

(No Model.)

3 Sheets—Sheet 1.

W. D. SHERMAN.
TILE MACHINE.

No. 405,186.

Patented June 11, 1889.

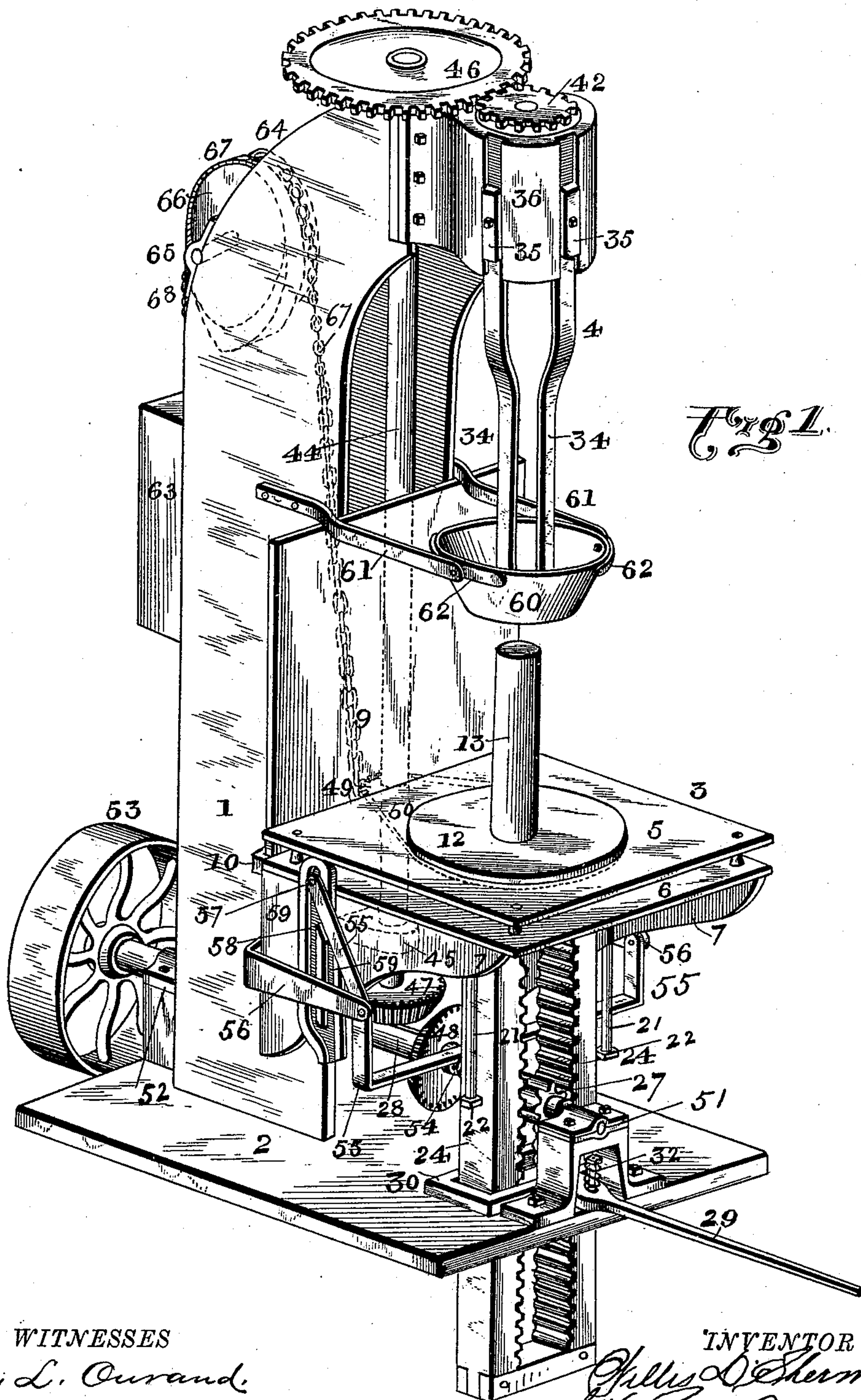


Fig. 1.

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Fig. 2.

