G. L. ALLEN.

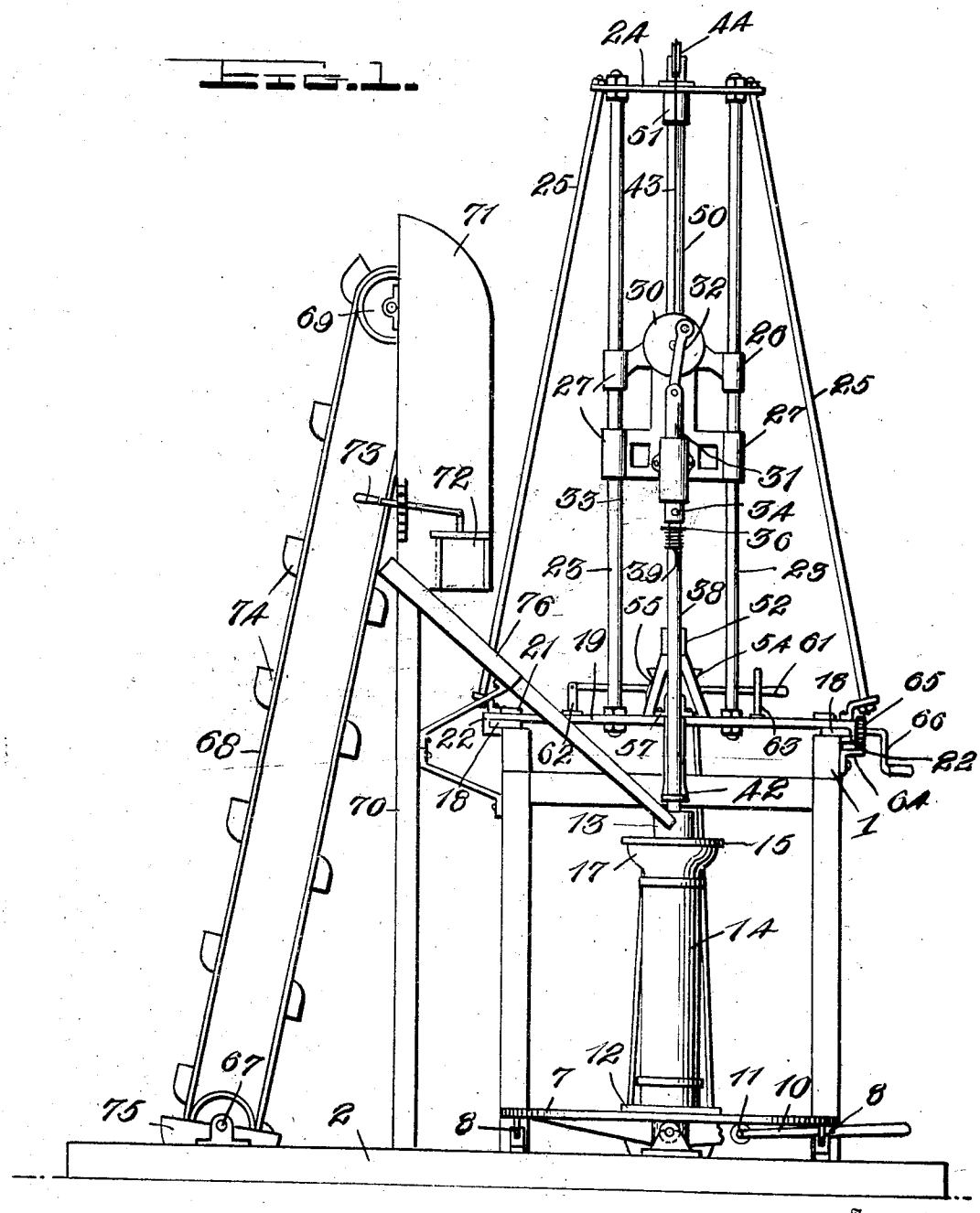
CEMENT TILE MACHINE.

APPLICATION FILED JULY 19, 1911.

1,037,189.

Patented Sept. 3, 1912.

