A. E. SPARROW.

TUBE MILL CEMENT FEEDER.

APPLICATION FILED JAN. 17, 1910.

967,075.

Patented Aug. 9, 1910.

3 SHEETS—SHEET 1.

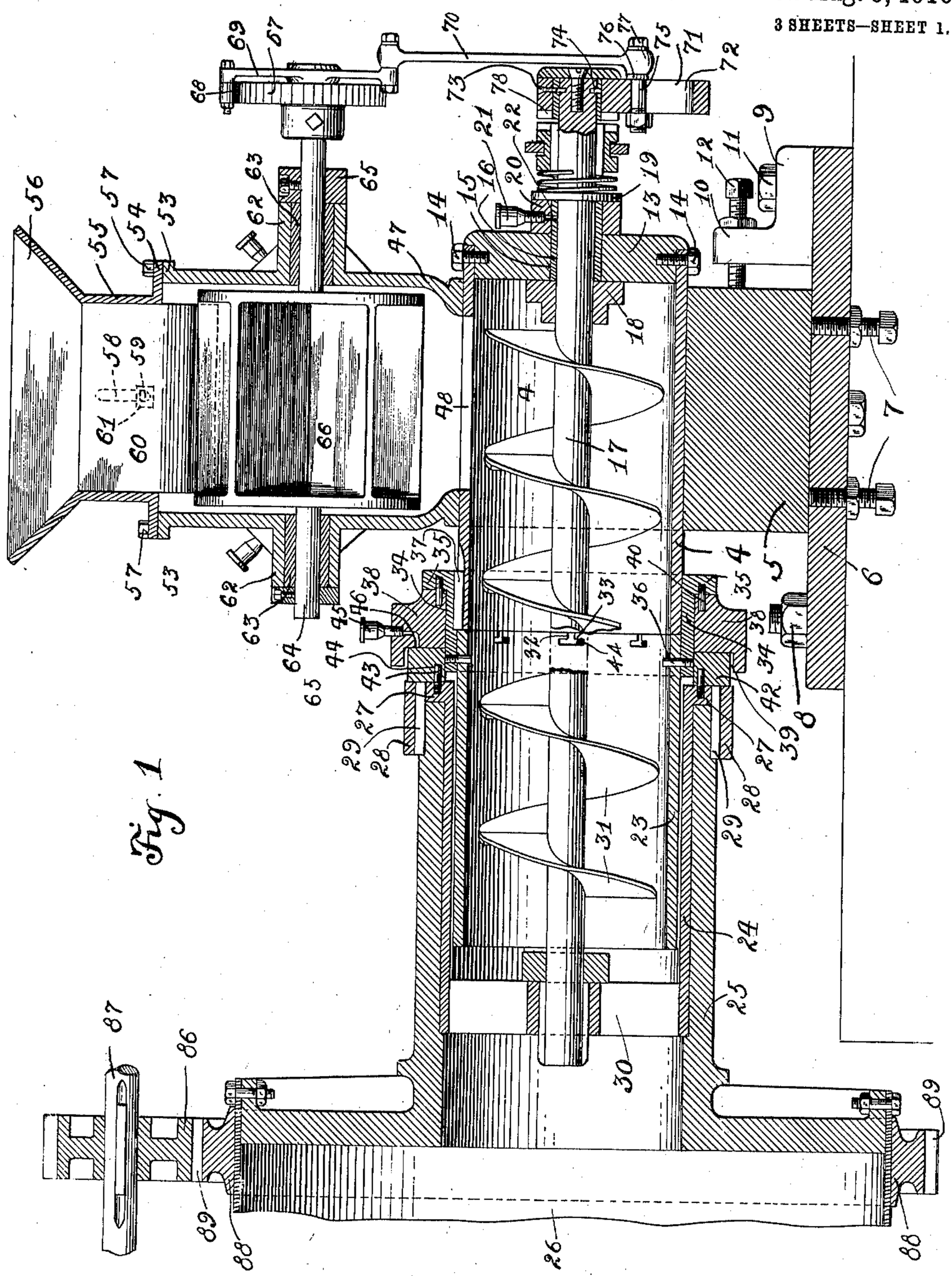

Fig. 1.