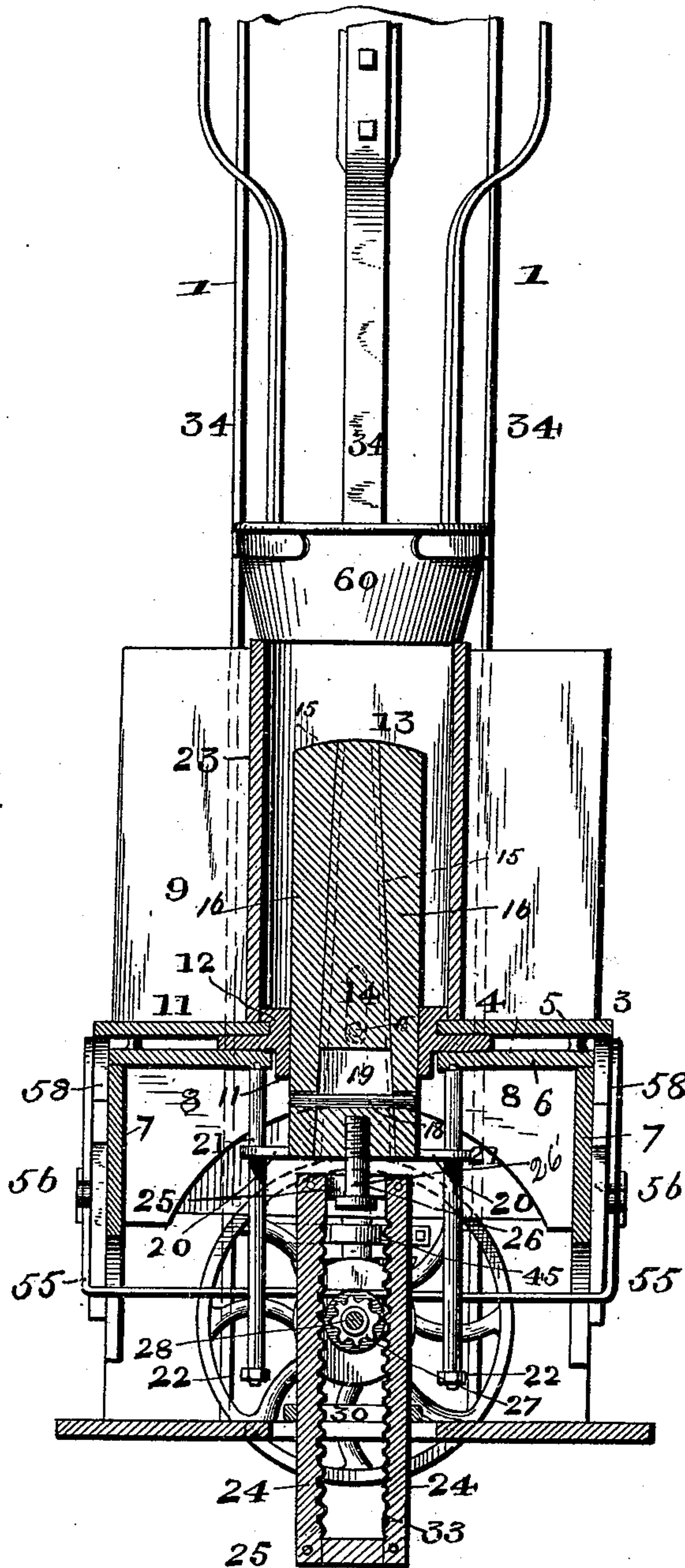
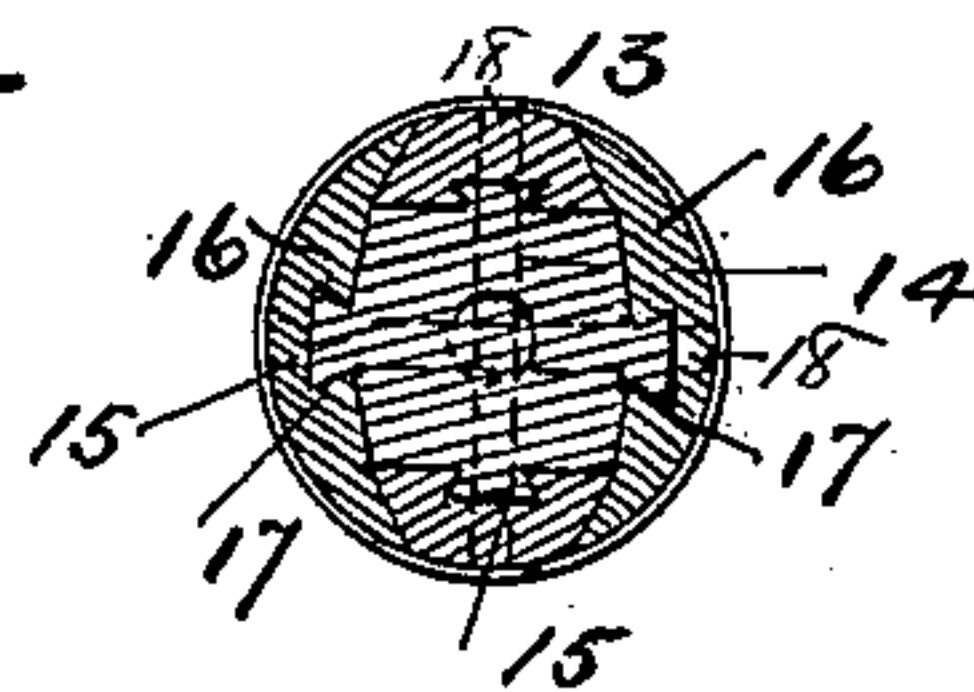