4 SHEETS—SHEET 1.



Witnesses

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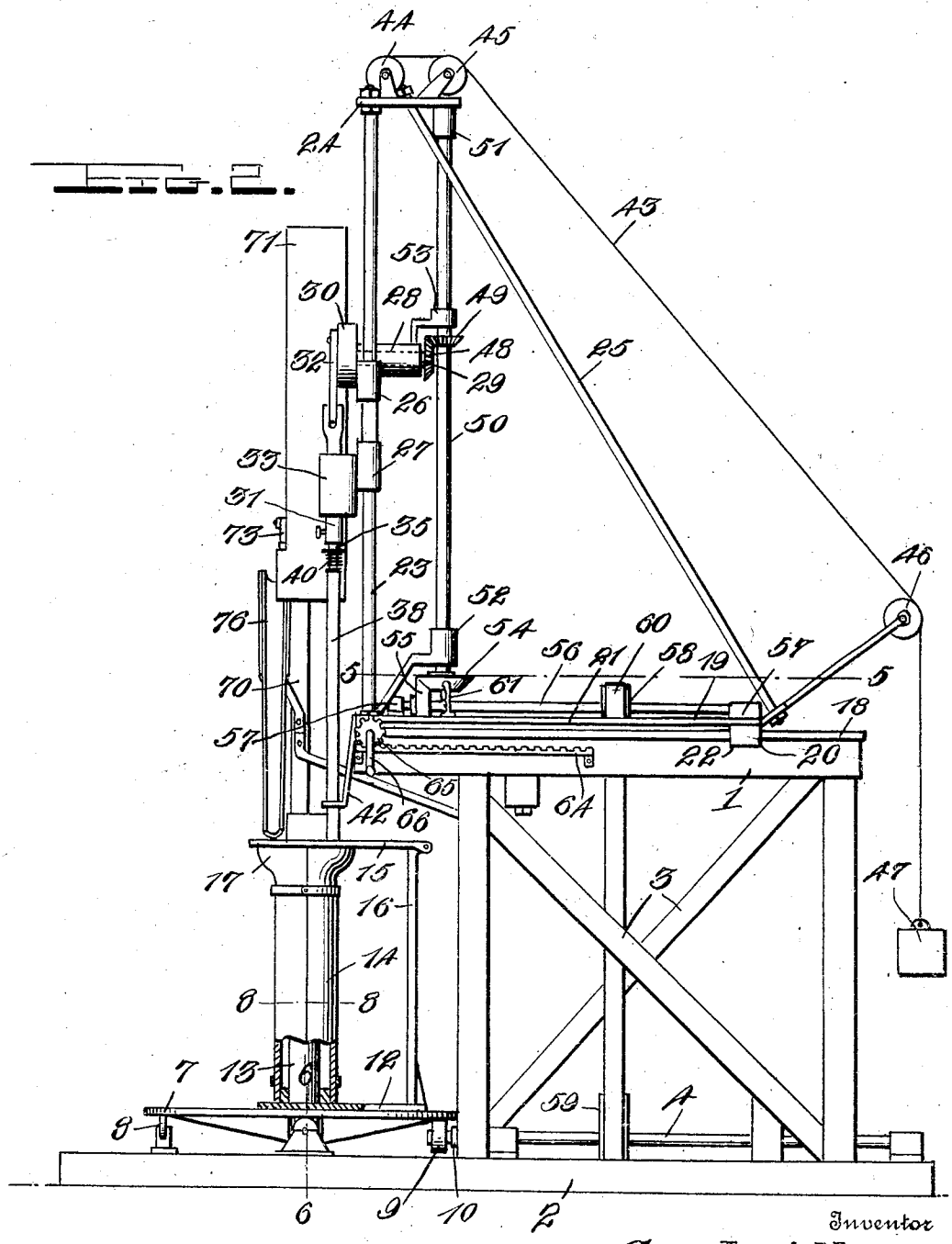
4 SHEETS—SHEET 2.

FIG. 2.



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4 SHEETS—SHEET 3.

FIG. 3.

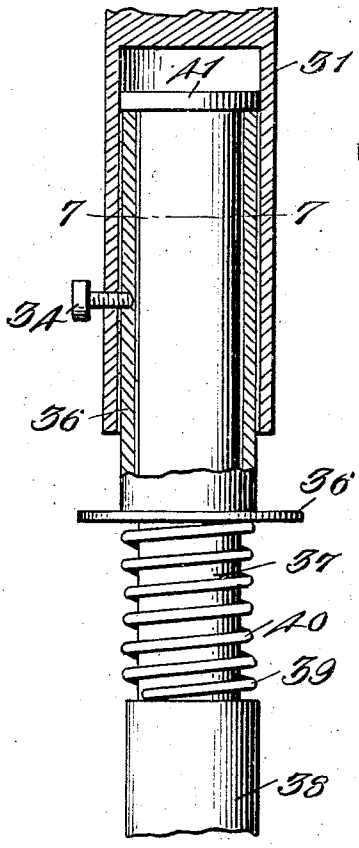


FIG. 4.