Witnesses

J. Milton Jester

B. B. Fishburne

Inventor

Arthur E. Sparrow,

By C. L. Parker,

Attorney

A. E. SPARROW.

TUBE MILL CEMENT FEEDER.

APPLICATION FILED JAN. 17, 1910.

967,075.

Patented Aug. 9, 1910.

3 SHEETS—SHEET 2.

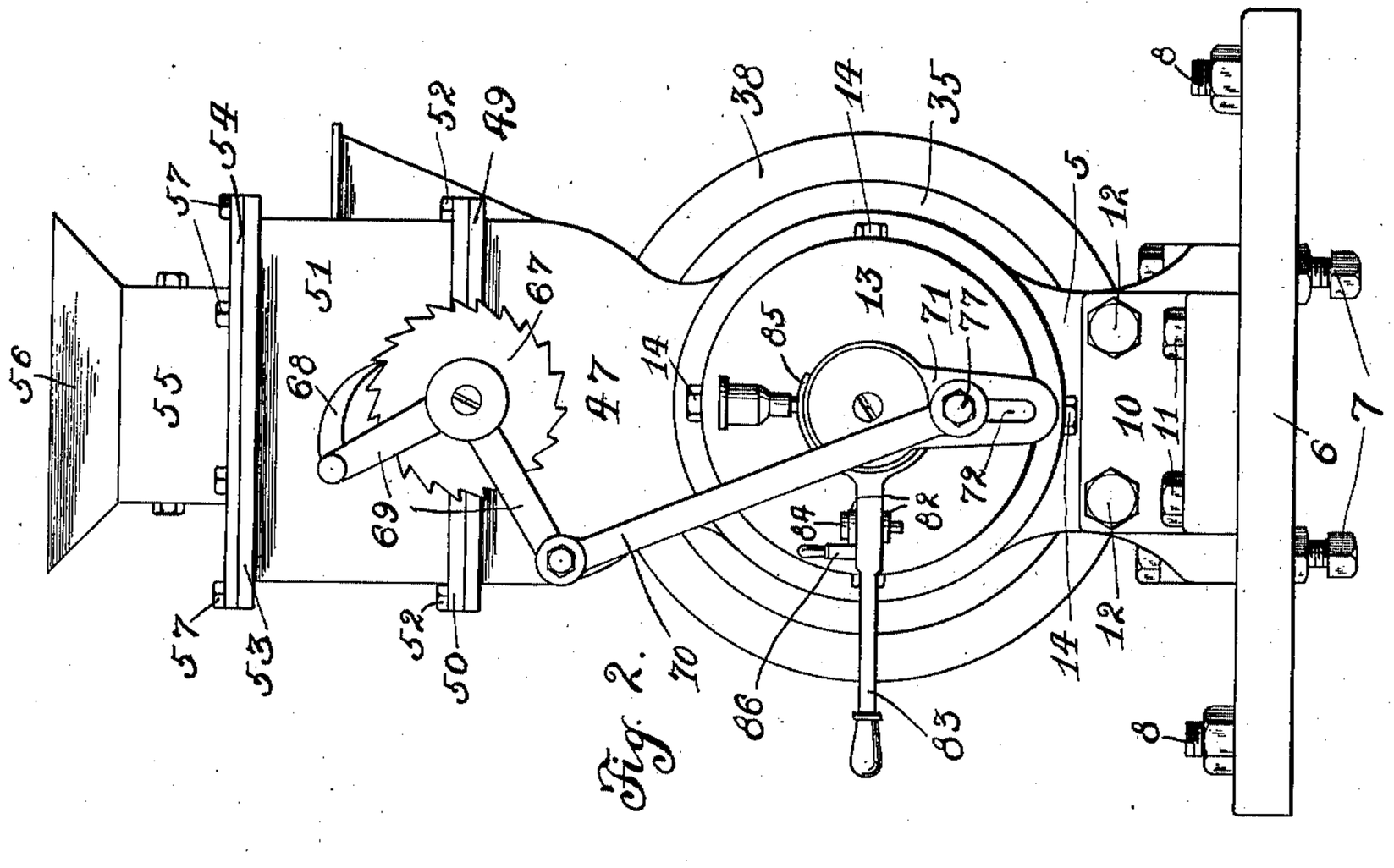

Fig. 2.

