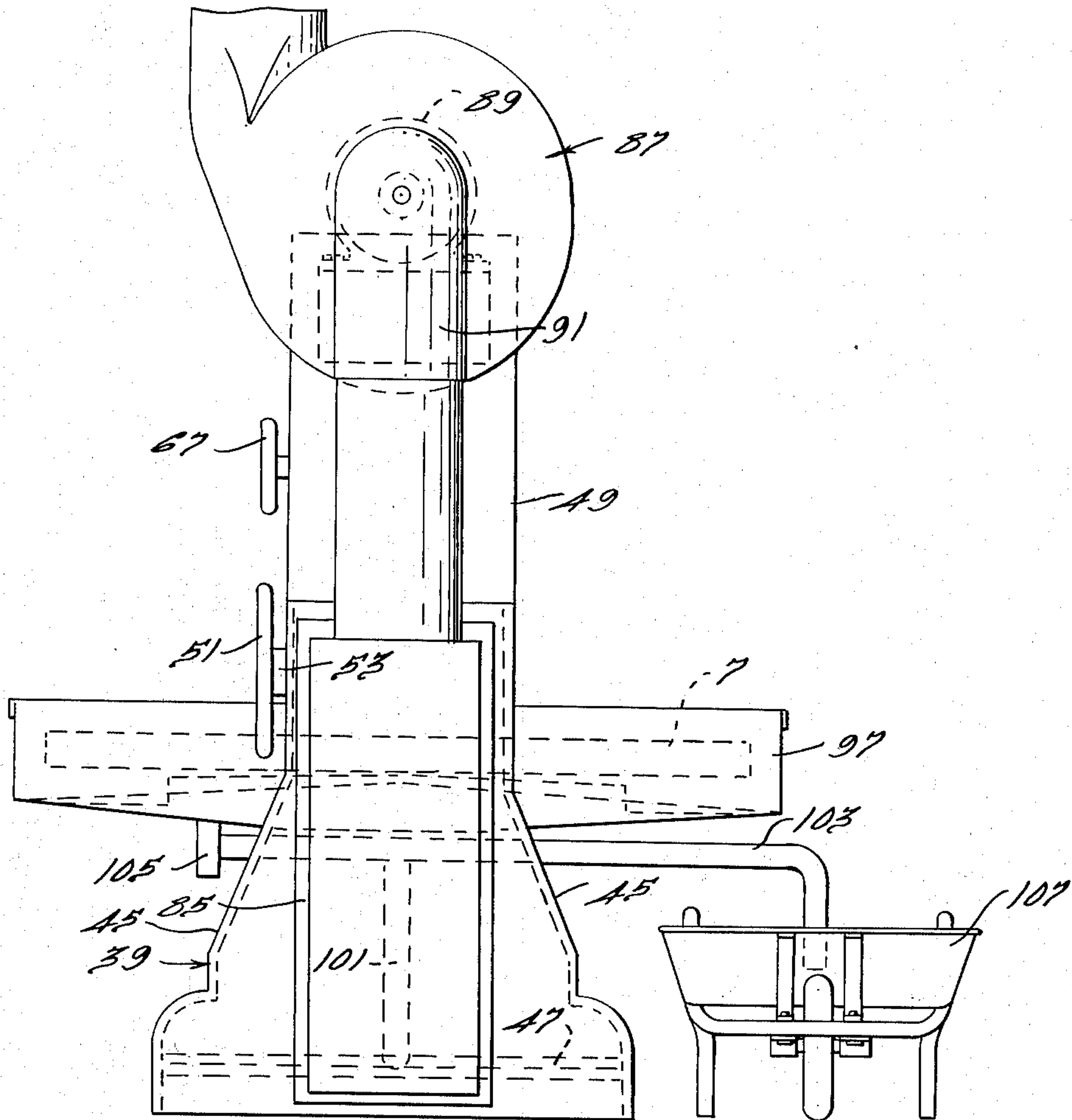


Fig. 2.

