951,740.

W. J. McCRACKEN.

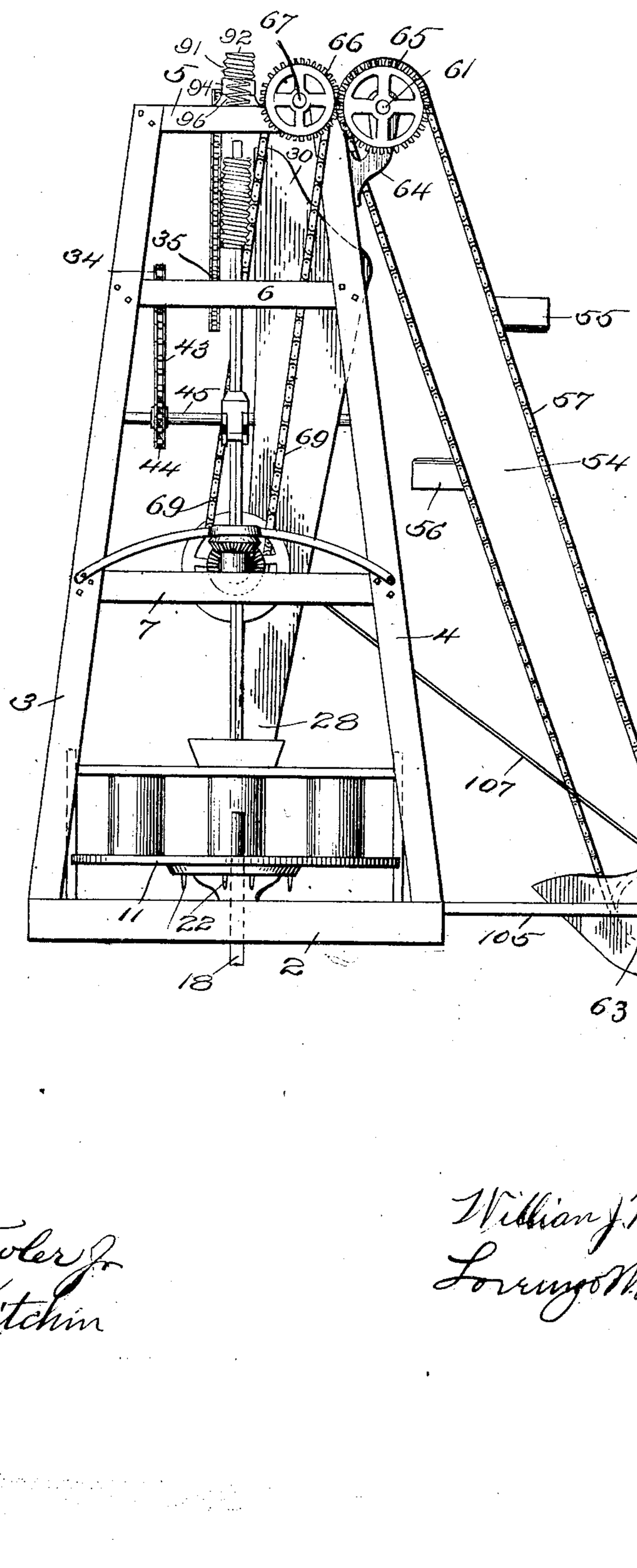
TILE MAKING MACHINE.

APPLICATION FILED JULY 28, 1908.

Patented Mar. 8, 1910.

6 SHEETS—SHEET 1.

Fig. 1.



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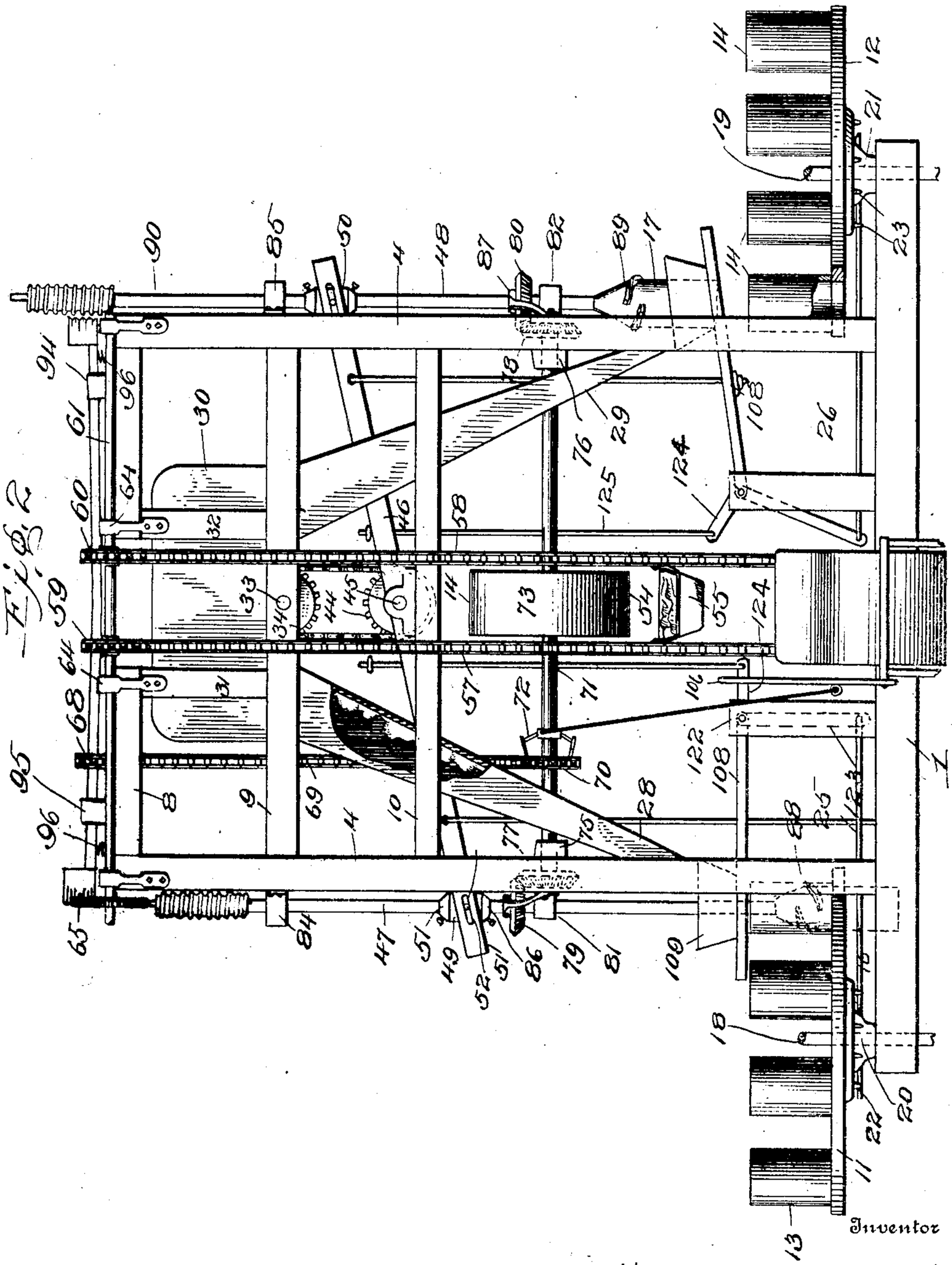

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6 SHEETS—SHEET 3.