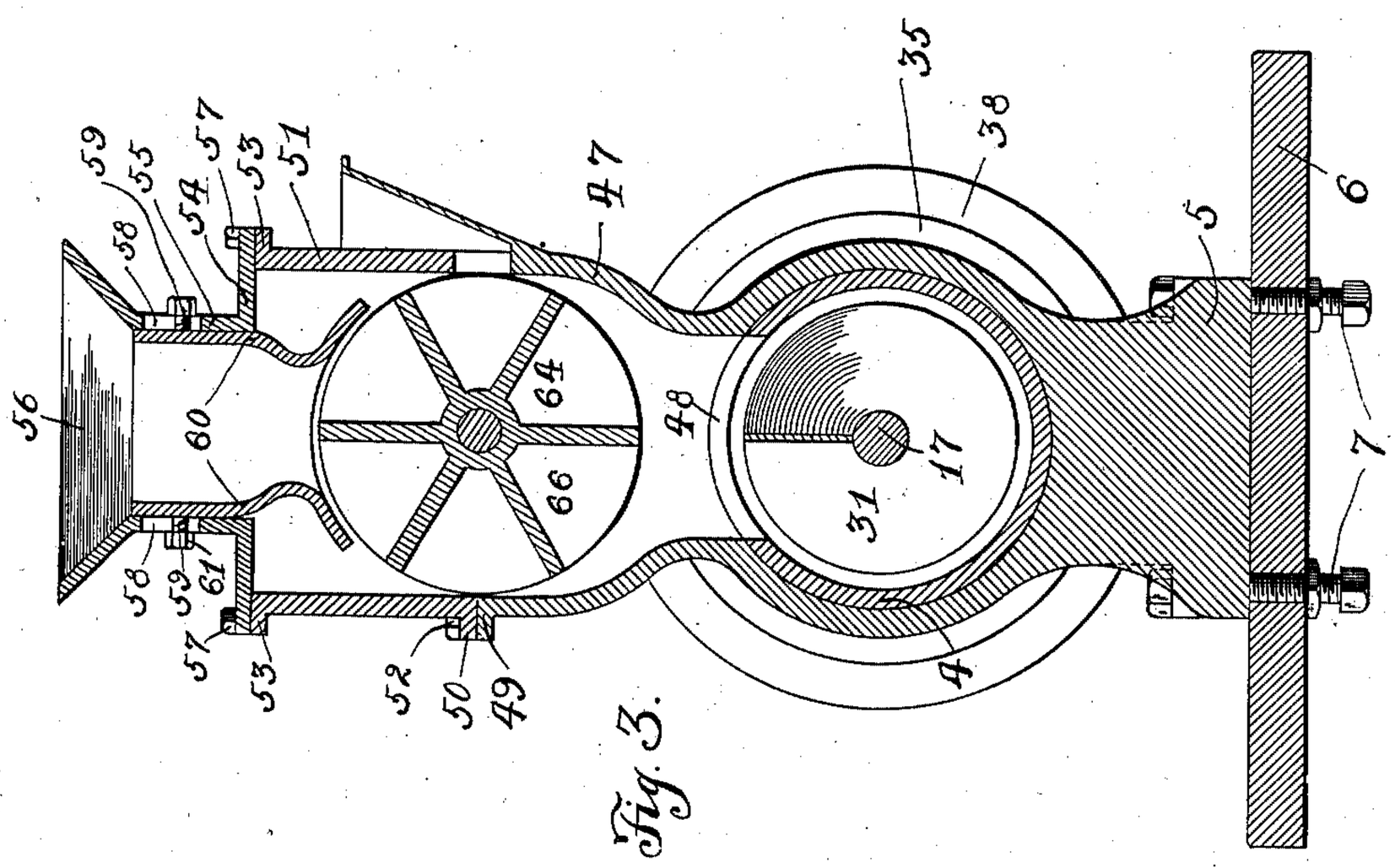

Fig. 3.

Witnesses

J. Milton Jester

B. P. Fishburne

Inventor

Arthur E. Sparrow,

By C. L. Parker, Attorney

A. E. SPARROW.

TUBE MILL CEMENT FEEDER.

APPLICATION FILED JAN. 17, 1910.