Fig. 3.

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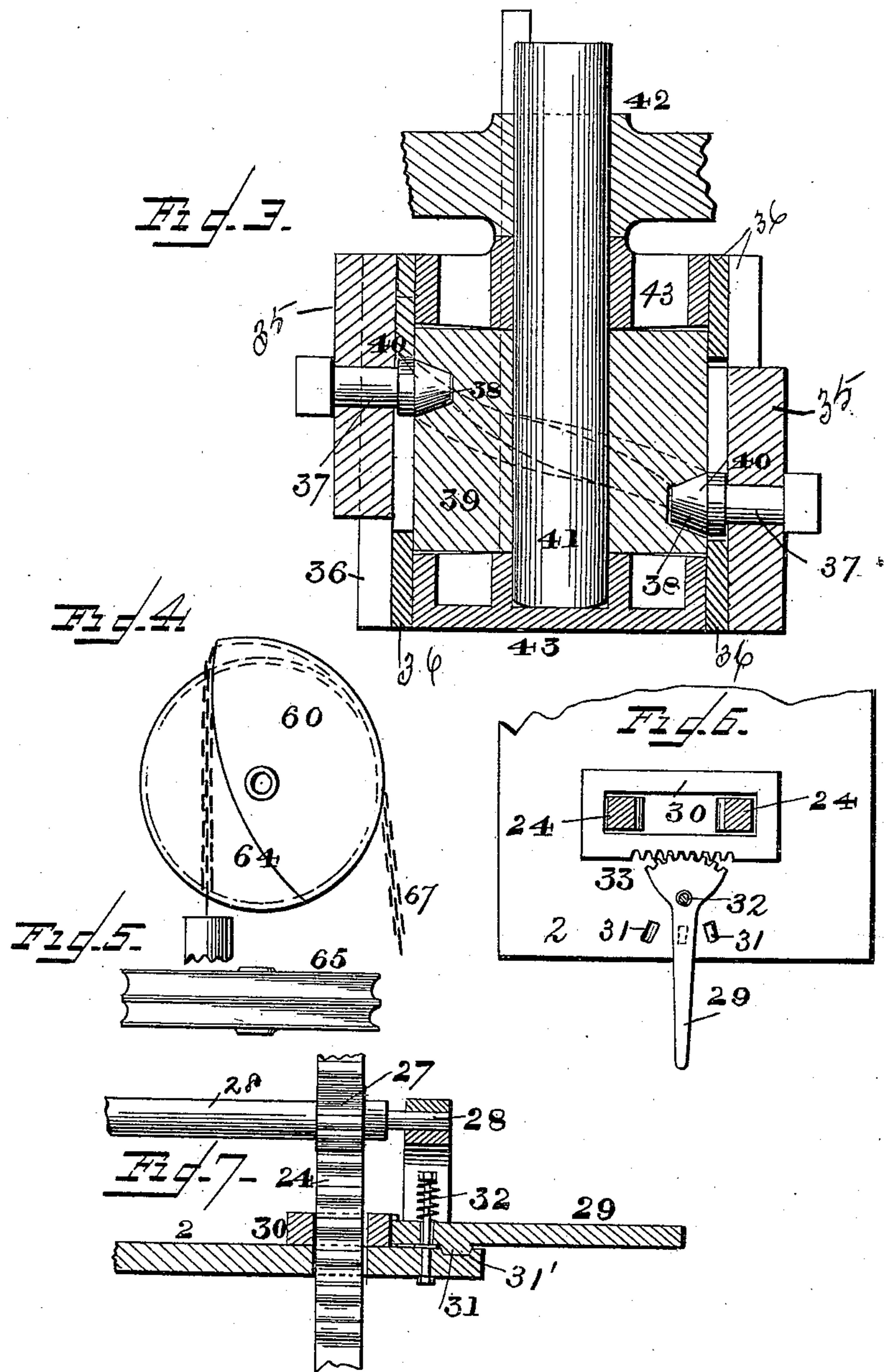
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3 Sheets—Sheet 3