Fig. 3

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6 SHEETS—SHEET 4.

Fig. 4.

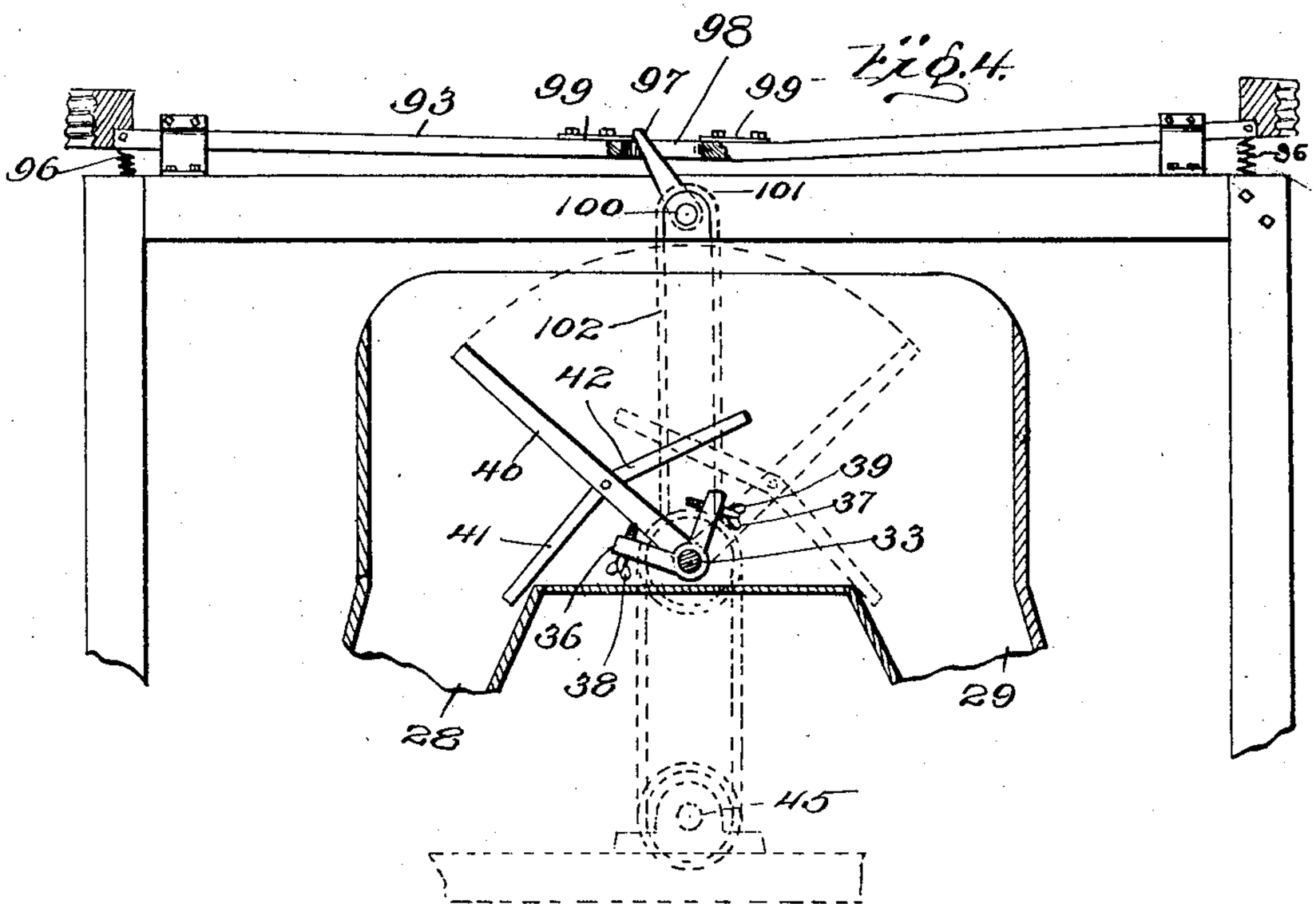


Fig. 6.

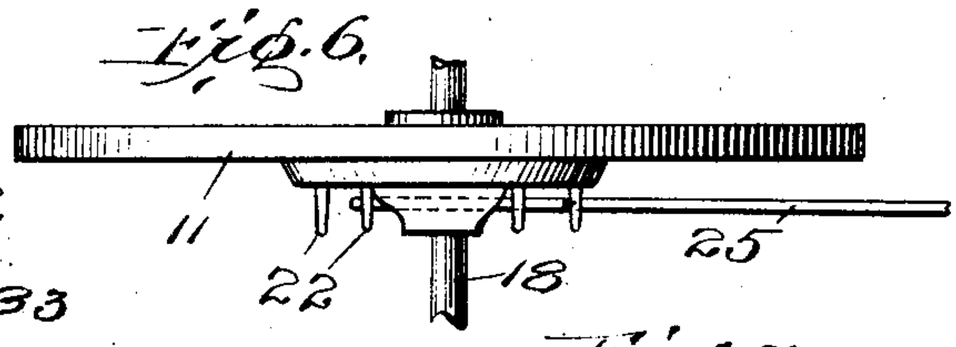


Fig. 8.