967,075.

Patented Aug. 9, 1910.

3 SHEETS—SHEET 3.

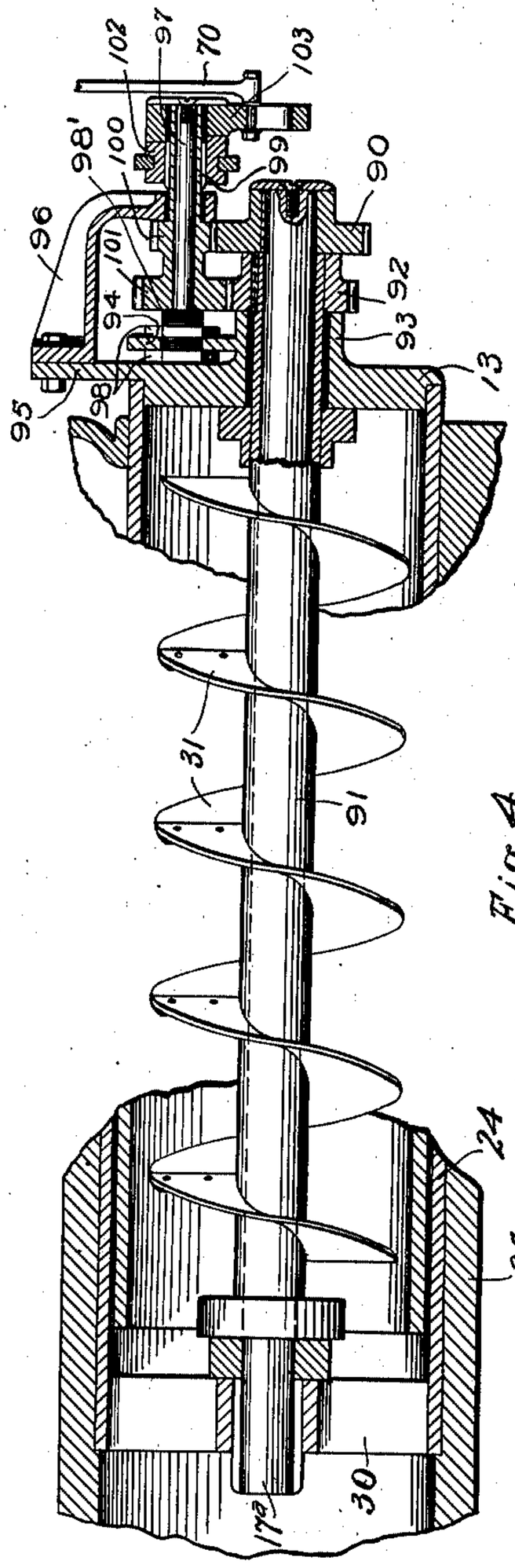

Fig. 4

Witnesses

L. S. Freeman.

B. P. Fischbourne

Inventor

Arthur E. Sparrow,

By C. L. Parker.

Attorney

UNITED STATES PATENT OFFICE.

