(No Model.) 3 Sheets—Sheet 1.

W. D. SHERMAN.

SEWER PIPE AND DRAIN TILE MACHINE.

No. 462,597. Patented Nov. 3, 1891.

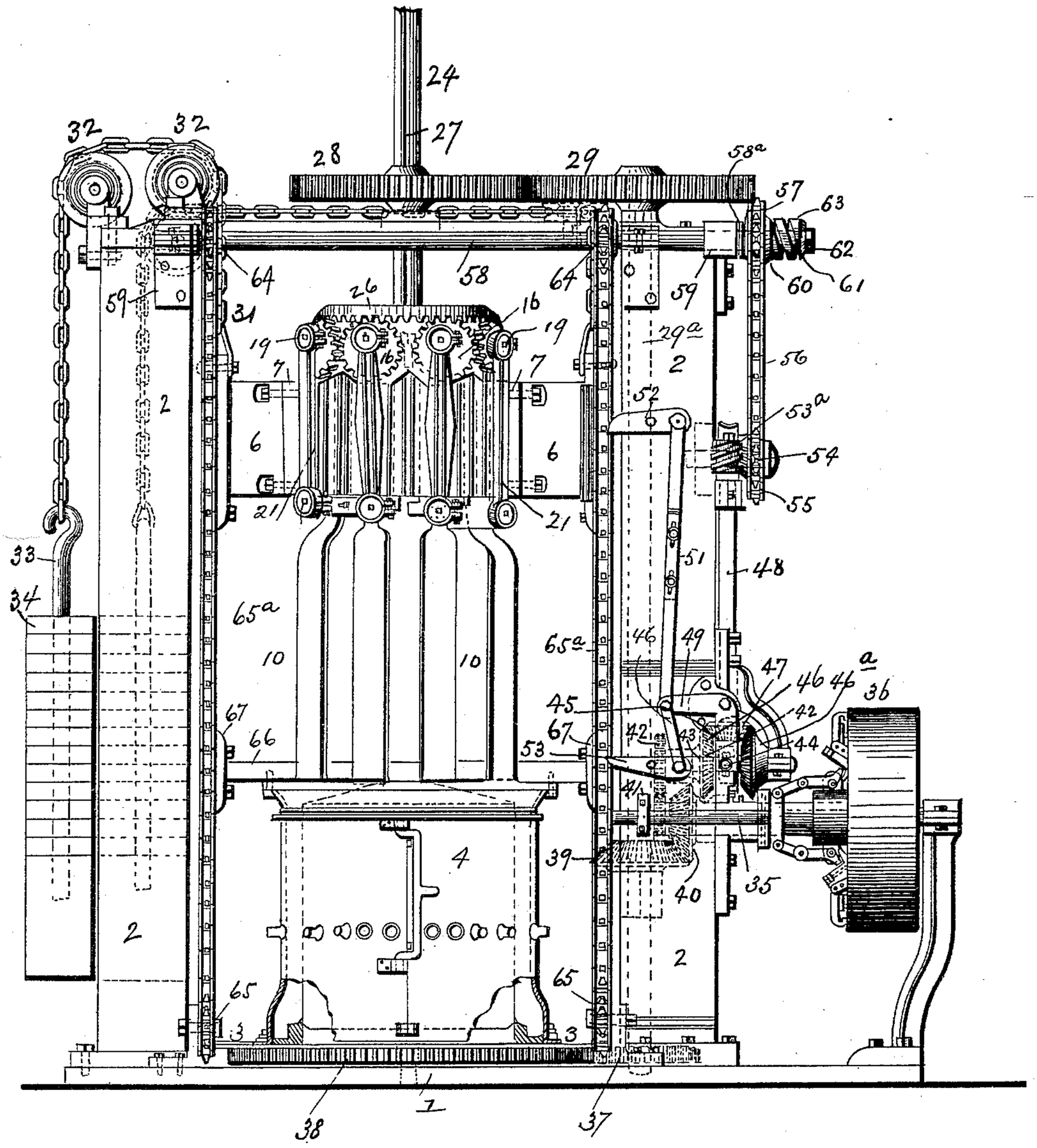

Fig. 1.