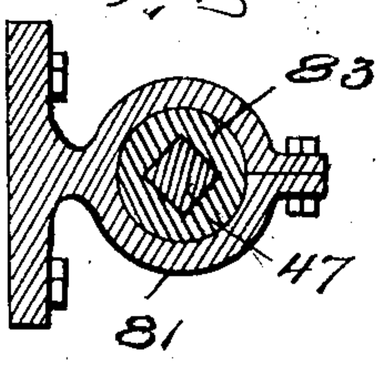
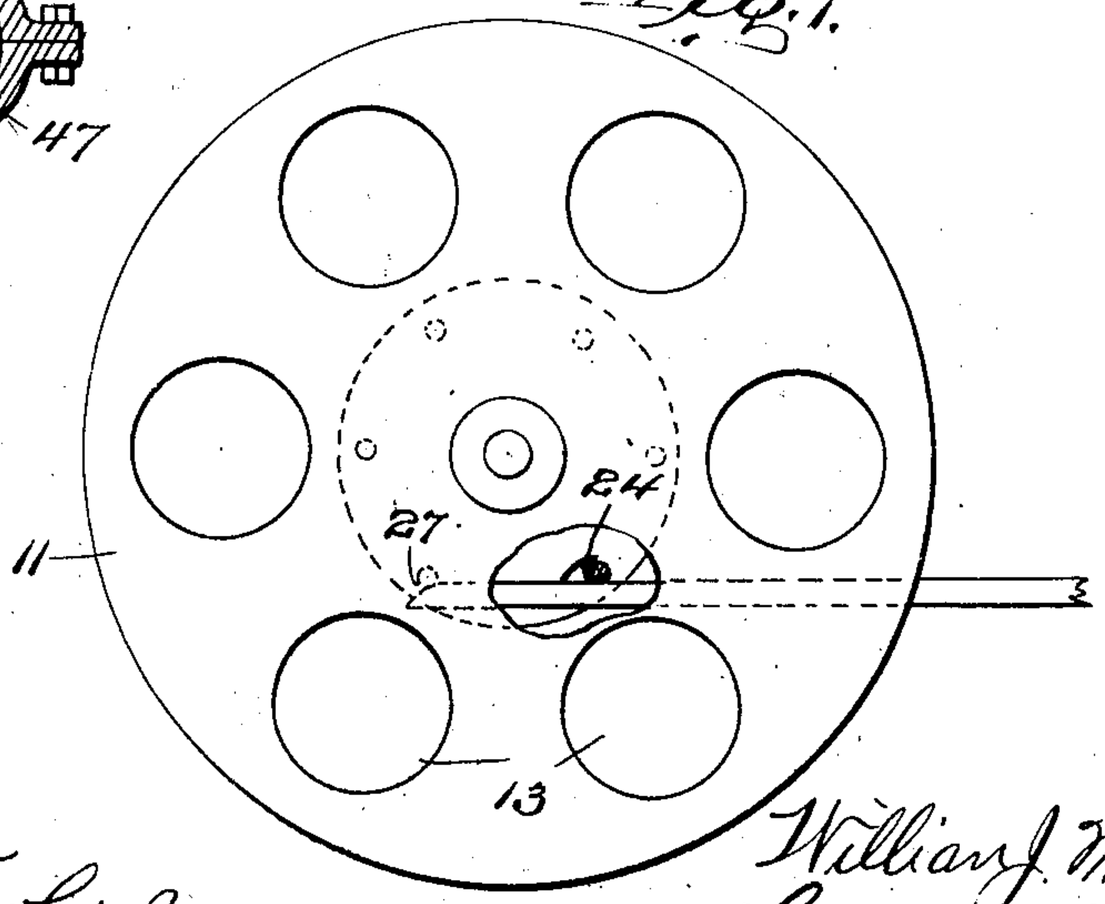


Fig. 7.



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6 SHEETS—SHEET 5.

Fig. 5.

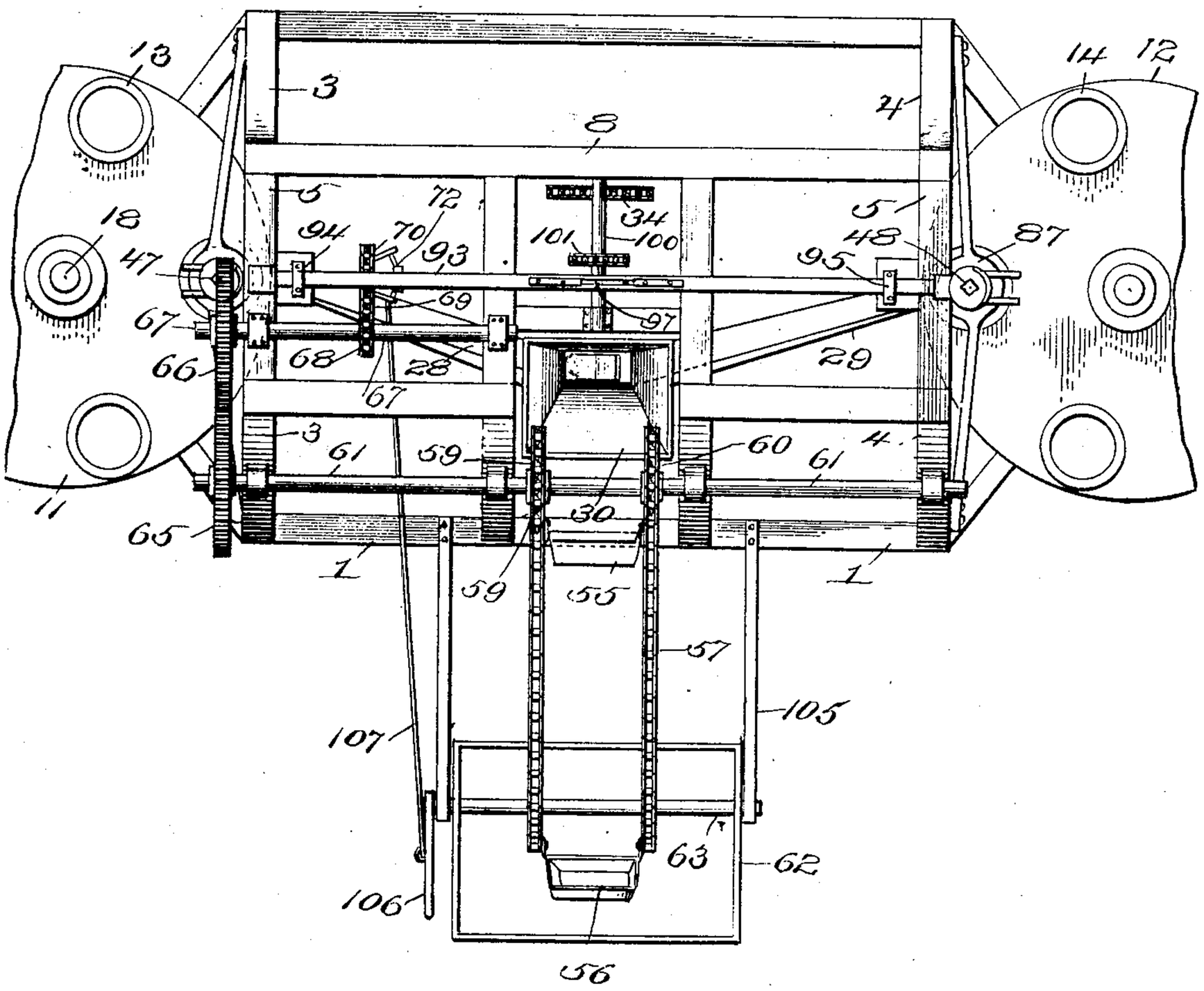
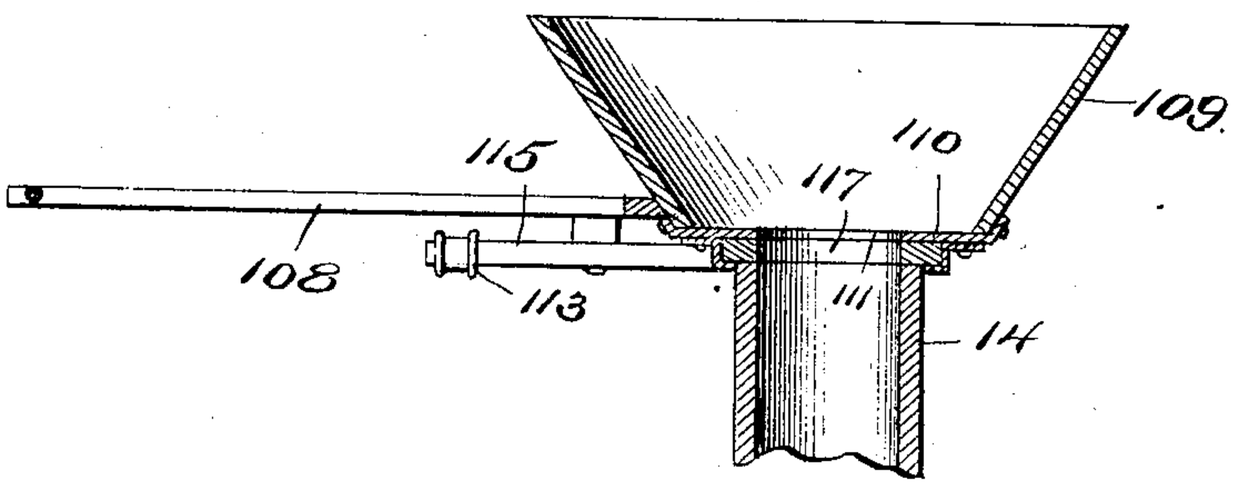