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Patented June 11, 1889.



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UNITED STATES PATENT OFFICE.

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HYDRAULIC DRAIN TILE COMPANY, OF SAME PLACE.

TILE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 405,186, dated June 11, 1889.

Application filed April 23, 1888. Serial No. 271,576. (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 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
10 which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a perspective view of my improved tile-machine. Fig. 2 is a vertical sectional view taken through the table, core, and tamping mechanism, looking toward the rear of the machine; and Fig. 3 is a sectional detail view of the tamping mechanism. Fig. 4
20 is a side view of the double-sheave wheel or pulley. Fig. 5 is an edge view of the same. Fig. 6 is a plan view of the yoke and lever for operating the rack, the rack being shown in section. Fig. 7 is a vertical sectional view
25 of the same; and Fig. 8 is a horizontal sectional view of the core, showing the wedge-shaped pieces upon all of its sides.

My invention relates to tile-machines in which the tile is formed or tamped around a
30 removable core upon a vertically-movable table, and is designed as an improvement upon a tile-machine for which application for Letters Patent of the United States was filed March 8, 1888, Serial No. 266,553; and it consists in the improved construction and combinations of parts of the same, as will be hereinafter more fully described, and pointed out
35 in the claims.

Referring to the accompanying drawings, in which the same numerals of reference indicate corresponding parts in each of the figures, 1 indicates the support or hollow column, which is secured at its lower end upon the base 2, and has a table 3 and tamping mechanism 4 secured to its upper portion. The
45 table consists of an upper plate 5 and lower plate 6, two side pieces 7 7, and a back piece 8, and is secured to a face-plate 9 upon the support 1 by means of clips or slides 10 10 at
50 its sides. Each of these plates is provided with a central aperture through which pro-

jects an annular flange 11 upon the lower side of a revolving die 12, which is also provided with a hole or aperture through which projects the core 13. This core is contractible
55 for the purpose of easily removing it from the tile when completed, and consists of a wedge-shaped central piece 14, Fig. 8, having dovetail ribs or flanges 15 upon its sides, and two or more wedge-shaped side pieces 16,
60 round upon their outer sides, and provided with dovetail recesses 17 upon the flat or inner sides. The central piece is always made wedge-shaped or tapering toward the top on each side, and where more than two sides of
65 the core are provided with the side pieces as shown in Fig. 8, where four sides are thus provided with the side pieces, two of the sides of the central piece opposite each other are inclined or tapering toward the edges, in order
70 that when the core is being withdrawn all of the side pieces may approach each other, and thus make a contractible core. A pin 18 is secured in the side pieces and passed through a slot 19 in the center piece, which permits of
75 the central piece being withdrawn from the side pieces only to a limited extent, and thus prevents the core from falling to pieces when it is withdrawn entirely from the tile. When
80 the side pieces are upon all sides of the core, as shown in Fig. 8, two pins are used, one above and at right angles to the other, and the central piece is provided with two slots, one above the other, as shown in dotted lines in Fig. 2. The lower end of the core is provided
85 with two laterally-extending guides 20, which move upon two rods 21 21, which are secured to the lower plate of the table. The lower ends of these rods are provided with stops or nuts 22 22, which, when the core has been
90 drawn down its entire length, engage with the guides and cause the table to be drawn down for the removal of the shell 23 and the inclosed tile. In raising the core into place for a new tile it is forced up through the die
95 until the guides come in contact with the lower edge of the flange 11, and then force die, table, and core all up together.