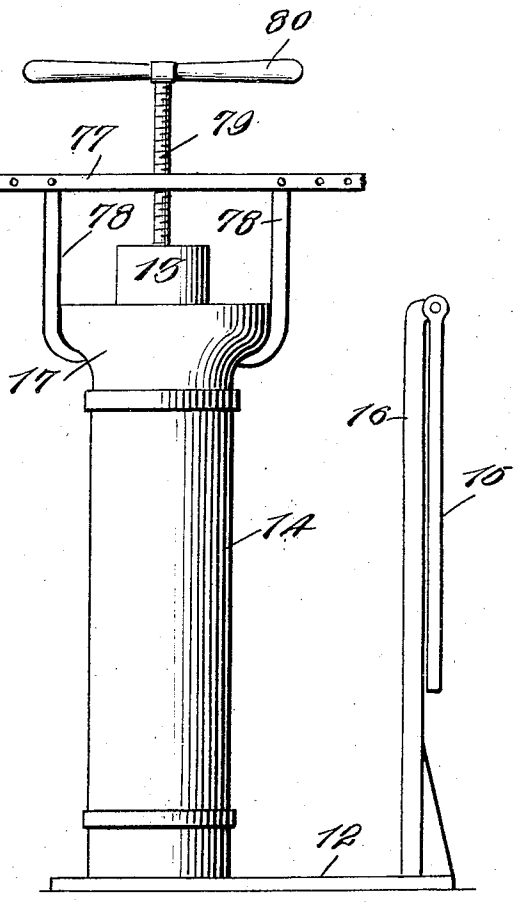
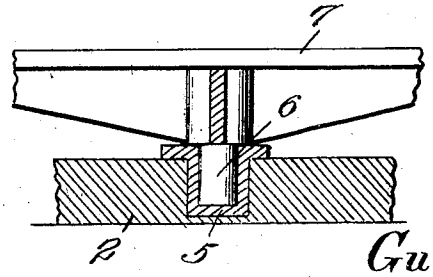


FIG. 6.



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4 SHEETS—SHEET 4.

FIG. 5.