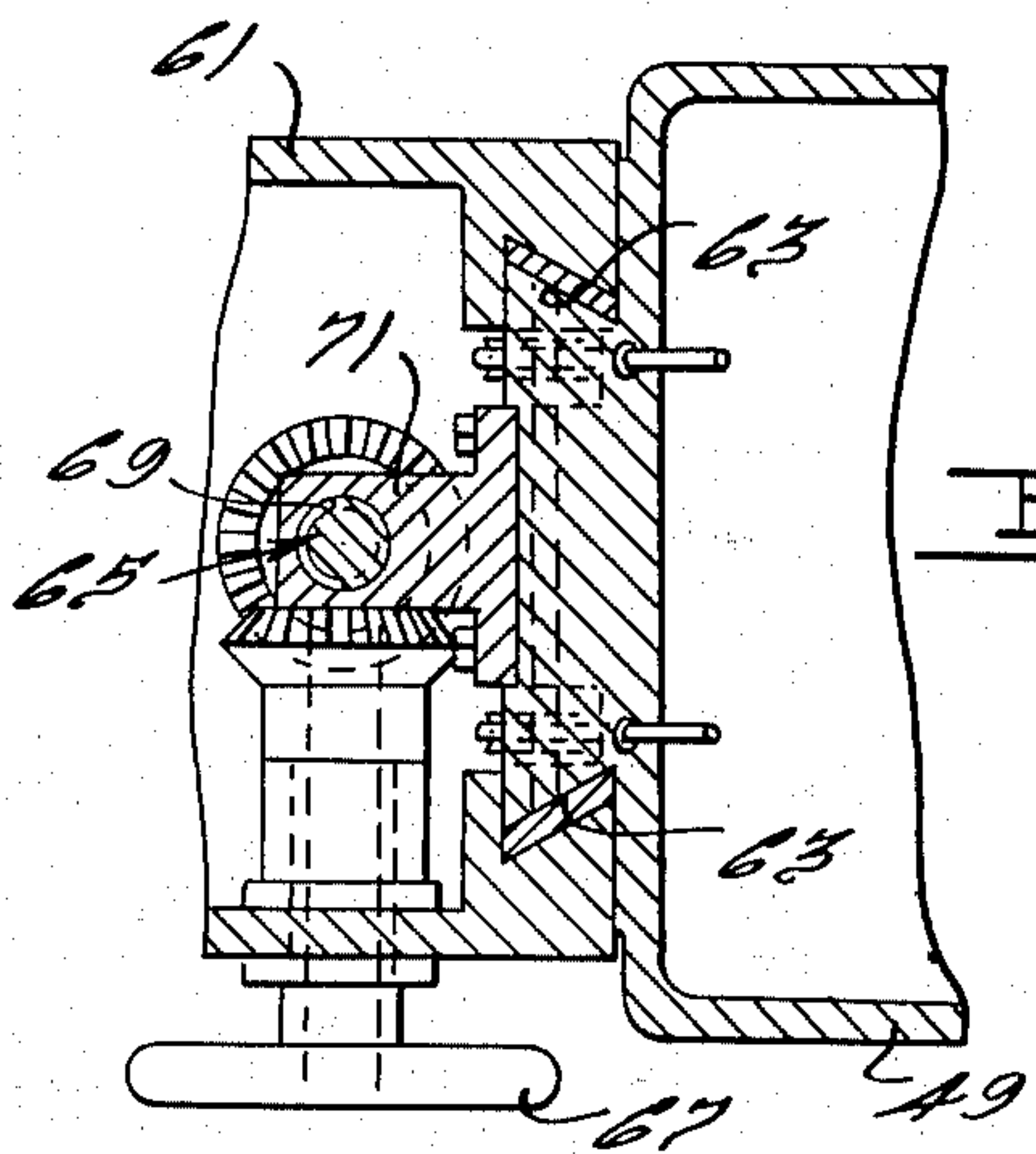


Fig. 3.

INVENTOR.

Clarence H. Miller.

BY

Harnes, Dickey & Pierce.  
ATTORNEYS



## UNITED STATES PATENT OFFICE

2,629,209

## CORE GRINDING MACHINE

Clarence H. Miller, Detroit, Mich., assignor to  
Standard Pattern Works, Detroit, Mich., a cor-  
poration of Michigan

Application June 23, 1950, Serial No. 169,865

4 Claims. (Cl. 51—131)

1

This invention relates generally to machines for grinding sand cores or the like, and more particularly to a novel core grinding machine incorporating means for disposing of the sand and silica dust ground from a core.

It is an object of this invention to provide a core grinding machine in which the sand ground from a core is directed into an enclosed receptacle so that it may be reused, and so that it will not be thrown onto the working parts of the machine or into the atmosphere and adjacent areas of the machine.