The mechanism for raising and lowering the core consists of a rack, the side pieces 24 24
100 of which are secured at their ends to the end pieces 25 25, the upper one of which end pieces

is provided with a slot 26, into which a bolt or pin 26' in the lower end of the central piece of the core is swiveled. The rack projects down through a hole through the base of the machine, and is operated by a cog-wheel 27 upon the main driving-shaft 28 of the machine. This cog-wheel is of such a diameter that it will revolve between the sides of the rack without engaging with either one of them, but can be made to engage with either the one or the other by shifting the rack to one side or the other. This is done by means of a lever 29, which is pivotally secured to the base a little in front of the rack and engages with a yoke 30, through which the rack passes. If desired, the inner end of the lever can be provided with a few cogs, which will engage with similar cogs upon the side of the rack, or the two may be connected in any other suitable manner. To keep the lever from moving back, and with it the yoke and rack, after it has been moved to run the rack up or down, its under side is provided with catches 31 31, Fig. 7, which engage with notches 31' upon the base of the machine. A spring-coil 32 is placed above the lever at its pivotal point, which permits of the lever being raised to disengage the catch from the notches 31' when desired. The rack can be automatically thrown out of engagement with the wheel 27 by means of the partially-cut cogs 33 at the upper end of one of the side pieces and at the lower end of the other side piece. As the cog-wheel forces the rack up or down when it comes in contact with these partially-cut cogs, of course the rack is forced back until the teeth of the wheel are entirely out of engagement with the rack and the movement of the rack ceases, although the wheel still continues its revolutions.

The tamping mechanism consists of a series of stampers or tamping-bars 34 34, which are secured at their upper ends to blocks 35 35 in vertical grooves in the sides of a hollow cylinder 36. Each of these blocks is provided with a pin 37, which projects through a slot in the side of the cylinder and through a spiral groove or cam 38 in a drum 39 within the cylinder 36. A friction-roller 40, preferably cone-shaped, is secured upon each of these pins and engages with the cam 38, and thus gives to the blocks the up-and-down movement necessary to compact the material in forming the tile. The cylinder 36 is secured upon the upper front of the column 1, and the drum 39 is secured upon a short shaft 41, to the upper end of which is secured a spur-gear 42, the drum and shaft being supported in position within the cylinder by two spiders 43 43. A vertical shaft 44 is journaled in a bearing at the top of the column 1 at its upper end and in a bearing in a cross-piece 45 at its lower end. The upper end of the shaft is provided with a cog-wheel 46, which engages with the spur-gear 42, and at its lower end with a bevel-gear 47, which engages with a bevel-gear 48 upon the main driving-shaft 28, and

at its intermediate portion with a sprocket-wheel 49. A chain 50 connects the sprocket-wheel 49 with a cog-rim around the die 12 and rotates the die, core, and tile as it is being formed by the tamping-bars. The main driving-shaft which thus communicates motion to each part of the machine is journaled upon the base of the machine in bearings 51 and 52, and is provided with a pulley 53, through which it receives motion from any convenient source of power. The bevel-wheel 48 upon this shaft is movable back and forth by means of the ordinary key or pin, and has its hub provided with a groove 54, within which fits the lever or arm 55 for moving the wheel upon the shaft. This lever is made in U shape, with its ends projecting upward at the sides of the table, where they are pivotally secured upon the outer ends of brackets 56 56, the extreme upper end of each arm being provided with an inwardly-projecting pin 57. The rear end of the brackets 56 56 are secured to the column 1 at the rear of the table, so as not to interfere with the movement of the table, each bracket being bent into an L shape to be out of the way of the sides and rear of the table. Upon the outside of each side of the table is secured a cam-guide or runway 58, in which are formed two channels 59 59, the upper end of one of which runs into the other near its end, while the lower end of the opposite track or channel runs into the other channel near its lower end. The pins 57 57 of the lever 55 fit within these tracks or channels, and as the guideways are carried up or down with the table the ends of the lever are thrown back or forward as the table reaches its upward or downward movement, and thus shift the lower or middle portion of the lever, and with it the bevel-gear 48 upon the main shaft, and throw it in or out of gear with the bevel-gear 47 upon the lower end of the shaft. As the shaft 44 is thus thrown in or out of gear with the main driving-shaft, of course the tamping mechanism and operation of the table are also stopped. By properly adjusting the guideways upon the sides of the table the machine can be stopped whenever the tile reaches a certain length, thus making all of the tiles of the same length.