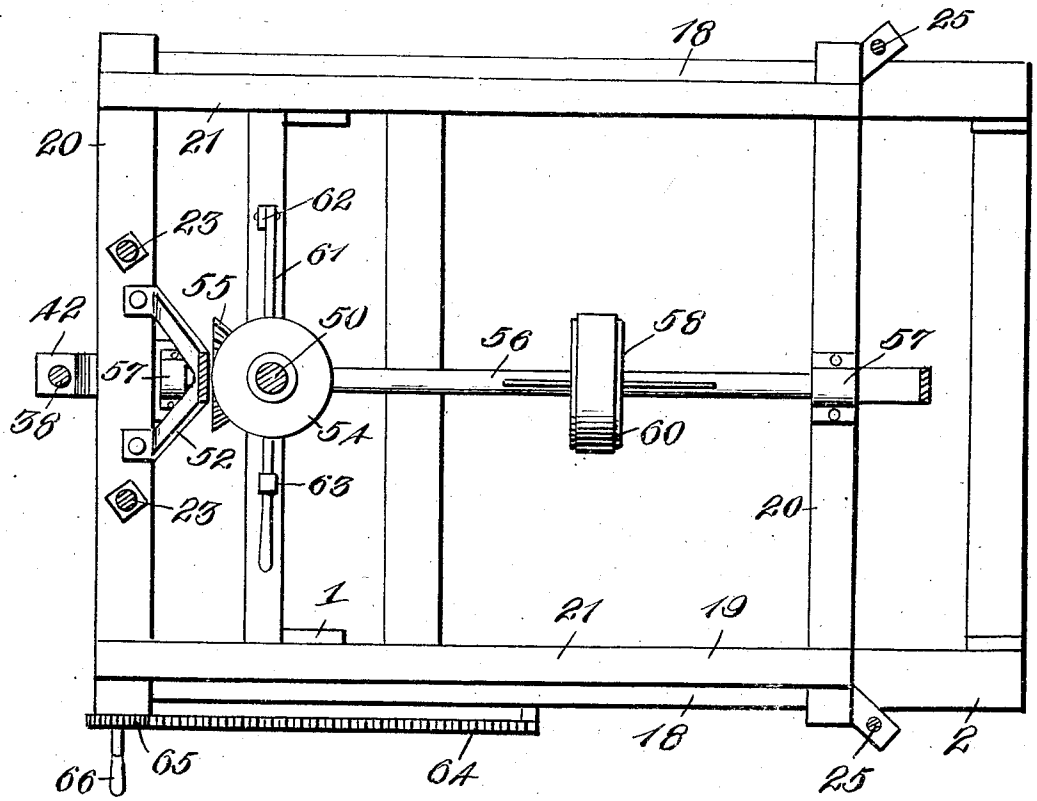


FIG. 7.

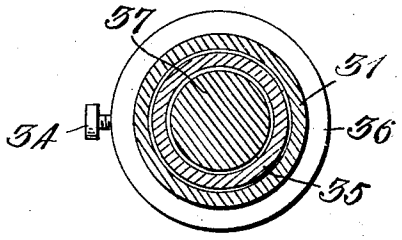
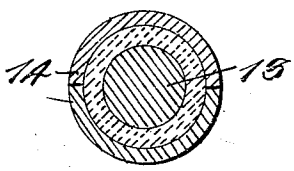


FIG. 8.



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UNITED STATES PATENT OFFICE.

GUY LEROY ALLEN, OF BOULDER, COLORADO.

CEMENT-TILE MACHINE.

1,037,189. Specification of Letters Patent. Patented Sept. 3, 1912.

Application filed July 19, 1911. Serial No. 639,303.

To all whom it may concern:

Be it known that I, GUY LEROY ALLEN, a citizen of the United States, residing at Boulder, in the county of Boulder and State of Colorado, have invented certain new and useful Improvements in Cement-Tile Machines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to new and useful improvements in tile forming machines and more particularly to a machine for forming drain tiles, cement sewer pipes and the like, and my object is to provide a machine of this character provided with an improved tamping device which tamps the cement as the same is fed into the mold to form the tile.

A further object of the invention resides in providing a tamping device with means whereby the tamper will be automatically raised and adjusted to the level of the cement in the form, and which will automatically raise and lower said tamper to adjust the same to the varying condition of the cement in the form.

A further object of the invention resides in providing a weight which partly balances the tamping device, whereby the increasing and decreasing of the weight will, respectively, decrease and increase the force of the blow given by said tamper, and a still further object resides in providing a suitable shock absorber for the tamper.

Still another object of the invention resides in providing means whereby the tamping device may be moved forwardly and rearwardly on the main frame of the machine, thereby compensating for various sizes of molds.

A still further object of the invention resides in providing a revolving table for the mold, and a still further object resides in providing means whereby the rotation of said table and the operation of said tamper may be discontinued without affecting one another or the operation of the machine proper.

With these and other objects in view, my invention consists in the novel features of construction, combination and arrangement of parts as will be hereinafter referred to and more particularly pointed out in the specification and claims.

In the accompanying drawings forming a part of this application, Figure 1 is a front elevation of the machine. Fig. 2 is a side elevation thereof. Fig. 3 is a fragmentary enlarged side elevation partly in section showing the means for absorbing the shock from the blow of the tamper. Fig. 4 is an elevation showing the means for removing the form from the machine after the tile has been formed. Fig. 5 is a horizontal section as seen on line 5—5, Fig. 2. Fig. 6 is a section as seen on line 6—6, Fig. 2. Fig. 7 is a section as seen on line 7—7, Fig. 3, and, Fig. 8 is a section as seen on line 8—8, Fig. 2.

In carrying out my invention, I shall refer to the drawings in which similar reference characters designate corresponding parts throughout the several views and in which—

1 and 2 indicate, respectively, the upper and lower platforms of the main frame of the machine, said platforms being held and supported one above the other by means of the braces 3, and said lower platform 2 has rotatably mounted thereon, the counter-shaft 4 which is adapted to receive power from any desired source, whatsoever, (not shown). The lower platform 2 is of greater length than the upper platform 1 and that portion of the lower platform extending beyond the upper platform, is provided about centrally with a socket 5 which receives the stem or stub shaft 6 of a rotating table or platform 7. This socket and stem center the table with respect to the platform in the rotating movement of said table, and in order to provide a supporting means for the outer ends of said table, a plurality of rollers 8 are mounted on said platform in circular alinement, which rollers receive in contact therewith, the under face of said table 7.