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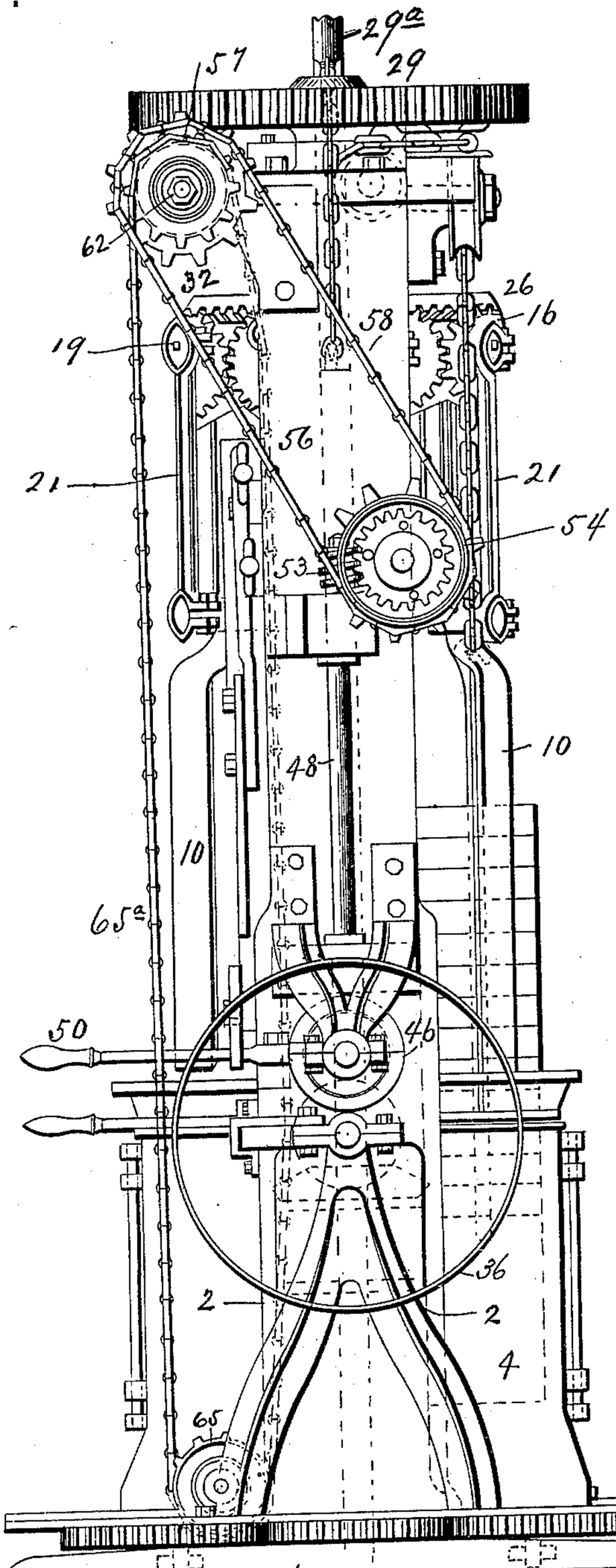

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

W. D. SHERMAN.

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Fig. 3.