It is a still further object of this invention to provide a machine of the aforementioned type, in which the sand will be directed into a receptacle while the silica dust will be drawn by an exhaust blower from the sand and machine and deposited in a dust collector, or the like.

It is a still further object of this invention to provide, in a machine of the aforementioned type, novel means for removing the sand from the receptacle in a simple, efficient and economical manner.

It is a still further object of this invention to provide in a machine of the aforementioned type, a rotatable turntable and a novel arrangement for supporting the same.

It is a still further object of this invention to provide a machine of the aforementioned type which is rugged in construction, efficient in operation, and in which the ground sand and silica dust will be positively and efficiently handled so as not to impair the operation of the machine or the health of the operator, and so as to enable the sand to be reused in the making of other cores.

These and other objects of this invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a side view, partially in section and partially in elevation, of the device of this invention;

Fig. 2 is an end elevational view of the structure illustrated in Figure 1; and

Fig. 3 is a sectional view of the structure illustrated in Figure 1, taken along the line 3—3 thereof.

The machine of this invention includes a supporting base 5, on which is rotatably supported a turntable 7. A vertical supporting structure 9 is supported on the base 5, adjacent the front end thereof, and is centrally bored at 11 to rotatably receive a turntable supporting shaft 13. The shaft 13 is connected with the turntable 7

2

in any suitable manner, and a collar 15 prevents relative vertical movement between the turntable and shaft. Spaced bushings 17 are disposed between the outer periphery of shaft 13 and the adjacent wall of the supporting structure 9 to provide bearing surfaces for the rotatable shaft and to maintain the shaft in its proper vertical position. A seal 18 is disposed in the upper end of the structure 9 and engages the shaft 13 to prevent the ingress of dirt or other foreign particles between the shaft and bushings. The lower end of the shaft 13 is recessed at 19 to receive the upper portion of a ball element 21. The lower end of the opening 11, in the base 5, is closed by means of plate elements 23, which are secured to the base 5 by means of cap screws 25. A hardened metal insert 27 is disposed in a recess 29 in the upper face of the top plate member 23, and the ball 21 rests upon the insert 27 so that the turntable is supported by the insert 27 through the ball 21 and can rotate relative to the base 5 and its supporting structure 9 on the ball 21. A ring gear 31 is connected to the turntable 7 adjacent the under side thereof, and meshes with a gear 33 of a speed reducer unit 35. A suitable motor 37 is connected with a speed reducer 35 for driving the work table 7, if so desired. In many cases with machines of this type the turntable is not positively driven by a motor, and in such cases the speed reducer and motor may be eliminated and the turntable 7 merely rotatably supported on the base 5. In such cases the engagement of the rotating grinding wheel with the core will cause rotation of the table at a desired speed, and also as the grinding wheel rotates relatively slowly, such as 420 R. P. M., there is no need to clamp the core on the table.

A vertical column 39 is supported on the base 5 and extends upwardly therefrom rearwardly of the turntable 7. The vertical column structure 39 includes a front wall 41, back wall 43, side walls 45 and a bottom wall 47. The vertical column 39 is hollow and supports, adjacent the upper end thereof, a housing or tool-supporting head 49. The housing 49 is mounted in suitable ways (not shown in detail) on the vertical column structure 39, and is adjustable forwardly and backwardly thereon by means of an operating handle 51, which is disposed exteriorly of one of the vertical column side walls 45. The handle or wheel 51 is connected with a shaft 53, which projects through the side wall of the vertical column and carries a suitable gear 55 of a gear train 57, one gear of which meshes with a gear rack 59 on the housing means so that when the handle



3

or wheel 51 is rotated the housing will be adjusted relative to the vertical column structure. A housing member 61 is connected in the front face of the housing 49, through ways 63, for movement in a vertical direction, and a suitable mechanism 65, including a hand wheel 67, screw 69, nut 71 and counterweight 73, is provided for adjusting the housing member 61 vertically relative to the housing 49. A housing 74 is connected with the front face of the housing 61, and is adapted to contain a suitable motor or the like (not shown) for rotatably driving a grinding wheel 75 for grinding a sand core mounted on the turntable 7, which is disposed below the grinding wheel 75. It will thus be seen that the grinding wheel is carried by a suitable supporting structure for both horizontal and vertical adjustment on the vertical column supporting structure 39.