ARTHUR E. SPARROW, OF SOUTH CHICAGO, ILLINOIS.

TUBE-MILL CEMENT-FEEDER.

967,075. Specification of Letters Patent. Patented Aug. 9, 1910.

Application filed January 17, 1910. Serial No. 538,523.

To all whom it may concern:

Be it known that I, ARTHUR E. SPARROW, a citizen of the United States, residing at South Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tube-Mill Cement-Feeders, of which the following is a specification.

My invention relates to tube mill cement feeders, and more particularly to certain new and useful improvements in the Patent No. 938,176, granted to me October 26, 1909.

The object of my invention is to provide a simple and inexpensive machine of the above character, and in which the parts may be readily replaced or removed for cleaning.

In the accompanying drawing forming a part of this specification, and in which like numerals are used to designate like parts throughout the same Figure 1 is a vertical longitudinal sectional view, of my improved apparatus. Fig. 2 is an end view of the same. Fig. 3 is a vertical cross-sectional view taken through the portion of my device equipped with a hopper. Fig. 4 is a partial sectional view of a slightly modified form of my invention, parts thereof being broken away.

In the preferred embodiment of my invention, as illustrated, 4 designates a conveyer cylinder which is suitably rigidly mounted upon a supporting block 5, arranged upon a supporting plate 6. The supporting block 5 is adapted to be vertically adjusted by means of the screw-threaded bolts 7 which extend vertically through the supporting plate 6. The supporting plate 6 is provided near its rear end adjacent its opposite sides with bolts 8, which securely hold the supporting plate 6 to its foundation. At the forward end of the supporting plate 6, there is arranged an angle bracket comprising horizontal and vertical sides 9 and 10 respectively. The horizontal side 9 is secured to the supporting plate 6 by means of suitable bolts as illustrated at 11. Horizontally disposed bolts 12 are screw-threaded through the vertical side 10 and are adapted to engage the supporting block 5 for preventing the longitudinal displacement of the same. The conveyer cylinder 4 has its forward end closed by means of a head 13, which is secured to said cylinder by means of bolts 14. The head 13 is provided centrally thereof with a cylindrical opening 15 within which is arranged a cylindrical tubular bearing 16, adapted for the reception of a conveyer shaft 17. Within the conveyer cylinder 4 adjacent the head 13, the conveyer shaft 17 is provided with a collar 18 which is fixedly secured to said shaft, and the shaft 17 is provided adjacent the forward end of the bearing 16 with a ring or collar 19. Disposed between the ring 19 and the head 13, is a collar 20 which surrounds the bearing 16 and is provided with an oil can 21 which communicates by means of opening 22 passing through said collar 20 and bearing 16 with the shaft 17, as clearly illustrated in Fig. 1.

Adjacent the rear end of the conveyer cylinder 4 is arranged a corresponding cylinder 23 disposed in end to end relation thereto and registering with said cylinder 4. The cylinder 23 is removable from the cylinder 4 and is connected thereto in a manner to be hereinafter described. The cylinder 23 is arranged within a cylindrical sleeve 24, which in turn is arranged within a reduced end or neck 25 of a rotatable tube mill 26. The cylindrical sleeve 24 has its forward end bent to form a vertical portion 27 and a horizontal portion 28, which are integral with the sleeve 24. The end of the neck 25 is adapted to fit between the horizontal portion 28 and the sleeve 24, and said neck 25 is keyed to the horizontal portion 28 by means of the keys 29. The cylindrical sleeve 24 is thus rotatable in connection with the neck 25 and is rotatably mounted upon the cylinder 23. Within the sleeve 24 adjacent its rear end, is arranged a spider 30, which is splined to the rear end of the conveyer shaft 17, upon which is suitably secured a spiral conveyer 31. This spider 30 is rigidly secured to the sleeve 24 by any suitable means.