Fig. 12.



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951,740.

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6 SHEETS—SHEET 6.

Fig. 10.

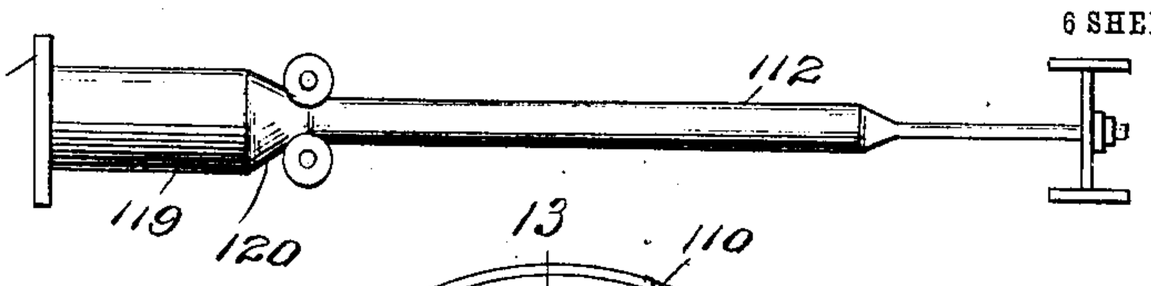


Fig. 9.

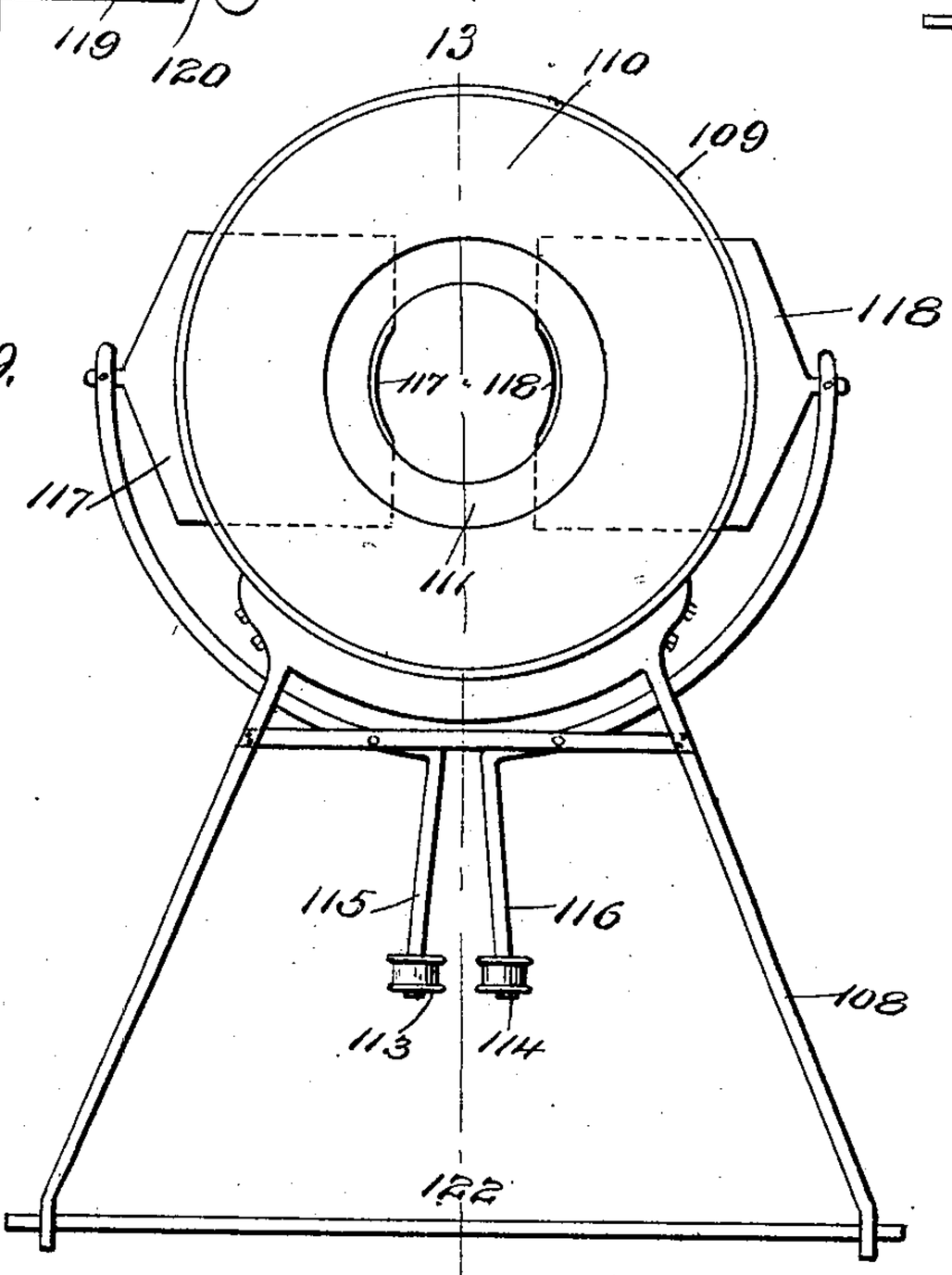
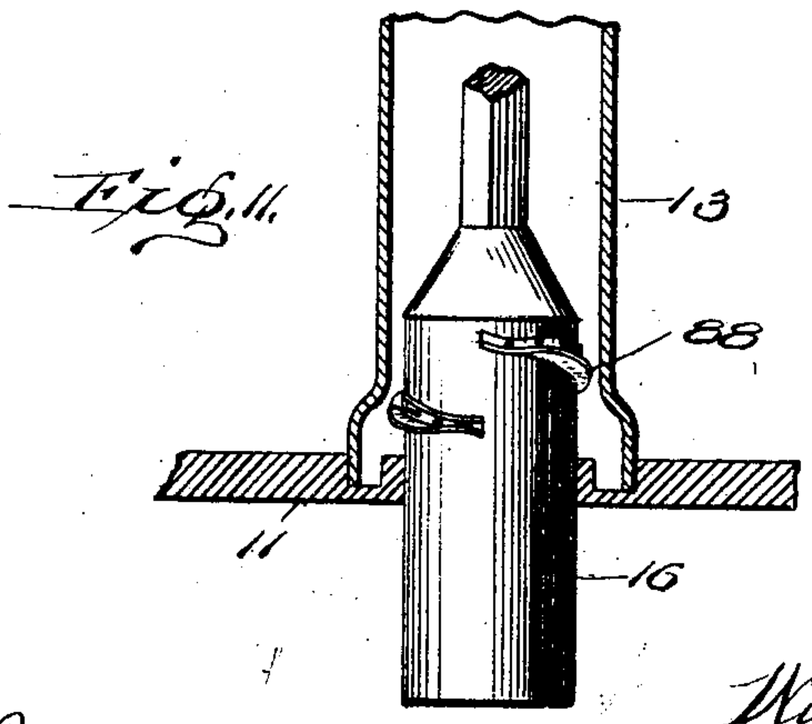