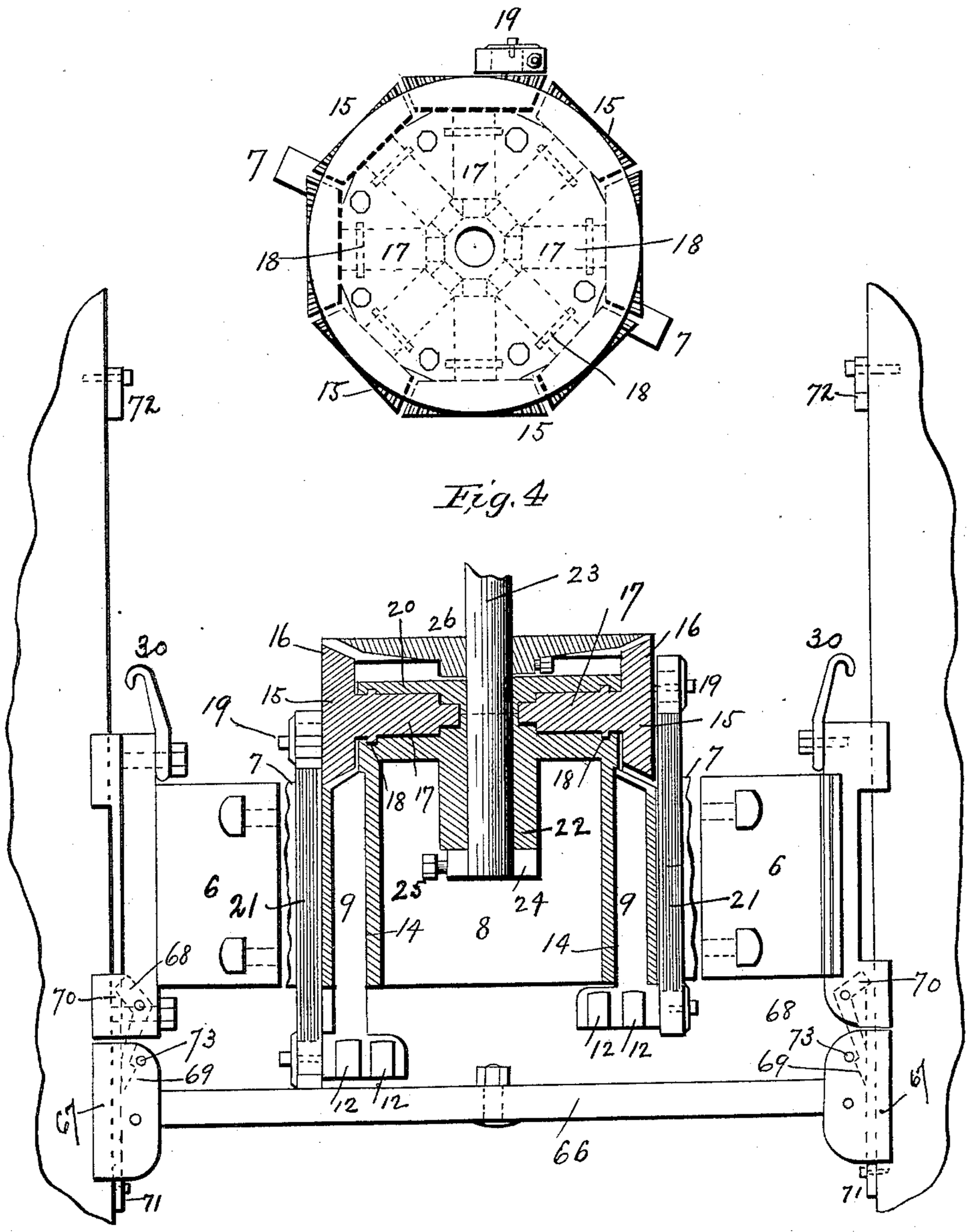

Fig. 4

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UNITED STATES PATENT OFFICE.

WILLIS D. SHERMAN, OF OMAHA, NEBRASKA, ASSIGNOR TO THE UNION HYDRAULIC DRAIN TILE COMPANY, OF SAME PLACE.

SEWER-PIPE AND DRAIN-TILE MACHINE.

SPECIFICATION forming part of Letters Patent No. 462,597, dated November 3, 1891.

Application filed December 11, 1890. Serial No. 374,357. (No model.)

To all whom it may concern:

Be it known that I, WILLIS D. SHERMAN, a citizen of the United States, and a resident of Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Sewer-Pipe and Drain-Tile Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain improvements in sewer-pipe or drain-tile machines, and is designed as an improvement upon the invention disclosed in Letters Patent granted to me in September 3, 1889, No. 410,455. In said Letters Patent the sewer-pipe or drain-tile, composed of concrete or cement or other material, is formed upon a revolving table by means of tamping-bars, which are connected with a vertically-movable drum or cylinder, the said tamping-bars being reciprocated vertically within a mold secured to said table, whereby the concrete or cement is compacted into a homogeneous mass.