I will now proceed to explain the manner in which the cylinders 23 and 4 are connected. The cylinder 23 is provided at its forward end with a plurality of longitudinally disposed slots 32 which extend rearwardly and communicate with slots 33, which are arranged at right angles to the slots 32. Arranged at the junction of the cylinders 4 and 23 is a cylindrical collar 34, which has its forward end provided with a peripheral flange 35. The collar 34 is provided near its rear end with a plurality of pins 36 which are adapted to register with the slots 32, and be introduced into the slots 33 by means of a longitudinal movement of

said pins through the slots 32. By this construction it is obvious that the pins 36 may be arranged within one end of the slots 33, by slightly rotating the sleeve 34 after said pins have been introduced within said slots 33, and that the pins 36 will thus be prevented from being withdrawn through the slots 32. After the pins 36 have been arranged at one end of the slots 33 and the collar 34 accordingly locked to the cylinder 23, I prevent further rotation of the collar 34 by keying the same to the cylinder 4, as shown at 37. Arranged upon the collar 34 and in engagement with the flange 35 thereof, is a circular ring 38 provided upon its rear end with a cut out portion 39. The flange 35 of collar 34 is provided with a plurality of pins 40, which register with and are adapted to be inserted within openings 41 formed upon the forward end of the ring 38. The ring 38 is thus non-rotatable with relation to the collar 34 and the conveyer cylinder 4. Arranged within the cut out portion 39 of the ring 38, is a bearing ring 42 which engages the forward end of the sleeve 24. The vertical portion 27 of the sleeve 24 is provided with a plurality of pins 43 which extend within openings 44 formed upon the rear end of the ring 42. The ring 42 is thus caused to rotate with the sleeve 24. An oil cup 45 is arranged upon the ring 38 and communicates with the engaging surfaces of the ring 42 and ring 38, by means of a channel 46.

From the construction above described, it is to be understood that when the key 37 is removed, the collar 34 may be rotated so that the pins 36 may be withdrawn through the slots 32, whereby the cylinders 23 and 4 are disconnected. It is to be further understood, that the flange 35 may be withdrawn from the ring 38 and the ring 42 may be moved forwardly away from the sleeve 24. It is to be understood that the greatest amount of wear caused by frictional engagement of the parts of the device will naturally fall upon the cylinder 23 and the bearing ring 42. It is obvious by the above described construction that the cylinder 23 and ring 42 may be readily removed and renewed when necessary. It is to be understood that the bearing ring 42 may be formed in two parts, which will expedite the removal of the same.

At the forward end of the conveyer cylinder 4, and upon the upper side thereof, is formed a chute 47, which communicates with the conveyer cylinder by means of the opening 48. The upper end of the chute 47 is flanged as at 49, for the purpose of receiving thereupon the lower flanged end 50 of a hopper 51, the flanges 49 and 50 being secured together by means of suitable bolts 52. The upper end of the hopper 51 is provided with the outwardly extending flange 53, upon which is arranged the base 54 of a feed chute 55, provided upon its upper end with an outwardly spreading mouth 56. The base 54 is secured upon the flange 53 by means of bolts 57. Opposite sides of the feed chute 55 are provided with alined vertical slots 58, within which are arranged screw-threaded projections 59 formed upon an adjustable guard 60, and the projections 59 are provided with nuts 61, whereby the guard 60 may be clamped in its adjusted position. The flanges 49 and 50 of the chute 47 and hopper 51 respectively, are extended upon opposite sides of the chute to form alined sleeves 62, within which are arranged bearings 63, through which is journaled a shaft 64, which is arranged parallel with the conveyer cylinder 4. The shaft 64 is provided with rings 65 fixedly secured thereto which prevent the longitudinal displacement of the shaft, and the shaft 64 is further provided with a fixed rotary feed valve 66, which is disposed within the hopper 51 and chute 47. Near the forward end of the shaft 64 is arranged the ratchet wheel 67, which is rigidly mounted thereon, and which is engaged by a pawl 68 pivotally mounted upon one arm of a bell-crank lever 69. The bell-crank lever 69 is loosely mounted upon the shaft 64, and has pivotally connected to its lower arm an actuating rod 70. Rotatably mounted upon the forward end of the shaft 17, is a crank 71, provided with a longitudinal slot 72. The crank 71 is prevented from having longitudinal movement upon the shaft 17, by means of a pin 73 which extends through a portion of said crank and has its inner end arranged within a peripheral groove 74 upon the shaft 17. The actuating rod 70 has its lower end provided with a rotatable pin 75, said pin 75 being provided with a rigid collar 76. The pin 75 is extended beyond the collar 76 and is arranged within the slot 72. The pin 75 may be thus adjusted longitudinally of the crank 71, and said pin 75 is provided with a nut 77 for clamping the same in a desired position upon the crank 71.