Fig. 11.



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UNITED STATES PATENT OFFICE.

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TILE-MAKING MACHINE.

951,740. Specification of Letters Patent. Patented Mar. 8, 1910.

Application filed July 28, 1908. Serial No. 445,726.

To all whom it may concern:

Be it known that I, WILLIAM J. McCRACKEN, a citizen of the United States, residing at Paullina, in the county of O'Brien and State of Iowa, have invented certain new and useful Improvements in Tile-Making Machines, of which the following is a specification.

This invention relates to improvements in tile making machines, and particularly to means for making tile pipes and the like from plastic material of any desired kind, as for instance cement.

Heretofore in constructing tile making machines difficulty has been experienced in providing mechanism that is adapted to run continuously and yet form tiling intermittently. Usually the tile making machines heretofore known present a single mold or a plurality of molds into which a plunger is adapted to be forced for forming tile, and then again removed and the mechanism brought to a standstill or to an inoperative position while new molds are being placed beneath the plungers and new material is being fed thereto preparatory to a second compression of the material for forming a tile.

In the present device means are presented that are adapted to overcome the objections suggested and to arrange for a continuous operation of the driving mechanism and the intermittent molding or forming of the tiling by means of a plurality of molds and plungers brought into operation intermittently or successively, one mold or set of molds as the case may be being operated while the other is being held out of operation or out of contact with the mold.

In carrying out the features of the present invention a suitable framework is provided having a plurality of reciprocating and rotating shafts carrying plungers for forming formers that are adapted to fit into suitably arranged molds that are brought therebeneath in succession, the respective formers or plunger heads being alternately brought into engagement with the molds of the respective mold carrying tables. Connected with both of the reciprocating shafts is a rocking bar that is adapted to move longitudinally or reciprocate the respective reciprocating shafts for causing one of the plunger heads or formers to engage the mold on one side of the frame while the former or plunger head on the opposite side is being raised from a mold. This rocking arm, as will be evident, will positively cause one former or plunger head to be disengaged from its mold while the other plunger head or former is being engaged by its mold. Connected with the rocking arm is a receiving pocket that is adapted to receive cement or the like from which the tiling is intended to be constructed that will deliver to the respective molds material subsequent to the descent or entrance of the former into the mold so that positive means are provided for supplying each mold subsequent to the entrance of the former therein with material for forming the tiling, and in this way upon each movement of the former a tile will be positively formed. In this way a mechanism is provided that is adapted to receive cement and to feed the same alternately in proper amounts to each side of the frame of the machine intermittently into the molds, and to then have the cement in the mold formed into a proper shaped tile immediately after its deposit in the mold by the action of the plunger head or former passing therethrough. As each successive mold has formed therein a tile and the former is moved therefrom the mold will be moved from beneath the plunger or former and another mold actuated for taking the place of the previous mold ready for receiving the next quantity of cement preparatory to forming the next succeeding tile. A rotating table is provided on each side of the machine that carries any desired number of molds that are brought successively beneath the plungers on each side of the machine so that when one plunger is forming a tile on one side of the machine the plunger on the other side of the machine is moved and the table is being rotated for bringing the next succeeding mold beneath the plunger. This operation continues intermittently and the respective tables are rotated step by step so as to bring their respective molds beneath their respective formers for having tile formed therein. As the mold having a formed tile therein is moved from beneath the former the same is removed to any desired place for disposal or for permitting the same to dry as the case may be and an empty mold is placed upon the table in place thereof.

In carrying out the object of the invention

and arranging a structure for forming tiling various structures may be provided and various changes may be adopted within the spirit of the invention.

In order to disclose one embodiment of the invention I have shown in the drawing the preferred structure in which:

Figure 1 is a side elevation of a complete machine. Fig. 2 is a front elevation. Fig. 3 is a rear elevation. Fig. 4 is a detail fragmentary view partly in section of the upper part of a chute and surrounding mechanism embodying certain features of the present invention. Fig. 5 is a top plan view of the structure shown in Fig. 1. Fig. 6 is an edge view of one of the mold carrying tables. Fig. 7 is a top plan view of the structure shown in Fig. 6. Fig. 8 is a detail sectional view showing one of the guiding brackets through which the shaft carrying the plungers is passed. Fig. 9 is an enlarged detail top plan view of a guiding chute and surrounding parts. Fig. 10 is an enlarged detail view of the lifting rod used in connection with the structure shown in Fig. 9 for operating the slides therein. Fig. 11 is an enlarged detail fragmentary sectional view through a mold, showing one of the plunger heads or formers positioned therein. Fig. 12 is an edge view of Fig. 9 on a reduced scale.

In constructing a machine according to the present invention any desired kind of frame or supports may be provided. In the drawings the frame comprises bars 1—1 and 2—2 which are secured together in any desired manner for forming a base. To this base are secured uprights 3—3 and 4—4 which in turn are secured together by cross braces 5—5, 6—6 and 7—7 on the ends of the frame and cross braces 8—8, 9—9 and 10—10 upon the front and back. This framework arranged with these cross braces forms a rigid and firm support for the various operating mechanisms hereinafter fully described.