In operation the sand and cement or other material out of which the tile is to be formed is fed into the shell 23 through a funnel 60, which is supported above the top of the shell at the outer ends of the arms or brackets 61 61. The other ends of these arms are secured to the sides of the column 1 above the top of the face-plate 9, so as to be out of the way of the table when it is raised to its highest point. To permit of the funnel being rocked a little when necessary, it is preferably suspended upon the curved or semicircular arms 62 62, each of which is pivotally secured at its middle to the end of one of the brackets 61. As the material is thus fed in between the shell and core upon the table, and is carried around

with them, it is passed under the ends of the tamping-bars, which rapidly compress or tamp it into a tile. This constant addition of material within the shell causes the table to be gradually forced down, as the tamping-bars are secured in such a manner that they can not be forced upward. To cause the table to offer sufficient resistance to this forcing down of the tamping-bars to make a good dense tile, the table is counterbalanced by a weight 63; but as the additional weight of the increasing tile would have a tendency to cause the table to move down more easily, on account of its more nearly equaling the weight 63, I place a double sheave or pulley 65 near the top of the column and make one portion of it 66 oval in shape, so that as the tile grows in size and weight the power of the weight 63 is correspondingly increased, so that it takes the same amount of power to force the table down when the tile is being completed that it did when it was first commenced, and thus produce a tile of the same density or consistency throughout. To produce this effect requires that two chains 67 and 68 be used, one of which is secured at one end to the table and to the round portion 64 of the double sheave, and the other one is secured to the weight and to the oval part 66 of the pulley. Now as the table goes down the oval pulley throws the weight farther from the center until the tile is completed, when the weight has been carried to its farthest point. From that point the oval wheel is cut back close to the center, so that by drawing the table down a few inches farther the wheel rolls over, letting the weight back near the center, so that the table will stay down while the shell and tile are being removed and an empty shell put in place for a new tile.

After a tile has been completed and removed from the table an empty shell is placed in position. The rack is then thrown into contact with the cog-wheel upon the main shaft, which causes the core to be pushed up through the table until it is at its height, when the guides upon the core come in contact with the flange on the bottom of the die, when the die and table are carried up along with the core until everything is at the height to commence a new tile, or until the table is just below the lower ends of the tamping-bars. By the time the table reaches this height the rack has been thrown out of engagement with the cog-wheel and its further upward movement automatically stopped, and at the same time the guideways upon the sides of the table have thrown the ends of the lever controlling the bevel-wheel upon the driving-shaft forward, which puts the tamping mechanism into operation. The material is now fed in between the shell and core, which is compressed into a tile, and the table with its increasing load is forced downward. As the table reaches its lowest movement, the tamping mechanism is thrown out of gear by the guideways upon the sides of the table and the supply of ma-

terial is cut off by the operator. The operator then throws the proper side of the rack into engagement with the cog-wheel upon the main shaft, which draws the core down through the table from the interior of the tile, the central piece of the core moving down at first, which so loosens the other parts of the core that they will almost fall down from their own weight. As soon as the core reaches its lowest point the rack is automatically thrown out of engagement with this cog-wheel and its further downward movement is stopped, when the completed tile can be removed.

Having thus described my invention, I claim—

1. In a tile-machine, the combination of a support, a table secured to its lower portion and a cylinder at its upper portion, a drum within the cylinder having a cam-groove or worm, blocks upon the cylinder, pins in the blocks engaging the grooves, and tamping-bars upon the blocks.

2. In a tile-machine, the combination of a support, a table secured to its lower portion and a cylinder to its upper portion, vertical slots in the sides of the cylinder, blocks upon the sides of the cylinder, each of which is provided with a pin, a drum within the cylinder having a cam-groove, and tamping-bars secured to the blocks.