The object of the present invention is to improve the construction of the drum or cylinder which carries the tamping-bars and the devices by which said tamping-bars are actuated. It is also the purpose to improve the construction of the machine generally, whereby superior advantages are obtained with respect to simplicity of the parts composing the same and the mode or manner of operation.

The invention consists in the novel features of construction and new combination of parts hereinafter fully described, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a front elevation of a sewer-pipe tile or drain-pipe machine constructed in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view of the drum or cylinder which carries the tamping-bars. Fig. 4 is a vertical central section of the said drum or cylinder, also showing portions of the machine in elevation.

In the said drawings, the reference-numeral 1 designates the base of the machine, to which are bolted or otherwise secured the lower ends of two columns or supports 2 2, said columns being preferably hollow and provided at their lower ends with flanges, by means of which they can be better secured to the base. A table 3 is pivotally secured to the base centrally between the columns, so that the pipe as it is being formed within the shell 4 upon the table may be slowly revolved or rotated under the ends of the stampers or tamping-bars of the tamping mechanism above the table. The outer portion of the table is supported upon rollers, which are journaled in suitable bearings in the base 1. To prevent the accumulation of sand or cement upon the base and table as the machine is operated they are cut away in any suitable manner to permit the material to pass through them, but not in such a manner as to interfere with the formation of the pipe, all as set forth in my Letters Patent before referred to.

The tamping mechanism, which moves up and down in guides upon the inner faces of the columns 2 2, consists of a frame composed of two yokes 6 6, bolted or otherwise secured to vertical extensions 7 of the drum or cylinder 8, which carries vertically-reciprocating slide-bars 9, to which the tamping-bars 10 are connected, said slide-bars being provided with radial recesses 12 for the reception of the upper ends of said tamping-bars. The object of having a plurality of these slots in each slide-bar is that the tamping-bars may be shifted so to conform to varying diameters of molds, whereby different diameters of pipe may be made. These slide-bars 9 work in vertical recesses 14 in said drum or cylinder. I have illustrated eight slide-bars as being employed; but it is obvious that the number may be varied without departing from the invention. Mounted in the upper part of the head or cylinder is a series of bevel gear-wheels 15, corresponding in number with the slide-bars. These bevel gear-wheels consist of the cogged head 16, shaft 17, having peripheral flange 18, and crank-pins 19, preferably all cast of a single piece of steel, and they rest and work in radial slots or grooves in said drum or cylinder and are held in place

by means of the radially-grooved plate 20, secured to the head and cylinder. The grooves in the said plate and drum correspond in shape with the shaft 17 and flange 18, so that when in proper position they will closely embrace the same, forming bearings therefor. Pivoted to the crank-pins 19 of said wheels are the rods 21, the lower ends of which are pivoted to the slide-bars 9. Passing centrally through the hub 22 of the drum or cylinder, Fig. 4, is a rotating shaft 23, having at its lower end a collar 24, secured thereto by a set-screw 25. This shaft carries a crown-wheel 26, which meshes with the bevel-gears 15, and is provided with a feather which works in a vertical groove 27, Fig. 1, in said shaft, so that as the latter is rotated the crown-wheel is also rotated, which in turn rotates the bevel-gears to actuate the crank-rods, slide-bars, and tamping-bars. This shaft passes through the cross plate or piece connecting the upper ends of the uprights and is provided with a cog-wheel 28, meshing with a similar wheel 29, carried by the vertical shaft 29[a]. (Shown in dotted lines, Fig. 1.)

Connected with hooks 30 in the yokes 6 are chains 31, which pass over sheave-wheels 32 at the upper part of the machine to one of the uprights 2, where their free ends are secured to a bar 33, which carries a number of removable weights 34, which act as counterbalances to the drum or cylinder, and by means of which the pressure of the tamping-bars can be regulated.