Mounted upon the base are revolving tables 11 and 12 that carry any desired number of molds 13 and 14 respectively. The molds are arranged in a circle on each of the tables so as to be brought successively beneath the respective formers 16 and 17. The tables are pivotally mounted upon the base formed from beams or bars 1—1 and 2—2 and are adapted to turn upon pivotal or journal members 18 and 19. The journal members 18 and 19 project to near the top of the molds for assisting the workmen in placing the molds in position, though it will be obvious that the members 18 and 19 may be shortened. A bearing extension or hub 20 is formed upon table 11 and a bearing extension or hub 21 is formed upon table 12. These bearing extensions or hubs are adapted to rest upon the base of the machine and have the respective journal members 18 and 19 pass therethrough. Projecting from the heads or bearing members 20 and 21 are pins 22 and 23 that are adapted to be equal in number to the number of molds on the respective tables and are engaged by hooks 24—24 secured to operating rods 25 and 26 respectively. The respective rods 25 and 26 are formed with beveled ends 27, as clearly seen in Fig. 7, which are adapted to strike against the respective pins 22 and 23 and permit the rods 25 and 26 to slide along the same until the respective hooks 24—24 have snapped over or passed one of the pins 22 and 23. The rods 25 and 26 are then pulled which will partially rotate the respective tables and their respective molds carried thereby, the respective rods 25 and 26 being reciprocated alternately so that one table will be standing still while the other table will be moving to another position, the table standing still being in a position for having a tile formed in one of the molds thereof.

In order to feed material to the respective molds 13 and 14 a pair of chutes 28 and 29 are mounted in the frame with one end so positioned as to discharge material in the molds mounted upon the respective tables 11 and 12. The upper ends of chutes 28 and 29 are connected with a receptacle or hood 30. The material is dumped into the hood 30 and from thence into the chutes 28 and 29 respectively as the case may require. The hood 30 is preferably held in position by being secured to uprights 31 and 32 that are mounted between cross bars 8 and 9. Passing through hood 30 is a journal 33 that has secured thereto sprocket wheels 34 and 35, sprocket wheel 34 being adapted to convey motion to shaft 33. Rigidly secured to shaft 33 (Fig. 4) is a pair of arms 36 and 37. The arms 36 and 37 have passing therethrough set screws 38 and 39 that may be adjusted as the occasion may require for limiting the movement of the blade or dividing member 40. The blade or dividing member 40 is loosely mounted upon shaft 33 and is adapted to divide the hood 30 or to form a movable partition therein. Rigidly secured to blade 40 are a plurality of blades or shelves 41 and 42 which, together with blade 40, form pockets for receiving the material dumped into hood 30. When a given quantity of material has been dumped into hood 30 and caught between blades 40 and 42 the same will be retained in that position until shaft 33 has been rocked and motion conveyed therefrom through arm 36 and set screw 38 to blade 40. As blade 40 is thus rocked the blade or shelf 42 will also be rocked and moved to the position shown in dotted lines in Fig. 4. This will permit the material located between blades 40 and 42 to drop by gravity down chute 29. At the same time that material is permitted to

thus drop down chute 29 blade or shelf 41 will move to such a position as to catch the next quantity of material deposited in hood 30 and will hold the same until shaft 33 has rocked sufficiently for causing arm 37 and set screw 39 to move over and force blade 40 to the position shown in full lines in Fig. 4. This will dump the material between blades 40 and 41 into chute 28 and will at the same time permit shelf 42 to catch the next succeeding quantity of material deposited in hood 30. By the successive rocking of shaft 33 material dumped into hood 30 will be successively dropped into one chute and then the other. Shaft 33 is adapted to be rocked in unison with the up and down movement of formers or plunger heads 16 and 17 so that material is only dropped into chute 29 when former 17 is in its lowermost position, and material is dropped into chute 28 when former 16 is in its lowermost position. In order to accomplish this shaft 33 is moved by sprocket 34 which in turn receives power through a chain 43. Chain 43 passes over sprocket 44 and is rotated by shaft 45 which is supported in journal bearings mounted upon cross bars or members 10—10.

Rigidly secured to shaft 45 is a rocking bar or walking beam 46. Walking beam 46 is adapted to extend a short distance beyond the uprights 3—3 and 4—4 and are connected with reciprocating rods 47 and 48 that carry the respective formers 16 and 17. The ends of walking beam 46 are preferably bifurcated for straddling or partially encircling the bearing members 49 and 50. The bearing members 49 and 50 are arranged with a sleeve formed with a square hole passing therethrough and a cylindrical periphery. Around the cylindrical periphery is arranged a block having a cylindrical interior engaging the sleeve that is formed with a square hole or aperture passing therethrough. Each of the bearing members 49 and 50 is constructed in this manner so as to permit the free reciprocation of shafts 47 and 48 therethrough, these shafts being square though it will be evident that a round shaft might be used and the respective members that are designed to rotate the shaft be keyed or splined thereto as occasion might require. Positioned above and below bearing block 49 are collars 51—51 that are held in place by suitable set screws so that any movement of walking beam 46 will be conveyed to shaft 47 for reciprocating the same. Projecting from block 49 are pins 52—52 that pass through a slot 53 formed in walking beam 46 so as to accommodate pins 52—52. The pins 52—52 may be ordinary bolts or screws if desired. Bearing block 50 is provided with collars held in place by set screws in a similar manner to block 49 and also the surrounding parts of the structure are identical and will therefore need no further description. By this construction and arrangement of walking beam and connected mechanism the formers 16 and 17 will be moved upward and downward or reciprocated in unison or in proper relation to the way material is dumped from hood 30 to the respective chutes 28 and 29.

In order to provide means for supplying hood 30 with material an elevator 54 is connected to the framework in such a manner that the bucket therefrom will dump material at intervals into hood 30. Elevator 54 is preferably constructed on the bucket and chain type in which buckets 55 and 56 are held in place by chains 57 and 58. The chains 57 and 58 are adapted to pass over sprockets 59 and 60 mounted upon a shaft 61 at the upper end of the frame and to pass over suitable sprockets mounted in a receptacle 62 which are mounted upon a shaft 63 that passes through the receptacle, the receptacle 62 being mounted near the base of the frame. Shaft 61 is held in position by a plurality of brackets 64 and in addition to carrying sprockets 59 and 60 carries a gear wheel 65 near one end thereof. Gear wheel 65 is adapted to mesh with a gear wheel 66 and is rotated thereby. Gear wheel 66 is mounted upon a shaft 67 which has secured thereto a sprocket 68. Sprocket 68 receives power from a chain 69 that passes over sprocket 70 loosely mounted upon shaft 71. A clutch 72 of any desired description is also mounted upon shaft 71 and arranged to connect sprocket 70 with shaft 71 so that power may be communicated from shaft 71 to sprocket 70, and from thence to elevator 54. Shaft 71 has secured thereto a pulley 73 that receives power through a blade 74 from any desired source. In operation shaft 71 is adapted to be continuously rotated but by reason of clutch 72 elevator 54 may be thrown into and out of operation as the case may require but the remaining mechanism will continue to operate.