The shaft 4 extends on the platform 2 so that one end thereof is disposed below the rotating table 7, and said end of the shaft 4 is provided with a friction disk 9 which is adapted to engage the lower face of said table 7 to cause the latter to be rotated upon the rotation of said shaft 4. In order, however, to allow the shaft 4 to continue in its rotation without rotating the table 7, a foot lever 10 is pivotally mounted on the platform 2 and has one end thereof provided with an idler roller 11 which is disposed beneath said table 7, whereby when pressure is placed on the free end of said lever 10, the end carrying the roller 11, will be forced

upwardly and contact with the under face of the table and thereby raise the same in its bearings above the friction disk or wheel 9.

Secured on the table 7, is a base plate 12 which carries thereon, a central core 13, said core being arranged on the base plate to be disposed in the plane of the vertical axis of said table, and also mounted on the base plate 12 to surround the core 13, is a sectional jacket or casing 14. The lower end of this jacket 14 may be held centered with respect to the core 13 in any desired manner at the lower end thereof, and the upper end thereof is held centered by means of a plate 15 adapted to engage same and which is pivoted on the upper end of a standard 16, which standard is secured on the base plate 12. The upper end of the jacket 14 is preferably flared, as shown at 17, which will result in forming a substantially bell-shaped tile, and the arm 15 is adapted to engage this portion of the jacket to retain the same centered with respect to the core 13.

The upper platform 1 has supported thereabove along the side edges thereof, a pair of guide bars or rods 18 which extend longitudinally the full length of the frame, and mounted on these guide rods 18, is a frame or the like 19 which embodies the transverse bars 20 and the longitudinal bars 21. The outer side edges of the guide bars 18 project beyond the side edges of the frame upon which they are mounted, and the transverse bars 20 are bent downwardly and inwardly, as shown at 22, to form channels to receive the projecting edges of said guide bars 18, whereby said frame 19 may be readily moved along said guide rods. The forward of the two transverse bars 20 has securely mounted therein, the lower ends of a pair of vertical shafts 23, said shafts being spaced a short distance apart and the upper ends of said shafts are secured in a bracing and spacing plate 24, and said shafts 23 are held in a substantially vertical position by means of the bracing bars or guys 25, which extend from said bracing plate 24 to the rear of said frame.

Slidably mounted on the shafts 23, which form substantial guide bars, is a frame 26 which frame is guided along said shafts by being provided with the sleeves 27 through which said shafts extend, and said frame 26 is provided with a rearwardly or laterally extending sleeve or bearing 28 which has rotatably mounted therein, a shaft 29. The ends of this shaft 29 extend beyond the sleeve 28, and the forward end thereof has mounted thereon, a crank 30 which is pivotally connected with a tamping head 31 by means of the connecting rod or pitman 32, said head 31 being extended through a vertically arranged guiding sleeve 33 carried on the frame 26. The head 31 is of tubular design and has secured therein by means of the set screw 34, a sleeve-like inner member 35, the lower end of which protrudes beyond the lower end of the head 31 and has secured thereto, a plate or disk 36, through which extends the reduced end 37 of a tamper rod 38, and encircling the reduced portion of said rod 38 between the shoulder 39 thereon and the disk 36, is a coil spring 40. The tendency of this coil spring is to force the rod 38 outwardly from the head 31 and sleeve 35, but a head 41 formed on the inner end of the reduced portion 33 of said rod, is adapted to contact with the inner end of the sleeve-like member 35 and limit the movement of said rod 38, whereby it will be seen that as said tamper 38 is forced into engagement with any material below, the shock or jar will be obviously absorbed by the action of the spring 40. The tamper 38 depends to a point below the upper platform 1 of the frame and is retained in a substantially vertical position by means of the guide member 42 secured on said platform 1, and in order to balance the frame 26 which supports said tamper, on the shafts or guide bars 23, a cable 43 is provided, one end of which is secured to said frame and extended over the pulleys 44 and 45 supported on the upper bracing plate 24 and over the pulley 46 which is carried on the rear end of the bar 20 of the frame 19. The opposite end of said cable 43 has a weight 47 secured thereto which partly balances the weight of the frame 26 and its adjunctive parts, whereby as the material by which the tamper 38 is adapted to be engaged, is increased in height, the frame and tamping device in general will likewise be automatically raised and the weight thereof taken up by the weight 47 in the end of the cable 43. The inner opposite end of the shaft 29 is provided with a bevel gear 48 which meshes with a similar gear 49 carried on an additional vertical shaft 50, said additional vertical shaft being disposed immediately in the rear of the shafts 23 and rotatably mounted in the upper and lower bearings 51 and 52, respectively. The upper bearing 51 is carried or supported by the upper bracing plate 24, while the lower bearing is extended from the forward transverse bar 20 of the frame 19 and said shaft 50 is also guided through a guide sleeve 53 carried on the sleeve 28, whereby it will be observed that the shaft 50 and the guide shafts 23 with the parts mounted thereon, are all movable with the frame 19.