The numeral 35 designates the main driving-shaft journaled in one of the uprights 2 and provided with a driving-pulley 36. The lower end of the shaft 29[a] is provided with a pinion 37, which meshes with the cogged rim 38 of the revolving table 3, and also has a beveled gear 39 meshing with a similar gear 40 on the driving-shaft 35. The inner end of said driving-shaft is provided with a spur-wheel 41, which engages with a cog-wheel 42 upon a short shaft 43, which is journaled in bearings at the side of the column. A clutch-wheel 44 is secured upon the shaft by means of a pin, so that it can be moved back and forth between two bevel-wheels 46 and 46[a], which are loosely secured upon the shaft and which engage with another bevel-wheel 47 upon the lower end of a rod or shaft 48, which is journaled in bearings in the side of the column. A bell-crank lever 49 is pivotally secured to the side of the column above the clutch, having one of its ends or arms slotted and passed down over the end of a handle pivoted in front of the clutch-wheel 44, while the lower portion of a rod 51 is connected with the other end or arm of lever 49. Two short stops or levers 52 and 53 are pivoted to the side of the column, one at the upper and the other at the lower end of the rod 51, to which they are each connected at one end, while the opposite end of each of the stops projects beyond the inner side of the face-column and are engaged by the tamping mechanism as it is moved up and down. The clutch mechanism and its lever mechanism just described are similar to those shown in my patent previously referred to and are not claimed herein.

The upper end of shaft 48 is provided with a short worm or spiral gear 53[a], which engages with a worm-shaft 54, journaled in the side of the column and which carries a sprocket-wheel 55, connected by means of a sprocket-chain 56 with a loose sprocket 57 on the transverse shaft 58, journaled in bearings 59 in the upper end of the columns 2 2. The sprocket 57 is loose on shaft 58, and at one side thereof is a collar 58[a] and on the other a friction-disk 60, which is keyed on said shaft. The end of the shaft is provided with a sliding collar 61 and a screw-nut 62, and intermediate of the collar and disk is a coiled spring 63, for a purpose hereinafter explained.

Secured to the shaft 58 are two sprocket-wheels 64, which are connected with sprocket-wheels 65, journaled in the lower ends of the uprights 2 2 by means of sprocket-chains 65[a]. Each sprocket-chain is secured at one side to a vertically-movable cross-head 66, having slides 67 working in guides in the uprights 2 2. This cross-head is adapted to be connected with this core of the mold, so that as said cross-head is elevated the core will also be elevated and removed from the mold.

Pivoted to the lower part of the tamping-frame are bent pawls 68, Fig. 4, the lower ends of which are formed into hooks 69, while the upper ends 70 extend outwardly. Secured to the inner sides of the columns 2 2 are adjustable stops 71 and 72, Fig. 4, with which the ends 70 of said pawls are adapted to engage to throw the hooked ends thereof into and out of engagement with studs 73 on the slides 67 of the cross-head 66.

The operation is as follows: The mold being placed in proper position on the revolving table, the driving shaft and pulley are actuated from any suitable motor, causing the shaft 29[a] to be rotated, which will rotate said table and also the shaft 23, journaled in the drum or cylinder 8. This will cause the crown-wheel 26 to be rotated, which in turn will rotate the gear-wheels 15 and actuate the crank-rods 21. The slide-bars and tamping-bars connected with said crank-rods will consequently be reciprocated to compact and compress the concrete or other material of which the pipe is to be composed which is being fed to the mold. As the pipe is formed by the accumulation of material under the ends of the tamping-bars, the entire tamping mechanism is gradually moved or lifted upward, the slides of the yokes moving within the guides upon the inner faces of the columns. When the pipe is completed, the frame is elevated to near the top of the machine. The operator now throws this clutch-wheel 44 into engagement with one of the clutch bevel-wheels 45 or 46 and sets the shaft 58 and