The numeral 78 designates a clutch splined upon the conveyer shaft 17 and provided with a clutch face, for coöperation with a clutch face 80 formed upon the crank 71. The clutch 78 is urged into engagement with the crank 71, by means of a coil spring 81, which surrounds the shaft 17 and is compressed between the ring 19 and clutch 78. The head 13 of the conveyer cylinder 4 is provided with a forwardly extending support provided with a bifurcated free end 82, upon which is pivotally mounted a shifting lever 83, by means of a pin 84. The inner end of the shifting lever 83 has formed thereon a curved section 85, which is adapted to be arranged within a circumferential groove 86 formed upon the clutch 78. It is

thus obvious that the crank 71 may be locked to the shaft 17, by means of the clutch 78, which in turn is controlled by the shifting lever 83. The lever 83 may be held in a desired position by means of a latch device 85.

Briefly the operation of the device is as follows:—Material being fed into the hopper 51, the same is conducted by the rotary feed valve 66 to the conveyer cylinder 4. The material is then carried by the conveyer 31 to the tube mill 26, which rotates the conveyer 31 and which is in turn rotated by a driving pinion 86ª which is keyed upon a shaft 87, and arranged to mesh with a ring 88 provided with teeth 89. It is obvious that the feed valve 66 is rotated intermittently and that such rotation may be regulated by adjusting the pin 75 in the slot 72 as above described.

I have found that it is advantageous to have the spiral conveyer illustrated in Fig. 1 rotated at a greater rate of speed than the reduced neck 25 by which said conveyer is rotated. To accomplish this result, I employ the arrangement of elements illustrated in Fig. 4. In the form of my invention illustrated in Fig. 4, the shaft 17ª is keyed in the same manner to the spider bearing 30 which is rigidly connected to the sleeve 24 as above described. The shaft 17ª extends through an opening 15 in the head 13, and the shaft 17ª is provided upon its forward end with a rigidly mounted pinion 90. In this form of my invention the spiral conveyer blade 31 is rigidly secured to a tubular sleeve 91, which is rotatably mounted upon the shaft 17 and journaled through the head 13. The tubular sleeve 91 terminates adjacent the pinion 90 and is provided at its forward end with a fixed pinion 92. By reference to Fig. 4 it is obvious that the pinion 92 is smaller than the pinion 90, for a purpose to be hereinafter apparent.

In the modified form of my invention as shown in Fig. 4, the head 13 is provided with an extension 93 upon the upper side of which is formed an upstanding arm 94 which is spaced away from the head 13. The head 13 is further provided upon its periphery with an upstanding section 95 to which is rigidly connected an angular bracket 96. A shaft 97 is provided with an enlarged screw-threaded end 98′ which is arranged within an opening formed upon the arm 94, and the enlarged screw-threaded end 98′ is locked upon the said arm 94 by means of nuts 98. The shaft 97 extends through an opening formed upon the vertical portion of the support 96, and the shaft 97 is parallel with the shaft 17, and said shaft 97 carries a cylindrical sleeve 99 which is rotatably mounted thereon. The sleeve 99 has formed integral therewith a small and larger pinion 100 and 101 which are accordingly rotatably mounted upon the shaft 97 and meshed with the large and smaller pinions 90 and 92 respectively. The cylindrical sleeve 99 is journaled through the opening in the vertical portion of the angular support 96, as illustrated in Fig. 4. The clutch 78, which in Fig. 1 is keyed upon the shaft 17, is in Fig. 4, keyed upon the sleeve 99 and is designated by the numeral 102. The clutch 102 is adapted to engage a crank 103 rotatably mounted upon the sleeve 99 and which corresponds to the crank 71, shown in Fig. 1. The connecting rod 70 is connected to the crank 103 in the same manner as it is connected to crank 71 and therefore need not be explained again.