The lower end of the shaft 50 has mounted thereon, a friction cone 54 which meshes with a similar cone 55 carried on a shaft 56, said shaft 56 being rotatably mounted in the bearings 57 also on said frame 19, and keyed on the shaft 56 so as to be capable

of a sliding movement thereon, is a pulley 58 which connects with a pulley 59 on the shaft 4 by means of a belt 60, whereby it will be seen that when power is applied to said shaft 4, the same may be conducted to the shaft 56 which in turn transmits the same to the vertical shaft 50, said vertical shaft indirectly operating the tamper 38 through the medium of the various parts heretofore described. In order to stop the rotation of the shaft 50 without affecting the rotation of the shafts 4 and 56, respectively, I have provided a lever 61, one end of which is pivotally connected to an arm 62 mounted on the forward transverse bar 20 so that said lever 61 is disposed immediately below the friction cone 54, and when said lever is raised, the friction cone 54 will be raised from its engagement with the cone 55 to stop the rotation of the former, and in order to retain said lever in such raised position, a guide or keeper 63 is provided to receive the free end of said lever 61.

As before stated, the shaft 50 and the guide shafts 23 with the adjunctive parts in connection with the tamping device, are all securely mounted on the frame 19 so as to be movable therewith, and in order to move said frame backwardly and forwardly on the upper platform 1, I have provided a rack 64 on one of the side edges of said platform with which is engaged the teeth of a pinion 65 rotatably carried on one side of the forward transverse bar 20 in said frame 19, and a crank or handle member 66 is provided on the shaft carrying the pinion 65, whereby when said crank is turned, said frame with the various parts carried thereby, will be moved backwardly or forwardly, as the case may be. In this manner, the frame carrying the tamper, may be adjusted so that the lower end of said tamper will be immediately over the mold in which the tile is being formed and when the tamping device is not desired for use, the same may be moved backwardly out of operative position.

I have also provided means for the raising of the concrete or cement so as to be lowered into the form, and to this extent, I provide an additional shaft 67 which is rotatably mounted on the lower platform 2 and which is connected by means of a belt 68 with a pulley 69 carried on the upper end of a standard 70, said standard being also supported on the lower platform 2. The upper end of this standard is provided with a bin or chute 71, in the bottom of which is provided a door or the like 72 which may be operated by means of a cable or the like attached to a lever 73 connected to said door, and said belt is provided with a plurality of elevating buckets 74 which are adapted to carry the mixture upwardly and empty the same into the chute or bin 71. A boot or hopper 75 is provided in the lower platform 2 below the shaft 67 into which the mixture is adapted to be emptied, whereby as the snaft 67 is rotated, the bucket 74 will engage the mixture and carry the same to said bin 71, and disposed immediately below the door 72 of said bin, is a telescoping or sectional chute 76 which is supported from the main frame of the machine and is disposed so that the lower end thereof is in position to conduct the material from the bin 71 to a point immediately over the form on the rotating table 7. This chute 76 being a sectional telescoping one, is capable of being adjusted so as to provide for various sized molds, and it will be seen that the material conducted from the bin 71 will be passed to the flared portion of said mold which acts as a hopper in this instance, from where the same is dropped between the core and the outer jacket and is tamped as the form is rotated on the table 7. When the form has been tamped to completion, the operating parts of the machine are stopped and the device is applied to the form for the removal of the jacket and the tile. This device comprises a plate 77 which has pivotally connected thereto, a pair of hooked arms 78, and extending through said plate 77 about centrally, is a threaded stem 79 provided with a handle member 80 thereon. This threaded stem extends through a threaded opening in the plate 77 and is adapted to be applied so that the lower end thereof is screwed down tightly upon the upper end of the core 13 and the hooked arm 78 engaged under the flared portion 17 of the jacket 14. The plate 77 is then secured in any desired manner to a stationary object and the table 7 is then rotated, which will allow the plate to rise on the screw 79 which will rotate with the core 13, thereby causing the jacket 14 to rise therewith.