sprocket-wheels 64 in motion through the medium of shaft 48, worm 53, shaft 54, sprocket-wheels 55 and 57, and sprocket-chain 56, by which the cross-piece 66 is elevated and with it the core is withdrawn from the completed pipe. When the cross-head reaches the bottom of the tamping mechanism, it carries it along up with it until the top of the frame engages with the upper stop or lever 52, and through it moves the rod 51 down, which throws the wheel out of engagement with the clutch bevel-wheel by means of the bell-crank lever. At the same time the ends 70 of the pawls 68 will strike the lugs or stops 71, which will cause their hooked ends 69 to be engaged with the studs 73 on the cross-head, so that the latter will be connected with the drum or cylinder. The shell and completed pipe are now removed from the table and an empty shell placed instead, when the core is again let down by the operator actuating the clutch-wheel, so as to bring it in engagement with the opposite bevel-wheel, which will reverse the movement of the sprocket-chains 65[a]. The tamping mechanism, being connected with the cross-head by the pawls 68 and studs 73, will be elevated with said cross-head until the lower end of the tamping mechanism strikes the lower lever 53, throwing the clutch-wheel out of mesh with the bevel-gear and stopping further downward movement of the cross-head. At the same time the ends 68 of the pawls will strike the stops 72, which will disengage the pawls from the studs 73, thus allowing the tamping mechanism to rise independently of the cross-head when another pipe or tile is being formed in the mold, as before set forth.

The object of the loose sprocket 57 and friction-disk is to prevent any breakage of the machine in case of disarrangement of the cross-head, as by means of the coiled spring 63 and screw-nut 62 the friction-disk 60 may be made to bear against the sprocket 57 with just sufficient force to raise the cross-head and its connections, so that if from any cause the cross-head should bind or become stuck in the ways in the columns the friction between said disk and sprocket would be overcome and the latter would turn on the shaft 58.

Having thus described my invention, what I claim is—

1. In a sewer-pipe and drain-tile machine, the combination, with the revolving table and a vertically-movable cross-head, of a vertically-movable drum or cylinder having a central shaft, a crown-wheel carried by said shaft, a series of bevel-wheels journaled in said drum or cylinder, crank-rods pivoted to said bevel-wheels and to sliding vertical bars carried by said drum or cylinder, and the tamping-bars connected with the vertical bars, substantially as described.

2. In a sewer-pipe and drain-tile machine, the combination, with the revolving table and a vertically-movable cross-head, of a vertically-movable drum or cylinder having a central shaft, a crown-wheel carried by said shaft, a series of bevel-wheels journaled in said drum or cylinder, and crank-rods pivoted to said bevel-wheels and to sliding vertical bars carried by said drum or cylinder and provided at their lower ends with radial recesses to receive the ends of tamping-bars, substantially as described.

3. In a sewer-pipe and drain-tile machine, the combination, with the vertically-movable cylinder, the sliding bars, the tamping-bars, and the crank-rods, of the central rotating shaft, the crown-wheel carried thereby, the bevel-wheels having inwardly-extending stems provided with circumferential flanges adapted to fit in corresponding radial grooves in the drum or cylinder, and the securing-plate having radial grooves adapted to fit over said stem and flanges, substantially as described.

4. In a sewer-pipe and drain-tile machine, the combination, with a vertically-movable drum or cylinder provided with tamping mechanism and the vertically-movable cross-head, of a transverse bar journaled in the upper part of the machine, having sprocket-wheels thereon, sprocket-wheels in the lower part of the machine connected therewith by sprocket-chains, which are secured to the cross-head, the loose sprocket in said shaft, the friction-disk keyed on said shaft, the coiled spring and binding-nut, a sprocket-chain passing over said loose sprocket-wheel, and means for actuating the same, substantially as described.

5. In a sewer-pipe and drain-tile machine, the combination, with a vertically-movable drum or cylinder provided with tamping mechanism and having pivoted pawls with hooked lower ends and outwardly-projecting upper ends, of the vertically-movable cross-head having studs thereon, and the stops secured to the columns of the machine, adapted to strike the upper ends of said pawls to engage the hooked ends thereof with said studs and to disengage them therefrom, substantially as described.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

WILLIS D. SHERMAN.

Witnesses:
JOS. L. COOMBS,
BENNETT S. JONES.