In the operation of the modified form of my invention, the shaft 17ª is rotated at the same rate of speed as reduced neck 25, and the rotation of the shaft 17ª is imparted to the pinion 90. The pinion 90 rotates the smaller pinion 100 which accordingly rotates the sleeve 99 and the pinion 101. It is obvious that the rotation of the pinion 101 will be faster than the rotation of the pinion 90. The pinion 101 then rotates a smaller pinion 92 which in turn operates the spiral conveyer. It is thus obvious that the conveyer derives its rotation from the reduced neck 25 and that said conveyer is rotated at a higher rate of speed than said neck 25. It is to be understood that the feed valve 66 is actuated by the connecting rod 70 in the manner above described in connection with the first form of my invention. It is also to be understood that the rate of rotation of the sleeve 91 and the spiral conveyer 30 may be varied by varying the relative sizes of the pinions 90, 100, and 92, 101.

Having fully described my invention, I claim:

1. In a device of the character described, the combination with a reduced extension of a rotatable mill casing, of a stationary conveyer cylinder of coöperation therewith, a second cylinder arranged to register with said conveyer cylinder, said second cylinder extending within said reduced neck, and a conveyer arranged within said cylinders.

2. In a device of the character described, the combination with a rotatable mill casing provided with a reduced extension, of a stationary conveyer cylinder for coöperation therewith, a cylinder arranged in engagement with and in end to end relation to said conveyer cylinder, a collar for retaining said cylinders in registration, said second named cylinder being arranged within said reduced extension, a conveyer arranged within said cylinders, means for imparting rotation from said reduced extension to said conveyer, and means for locking said collar to said second named cylinder.

3. In a device of the character described, the combination with a rotatable mill casing

provided with a reduced extension, of a stationary conveyer cylinder for coöperation therewith, a cylinder arranged in engagement with and in end to end relation to said conveyer cylinder, a collar for retaining said cylinders in registration, a sleeve arranged within said reduced extension, said second named cylinder being arranged within said sleeve, means for locking said sleeve to said reduced extension, means for locking said collar to said second named cylinder, a conveyer arranged within said cylinders, and means for rigidly connecting said conveyer with said sleeve.

4. In a device of the character described, the combination with a rotatable mill casing provided with a reduced extension, of a stationary conveyer cylinder for coöperation therewith, a cylinder arranged in engagement with and in end to end relation to said conveyer cylinder, a collar for retaining said cylinders in registration, a sleeve arranged within said reduced extension, said second named cylinder being arranged within said sleeve, means for locking said sleeve to said reduced extension, means for locking said collar to said second named cylinder, rings arranged upon said collar for coöperation with said sleeve, a conveyer arranged within said cylinders, and means for rigidly connecting said conveyer with said sleeve.

5. In a device of the character described, the combination with a rotatable mill casing provided with a reduced extension, of a stationary conveyer cylinder for coöperation therewith, a cylinder arranged to register with said conveyer cylinder, means for normally retaining said cylinders in registration, said second named cylinder being arranged within said reduced extension, a rotatable conveyer arranged within said cylinders, and means whereby said conveyer may be rigidly connected to said reduced extension.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR E. SPARROW.

Witnesses:

JNO. W. STONE,

WALTER WILLIS.