The front wall 41 of the vertical column 39 is provided with an opening 77 therein adjacent to the table top 7 and the back wall 43 of the column 39 is provided with an opening 79. The vertical column 39 provides a receptacle into which sand ground from the core on the turntable 7 will be directed, as will hereinafter appear. The upper portion of the vertical column 39 is closed by means of a suitable closure plate or the like 81, so that sand cannot flow upwardly into the gear train 57 and housing 49. A filter 83 closes the opening 79 in the back wall 43 of the vertical column, and a bonnet or enclosure 85 encloses the filter 83 and is connected with the back wall of the vertical column. The bonnet 85 may be connected with the vertical column 39 in any suitable manner, and preferably is connected therewith so as to be detachable therefrom. The bonnet 85 supports the filter 83 in the proper position to close the opening 79. An exhaust blower 87 is provided adjacent the machine, which is driven by a suitable motor 89. The blower 87 is connected with the bonnet 85 through suitable conduit means 91 and the blower is connected at its outlet side with a dust collector 95, which may be of any suitable type.

When the machine is in operation so that a core supported on a rotatable table 7 is being ground, the exhaust blower 87 will create a draft which will cause the sand and silica dust ground from the core to flow through the opening 77 in the front wall of the vertical column 39, and will cause the silica dust to flow through the filter 83 and into the bonnet 85, while the filter will prevent the passage of the sand therethrough so that the sand will drop down into the bottom of the vertical column. The blower will draw the silica dust from the bonnet 85 through the conduit 91, and discharge it into the dust collector 95, so that it will not circulate into the atmosphere, so as to affect the health of the operator of the machine, and also so that it is separated from the sand and the sand in the vertical column receptacle will be clean and reusable. In order to positively insure that the sand or silica dust will flow into the vertical column, a sheet metal cover or closure 97 is provided, which surrounds the portions of the work table remote from the vertical column opening 77 but which is, of course, suitably constructed so as not to interfere with movement of the grinding wheel 75 or positioning of the core on the work table 7. The cover or closure 97 is supported on the base by suitable supporting structure 99, and a baffle element 101 is disposed below the work table 7, adjacent the vertical col-

4

umn, for directing any sand which falls from the table into the vertical column receptacle through an opening 103 in the wall 41, below opening 77.

While the sand may be removed from the vertical column receptacle in many ways, such as by removing the bonnet 85 and filter 83 and shovelling the sand from the receptacle, a novel, simple and efficient arrangement for removing the sand is illustrated, which includes a vertically extending pipe 101, the lower end of which is disposed adjacent the bottom 47 of the receptacle. Extending across the top of the pipe 101 and communicating therewith is a transversely extending conduit 103, one end of which is connected to a suitable high pressure air supply source 105, and the opposite end of which is disposed adjacent a wheelbarrow 107, or the like, positioned adjacent to the machine. The flow of air across the top of the pipe 101 will cause the sand to flow upwardly through the pipe 101 and be carried in the air stream to the wheelbarrow 107, from whence it may be removed in any conventional manner.

It will thus be seen that the device of this invention provides a novel, positive and simple arrangement for removing the silica dust from the sand and for removing the sand from the receptacle so that it may be reused. At the same time the sand and dust are prevented from flowing into the area adjacent the machine, or on the operating parts of the machine itself. It will also be appreciated that a novel and simple structure is provided for rotatably supporting the work table on which the core is mounted, and the entire machine provides a more efficient and desirable arrangement for grinding sand cores and the like than any heretofore developed.

What is claimed is:

1. A machine for grinding sand cores of the type containing silica dust, including a supporting base structure, a work table rotatably supported on said base structure for supporting a core to be ground, structure forming a hollow vertical column extending upwardly from said base structure adjacent said work table, a housing, means supporting said housing for movement on the upper portion of said vertical column, means connected with said housing for supporting a grinding wheel in position for engagement with a core on the work table, the wall portion of said vertical column adjacent said work table having an inlet opening therein, a wall portion of said vertical column spaced from said first opening having an outlet opening therein, said vertical column providing, between said openings, a receptacle for sand ground from said core, means closing the upper end of said vertical column above said openings to prevent sand from passing upwardly into said housing, filter means closing said outlet opening of the type which will permit silica dust to pass therethrough and prevent sand from passing therethrough, and exhaust blower means connected with said receptacle openings for drawing sand ground from a core through said first opening and into the receptacle and for drawing silica dust through said filter means, while the sand remains in the receptacle.