Shaft 71 is mounted in suitable bearing boxes 75 and 76. Secured to shaft 71 at the end thereof are beveled gears 77 and 78 that mesh with beveled gears 79 and 80. Beveled gears 79 and 80 are formed with a square hole or aperture therethrough through which the square shafts 47 and 48 pass, the gears being slidably mounted upon said shafts but rotatable therewith. Projecting from cross members 7—7 are guiding journals or brackets 81 and 82 which assist in guiding the reciprocating shafts 47 and 48, and also prevent a downward movement of gears 79 and 80. The brackets 81 and 82 may be formed as seen in Fig. 8 with a cylindrical sleeve 83 mounted therein through which the square shaft is adapted to pass. In addition to the guiding journal members or blocks 81 and 82 another set of journal members or blocks 84 and 85 are secured to

cross pieces 6—6 for guiding the upper part of rods 47 and 48, the brackets 84 and 85 being preferably similar to the brackets seen in Fig. 8. In order to positively prevent gears 79 and 80 from moving upward with shafts 47 and 48 suitable holding members or retaining brackets 86 and 87 are secured to the uprights of the framework and have the central enlarged portion thereof encircle the shafts 47 and 48 above the respective gears 79 and 80. By this construction and arrangement whenever shaft 71 is rotated shafts 47 and 48 will be rotated and by reason of the fact that both of the gears 79 and 80 are positioned above the gears 77 and 78 they will be rotated in reverse directions so that when the threads 88 and 89 upon the respective formers 16 and 17 engage the cement or other material of which the tile is formed an upward movement of the shafts 47 and 48 will be given at the same time that the shafts are rotated, the rotation of the shafts being caused by power from shaft 71 and the upward movement of the respective shafts for a short distance being caused by the respective spirals or threads 88 and 89 acting against the material in the mold. After the threads of one of the formers have forced the former out of the mold, as for instance former 17, the same would stay at a standstill in that position if other means were not provided for further raising the same. In order to provide this additional movement a screw or threaded sleeve 90 is rigidly secured to shaft 48 that engages threads 91 formed in a nut or what might be more properly termed a half nut 92. The threaded sleeve 90 is adapted to engage threads 91 at the same time or slightly previous to the time that threads 89 have raised the former out of the mold. In order that block or nut 92 may be in proper position for permitting threads or sleeves 90 to engage threads 91 the same is moved over so as to be in proper alinement with sleeve 90 by sliding bar 93 (Fig. 3) longitudinally across the top of the frame. Bar 93 is held in position by brackets 94 and 95 which permit a slight up and down movement as well as a reciprocatory movement, springs 96—96 being provided for normally forcing bar 93 to its extreme upward position.

In order that bar 93 may be reciprocated an arm 97 is adapted to pass through an aperture 98 formed in bar 93 and is adapted to engage adjustable guides 99. Guides 99 are preferably formed with slots therein through which suitable bolts are passed into bar 93 for clamping the guides in any desired position. By this construction and arrangement the guides 99 may be adjusted toward the center of aperture 98 or away from that point for permitting arm 97 to engage sooner or later the respective guides and consequently act upon bar 93 sooner or later. Arm 97 is rigidly secured to a shaft 100 which has mounted thereon a sprocket 101 that receives power through a chain 102 which in turn receives power from sprocket 35. Sprocket 35 is rigidly secured to shaft 33 in order to secure power therefrom. Shaft 33, as heretofore set forth, receives power from shaft 45 through sprocket wheel 44, chain 43, and sprocket 34. By this arrangement of power conveying means shaft 100 will be simply rocked and will be rocked in a certain predetermined relation to the rocking of shaft 45 to which is secured the walking beam 46. This will regulate the action of arm 97 so as to throw the nut 92 over to a position to be engaged by sleeve 90 at the proper time that the sleeve 90 is raised. Positioned on the opposite end of nut 92 is another nut 103 similar to nut 92 and adapted to engage a sleeve 104 rigidly secured to shaft 47. As will be understood nut 103 will only engage sleeve 104 after the same has been raised by threads 88 on former 16 and while sleeve 90 is in a lower position. Just before shaft 48 reaches its lowest point walking beam 46 will actuate the mechanism heretofore set forth for moving arm 97 sufficiently to cause the same to slide bar 93 longitudinally and move nut 103 from beneath sleeve 104 and nut 92 to a position above sleeve 90. As sleeve 90 continues to rise by the action of spiral threads 89 on the former sleeve 90 will engage nut 92 and will be positively raised thereby. As soon as nut 103 has been moved from beneath sleeve 104 shaft 47 together with sleeve 104 will move down until former 16 is in the lower part of the mold ready for compressing material placed in the mold.

In operation the material of which the tiling is designed to be made, as for instance properly mixed cement, is placed in receptacle 62 which is supported upon a frame 105. This receptacle 62 may be of any desired kind, but preferably of ample size to contain a pair of sprocket wheels around which the chains of the elevator may pass, and also a suitable supply of cement that is adapted to be scooped up and elevated by buckets 55 and 56. After the cement has been placed in receptacle 62 the machine is started by applying power to pulley 73. This will cause shaft 71 to rotate and consequently cause shafts 47 and 48 to rotate. Clutch 72 is then engaged by arm 106 being actuated for pulling rod 107. This will cause clutch 72 to rigidly connect sprocket 70 with shaft 71. This will convey motion to chain 69 and from thence to shaft 67 through sprockets 68. From shaft 67 power is conveyed through gear wheel 66 to gear wheel 65 and from thence to shaft 61. Mounted on shaft 61 are sprocket wheels

59 and 60 around which pass chains 57 and 58 that carry buckets 55 and 56. Power is thus conveyed from pulley 73 to buckets 55 which will receive cement from receptacle 62 and raise the same to the top of the frame of the machine and dump the cement into hood 30 where it is caught by blades 40 and 42 or 40 and 41 as the case may be. If the material is caught between blades 40 and 41 the same will be dumped into chute 28 and pass through the same as seen in Fig. 2 into one of the molds 13. Previous to the dumping of the material from between blades 40 and 41 into chute 28 former 16 will be lowered to the position shown in Fig. 2, and also the framework 108 will be lowered. Frame 108 carries a hopper or hood 109 which receives and guides the material from chute 28 into one of the molds 13. The hopper 109 is adapted to project above frame 108 and be of such a size as to form a substantially flared continuation of each of the molds 13 as the same is moved over the respective molds. A plate 110 is bolted or otherwise rigidly secured to hopper 109 preferably near the bottom thereof or across the bottom and is formed with an aperture 111 through which former 16 is adapted to pass. Plate 110 may be removed and replaced by one having a hole of a different size for forming different sized tiles as the case may require. It will be of course evident that the former 16 must be changed when the tile is to be changed in size as well as the mold. Frame 108 is adapted to move down by gravity to a position above one of the molds 13 when permitted to do so by the movement of walking beam 46, but it will be evident that a spring may be secured to the same for positively moving the same down to substantially a horizontal position as seen in Fig. 2.