3. In a tile-machine, the combination of a support, a table secured to its lower portion and a cylinder to its upper portion, a spider within the cylinder, a shaft journaled in the spider, a drum upon the lower portion of the shaft within the cylinder and a spur-gear upon its upper portion, blocks upon the sides of the cylinder, pins in the blocks engaging the grooves, and a series of tamping-bars secured to the blocks.

4. In a tile-machine, the combination of a support, a table secured to its lower portion and a cylinder to its upper portion, a drum within the cylinder having a cam-groove around its circumference, blocks upon the sides of the cylinder, a pin upon each block projecting into the cam-groove, a friction-roller upon each pin, and tamping-bars upon the blocks.

5. In a tile-machine, the combination of a support, a table secured to the lower portion of the support, a contractible core through the table, the central piece of which is wedge-shaped and provided with dovetail flanges or ribs, and the outside pieces are provided with dovetail recesses, a slot in the central piece, a pin in the side pieces and through the slot in the central piece, a rack secured to the lower end of the central piece, and tamping-bars above the table.

6. In a tile-machine, the combination of a support, a table secured to the lower portion of the support, a rack below the table, the upper end piece of which is slotted, a core through the table, the lower end of which is swiveled in the slot, and tamping-bars above the table.

7. In a tile-machine, the combination of a support, a table secured to the lower portion of the support, a rack below the table, the side pieces of which are provided with cogs, the
5 cogs at the upper end of one side piece of the rack and at the lower end of the other side piece being only partly cut, a shaft between the side pieces, a cog-wheel upon the shaft, a core secured to the upper end of the rack,
10 and tamping-bars above the table.

8. In a tile-machine, the combination of a support, a table secured to the lower portion of the support, a core through the table, a rack secured to the lower end of the core, a
15 yoke around the rack, a lever pivotally secured in front of the rack, a wheel for operating the rack, and tamping-bars above the table.

9. In a tile-machine, the combination of a
20 support, a table secured to the lower portion of the support, a core through the table, a rack secured to the lower end of the core, a yoke around the rack, a lever pivotally secured in front of the yoke, catches upon the
25 under side of the lever, a coiled spring upon the top of the lever at its pivotal point, a wheel for operating the rack, and tamping-bars above the table.

10. In a tile-machine, the combination of a
30 support, a table secured to the lower portion of the support, a shaft below the table, a bevel-wheel upon the shaft, a lever in engagement with the wheel, cam-guides upon the sides of the table in engagement with the
35 ends of the lever, a vertical shaft, and tamping-bars above the table.

11. In a tile-machine, the combination of a support, a table secured to the lower portion of the support, a shaft below the table, a
40 bevel-wheel movably secured upon the shaft, the hub of which is provided with a groove, brackets secured to the support behind the table, a lever pivoted to the ends of the brackets, the ends of which are provided with pins

and the middle portion engages with the
45 groove in the hub of the wheel, cam-guides upon the sides of the table in engagement with the pins, a vertical shaft, and tamping-bars above the table.

12. In a tile-machine, the combination, with
50 a base-piece, of vertical columns secured thereto, a table upon the base, a tamping-frame between the columns, consisting of a hollow cylinder secured to the columns, a spirally-grooved drum, blocks upon the outer side of
55 the hollow cylinder, pins secured to the blocks, the inner ends of which project through the cylinder and engage with the spiral groove, and tamping-bars secured to the blocks.

13. In a tile-machine, the combination of a
60 support, a vertically-movable table secured thereto, a sheave journaled at the top of the support, a counterpoise, means for connecting the table and counterpoise with the sheave,
65 and tamping-bars above the table.

14. In a tile-machine, the combination, with
a base-piece, of vertical columns secured to the base, a revolving table upon the base, a tamping-frame between the columns, a drum
70 within the frame, a cam-wheel within the drum, tamping-bars upon the outside of the drum, a cross-piece secured at its ends to the top of the columns, a bearing in the cross-piece through which the shaft of the cam-wheel
75 projects, said shaft being provided with a groove, a cog-wheel upon the shaft above the cross-piece, having a fin, an idle-wheel upon the cross-piece, a vertical shaft, and a cog-wheel upon each end of the shaft, the upper
80 one of which engages with the idle-wheel and the lower one with the table.

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:

FRED J. BORTHWICK,
GEO. M. RHETT.