2. A machine for grinding sand cores of the type containing silica dust, including a supporting base structure, a work table rotatably supported on said base structure for supporting a core to be ground, structure forming a hollow vertical col-



umn extending upwardly from said base structure adjacent said work table, a housing, means supporting said housing for movement on the upper portion of said vertical column, means connected with said housing for supporting a grinding wheel in position for engagement with a core on the work table, the wall portion of said vertical column adjacent said work table having an inlet opening therein, a wall portion of said vertical column spaced from said first opening having an outlet opening therein, said vertical column providing, between said openings, a receptacle for sand ground from said core, means closing the upper end of said vertical column above said openings to prevent sand from passing upwardly into said housing, filter means closing said outlet opening of the type which will permit silica dust to pass therethrough and prevent sand from passing therethrough, and exhaust blower means connected with said receptacle openings for drawing sand ground from a core through said first opening and into the receptacle and for drawing silica dust through said filter means, while the sand remains in the receptacle, and closure means connected with said supporting base structure and surrounding a portion of said work table remote from said receptacle first opening so as to prevent sand ground from a core from being thrown outwardly from said table away from said receptacle and into the atmosphere.

3. A machine for grinding sand cores of the type containing silica dust, including a base supporting structure, a work table disposed above said base structure for supporting a core to be ground, means rotatably supporting said table on said base structure, structure forming a hollow vertical column supported on and extending upwardly from said base structure adjacent to and behind said work table, housing means supported on said vertical column structure above said work table, means for adjusting said housing means relative to said vertical column including an operating handle connected with a shaft projecting through one side of said vertical column structure, structure mounted on said housing means for adjustably supporting a grinding wheel, said housing means and grinding wheel supporting structure being adjustable to position the grinding wheel for engagement with a core on the work table, the front wall of said vertical column structure adjacent said work table having an opening therein through which sand ground from said core may pass, the opposite wall of said vertical column structure having an opening therein, said vertical column structure between said openings and below said handle shaft providing a receptacle adapted to receive and support ground sand, means closing the upper portion of said vertical column below said housing means, a filter closing said second opening and adapted to permit silica dust to pass therethrough but to prevent the passage of sand therethrough, bonnet means connected with said vertical column structure opposite wall and enclosing said filter, exhaust blower means connected with said bonnet means and adapted to draw sand ground from the core

through said vertical column first opening and into the receptacle and to draw the silica dust through the filter while the sand remains in the receptacle.

4. A machine for grinding sand cores of the type containing silica dust, including a base supporting structure, a work table disposed above said base structure for supporting a core to be ground, means rotatably supporting said table on said base structure, structure forming a hollow vertical column supported on and extending upwardly from said base structure adjacent to and behind said work table, housing means supported on said vertical column structure above said work table, means for adjusting said housing means relative to said vertical column including an operating handle connected with a shaft projecting through one side of said vertical column structure, structure mounted on said housing means for adjustably supporting a grinding wheel, said housing means and grinding wheel supporting structure being adjustable to position the grinding wheel for engagement with a core on the work table, the front wall of said vertical column structure adjacent said work table having an opening therein through which sand ground from said core may pass, the opposite wall of said vertical column structure having an opening therein, said vertical column structure between said openings and below said handle shaft providing a receptacle adapted to receive and support ground sand, means closing the upper portion of said vertical column below said housing means, a filter closing said second opening and adapted to permit silica dust to pass therethrough but to prevent the passage of sand therethrough, bonnet means connected with said vertical column structure opposite wall and enclosing said filter, exhaust blower means connected with said bonnet means and adapted to draw sand ground from the core through said vertical column first opening and into the receptacle and to draw the silica dust through the filter while the sand remains in the receptacle, a conduit supported in said receptacle and having its lower end adjacent the bottom of said receptacle, and means connected with the upper end of said conduit for withdrawing sand from said receptacle through said conduit.

CLARENCE H. MILLER.

#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

Number	Name	Date
276,879	Randolph	May 1, 1883
1,003,099	Freeman	Sept. 12, 1911
1,262,529	Lowe	Apr. 9, 1918
1,392,325	Hanson	Oct. 4, 1921
1,424,713	Coburn	Aug. 1, 1922
1,493,394	Leon	May 6, 1924
1,528,439	Leiman	Mar. 3, 1925
1,642,171	Reavis	Sept. 13, 1927
1,986,378	Smith	Jan. 1, 1935
2,216,693	Monroe	Oct. 1, 1940