After the cement or other material used in making tile has passed through hopper 106 into mold 13 the rotation of former 16 will cause the threads 88 to engage the cement and pack the same in spiral layers around the former and against the sides of the mold. As the cement is packed around the former 16 the spiral or threads 88 will press against the same and gradually rise until the spirals or threads have moved entirely out of the mold. At this instant or slightly before this period the threads on sleeve 104 will engage nut 103 and as the shaft carrying the plunger will continue to rotate the same will be raised by the action of threads on sleeve 104 against the threads or nut 103. The raising of shaft 47 by the action of the spirals or threads 88 and also the action of sleeve 104 against nut 103 will cause walking beam 46 to lower shaft 48 and consequently lower former 17 to a position similar to the position of former 16 as shown in Figs. 2 and 11. At the same time that plunger or former 17 is lowered blades 40 and 42 will be moved over to the dotted position shown in Fig. 4 and permit cement to be fed through chute 29 into the mold 14 that contains the plunger or former 17. As former 16 leaves mold 13 walking beam 46 is raised and consequently raises a reciprocating bar 112 that is connected therewith. The bar 112 passes through a pair of rollers 113 and 114 secured to pivotally mounted arms 115 and 116. Arms 115 and 116 are pivotally mounted upon frame 108 and are adapted to move slides 117 and 118. The slides 117 and 118 are formed preferably with semi-circular notched out ends and are adapted to move inward upon the pivotal bearings of arms 115 and 116. When slides or plates 117 and 118 have moved inward they take a position above the newly formed tile and hold the same in the mold while the lower part of the former is being pulled therefrom. This will prevent any tearing or breaking of the tile. In order to cause the slides 117 and 118 to move inward and take a position above the tile bar 112 is formed with an enlarged portion 119 that is connected with the main body portion by a bevel 120. This will spread rollers 113 and 114, and consequently move slides 117 and 118. After rollers 113 and 114 have traveled the full length of enlarged portion 119 they will engage a stop 121 that will pivotally raise frame 108 and its associated parts upon its pivotal journal bar 122 which is mounted in suitable uprights 123. Rod 112 together with enlarged portion 119 is adapted to be of such a length as to not cause stop 121 to move frame 108 until the lower end of the former has moved out of the newly formed tile.

Pivotally mounted upon shaft 122 is a bell crank lever 124 that is actuated by a rod 125 connected with walking beam 46 preferably by passing loosely through an aperture therein and having a nut formed on the end of the rod so that as the walking beam moves downward rod 125 will be stationary and will remain stationary until walking beam 46 has moved above a predetermined point, preferably a horizontal level. The nut or stop positioned on the end of rod 125 is adapted to be engaged immediately after the former has been moved from the mold, and as the walking beam 46 rises farther rod 125 will be moved upward and will act upon bell crank lever 124 for pulling upon rod 26. This will rotate table 11 for bringing another mold beneath the former as heretofore set forth. As former 16 is raised and frame 108 is raised for permitting table 11 to be rotated for bringing a new mold beneath the former, former 17 is lowered and is adapted to receive material that has been deposited from one of the buckets 55 and 56 between

blades 40 and 42. A table 108 and surrounding mechanism is provided for former 17 constructed in a similar manner to frame 108 and surrounding parts provided for former 16 and adapted to operate in identically the same manner but alternately therewith. As the tile is formed in one of the molds 14 former 17 is gradually forced therefrom by the action of the spirals or threads 89 until the sleeve 90 engages nut 92 which will continue the upward movement of shaft 48. As shaft 48 rises shaft 47 will be lowered and vice versa so that tiles will be formed alternately on each side of the frame and the mechanism may be continuously operated. If the elevating mechanism should feed the cement to hood 30 at too great speed or in too large quantities the same may be stopped by the movement of lever 106 which will unclutch sprocket 70 from shaft 71 and will consequently stop the operation of elevator 54, but will not affect the operation of the formers and various other mechanism of the device. As walking beam 46 is moved upward on one side sliding bar 93 will be reciprocated after the walking beam has moved a certain distance upward on that side, and will be moved back and again when that particular side of the walking beam has been lowered. Bar 93 does not slide at the same time that walking beam 46 moves but only as the respective ends of walking beam 46 reach their extreme upward movement, opening 98 permitting loose movement between bar 93 and arm 97 so that arm 97 may move through almost its entire stroke before moving bar 93.

Molds 13 and 14 may be of any desired kind and provided with pallets of any desired kind as will be evident, the molds being adapted to be removed and empty ones substituted as the respective molds have tiles formed therein.

By thus constructing a continuously moving machine all that will be necessary to do after the machine has been started is to see that a proper amount of supply of cement or other material is fed into hood 30 and tiling will be formed alternately on the side of the machine and formed in layers by the action of the threads 88 and 89. Though the tiles are formed in layers when the same are set a uniform product is presented and one having all of the parts thereof compressed to an equal degree and consequently having equal strength. It will also be evident that a tile formed in this manner will be free from flaws and will after having been set form an integral structure.

What I claim is:

1. In a tile making machine, a frame, molds on each side of said frame, a rotatable and reciprocating former on each side of said frame and arranged to engage said molds successively, a rotatable and reciprocating shaft for each of said formers, a beveled flange positioned on each of said formers for causing each of the formers to move out of said molds and at the same time form tile therein, means for rotating said shafts and formers, and threaded means at the upper ends of said shafts for causing the shafts to raise said formers above said molds after the same have completed the formation of a tile therein.

2. In a tile making machine, a frame, a plurality of reciprocating and rotating formers, a mold for each of said formers, a mold table for carrying the mold for each of said formers, a walking beam connected with said formers, means for rotating said formers, means connected to said walking beam for causing said mold tables to bring beneath said former successively the mold positioned thereon, means for supplying said molds with material to be formed into tile after the formers have entered therein, means for causing said formers to move out of said molds during the formation of said tile, and threaded means for causing said formers to move above said molds after the tile has been completed.

3. In a tile making machine, a frame, a plurality of formers, molds for said formers, mold tables for feeding molds to said formers, means for rotating said mold tables for bringing said molds beneath said formers successively, a rotating and reciprocating shaft for each of said formers, means for rotating each of said shafts, means formed on each of said formers for causing the same to move out of the mold in which the same is positioned, and threaded means at the upper end of each of said shafts for moving said shafts and said formers above said molds after the tile has been completed.

4. In a tile making machine, a framework, a former, means for actuating said former, a reciprocating shaft secured to said former, a mold co-acting with said former, means secured to said former for raising said former from said mold during the formation of the tile, a threaded sleeve connected to said shaft, a nut for engaging said threaded sleeve, and means for rotating said shaft and said sleeve for causing said sleeve to raise said shaft and said former after the former has been forced out of said mold.

5. In a tile making machine, a framework, a plurality of formers, molds for said formers, a shaft for each of said formers, means for rotating said shafts, means formed on each of said formers for forcing the same from said molds, a reciprocating bar positioned on said frame, a threaded extension secured to each end of said bar, means for causing said bar to reciprocate and said threaded extension to be in a position above said respective shafts as the respective formers are forced from their respective

molds, a threaded sleeve secured to each of said shafts and engaging said threaded extension whereby each of said shafts are elevated above said molds alternately.

6. In a tile making machine, a framework, a plurality of formers, molds for said formers, a reciprocatory shaft for each of said formers, means for rotating said shaft, a threaded sleeve secured to each of said shafts, a reciprocating bar, a nut secured to each end of said reciprocating bar for alternately engaging said threaded sleeves for alternately raising said shafts, and means for reciprocating said bar.

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

WILLIAM J. McCRACKEN.

Witnesses:

H. C. LAGE,

GEO. RAW.