In operation, a jacket of any desired size, is placed on the base plate 12 and centered in position with respect to the core 13, whereupon the frame 19 carrying the tamping device and other adjunctive parts, is moved on the upper platform 1 so that the tamper 38 suspended therefrom, will be in position to tamp the material which is adapted to be entered in the upper end of the jacket. The lever 61 is then raised so that the friction cones 54 and 55 are disengaged and the machine is started, whereby the table 7 will be revolved to also revolve the form thereon and as the shaft 67 is connected in any desired manner, (not shown), with the shaft 4, it will be appreciated that at the start of the operation of the machine, the belt 68 will be rotated on the shaft 67 and the pulley 69 to carry the concrete from the boot 75 upwardly to the bin 71. Through the medium of the door 72, the flow of said

concrete from said bin may be adjusted so as to flow gradually on the chute 76 to the form on the revolving table 7. After the flow of concrete to the form has been started, the shaft 50 is lowered through the medium of the lever 61 so that the friction cones 54 and 55 are engaged with one another, which operation will allow the gears 48 and 49 to mesh and thereby rotate the crank 30, and as said crank 30 is rotated, the tamper 38 will be in turn reciprocated to tamp the concrete between the core 13 and the jacket 14. As the frame 26 which is slidably mounted on the shafts or bars 23 and carries the tamper 38, is not quite balanced by the weight 47, the same will lower itself so that the lower end of the tamper 38 will engage the concrete as the same is started to flow in the form, and as said concrete is increased in height by the continuous flow thereof from the chute 76, said frame 26 and the parts will be automatically raised and compensated for by the weight 47 on the end of the cable 43. It may happen during the operation of the machine that the mixture which is being tamped, is uneven on its upper surface, but in view of the particular manner in which the tamping device is applied to the machine, that is, through the medium of the weight, the tamper will rise and fall with the unevenness of the upper surface of the concrete, thereby insuring a perfectly tamped tile. In order to increase or decrease the force with which the blow of the tamper 38 is driven, lighter or heavier weights are, respectively, applied to the end of the cable 3, and in order to relieve the frame of the tamping device of the jar from which the same is ordinarily subjected, as said tamper is in operation, the spring 40 has been provided in connection with the head 31 and sleeve 41, as heretofore described. When the tile has been tamped to completion, the shaft 50 may be raised so that the cones 54 and 55 are disengaged and the frame 19 moved rearwardly through the medium of the crank 66 operating the pinion 65. Pressure may then be placed on the foot lever 10 to raise the table 7 from its engagement with the rotating friction disk 9 and the jacket-removing device applied in the manner heretofore described, whereupon the pressure is then released from said foot lever and the table allowed to again rotate. As the table rotates, the jacket 14 will be raised slightly, that is, just sufficient to loosen the jacket from the material, and when said jacket has been raised a slight distance, the rotation of the table may be stopped, whereupon the sections of the jacket may be readily removed from the tile formed. The core may be removed from the tile in any approved manner, and said tile may then be allowed to stay in one section of the jacket 14, said jacket acting as a pallet until the cement has set. When one tile has been completed, another jacket may be applied to the base 12 about the core 13 and the machine again set in operation, as before described, and in this connection, it might be stated that provision may be made in the base plate 12 for various sized jackets, and when tiles of various sizes are desired, sleeve-like members (not shown) may be telescoped about the core 12 for that purpose.

It will be seen from the foregoing, that I have provided a tile forming machine in which an improved tamping device is used, and it will further be seen that I have provided means whereby said tamping device may be thrown into and out of effective position without affecting the rotation of the mold. It will further be seen that I have provided a revolving table upon which the mold is adapted to be placed, the rotation of which table may be stopped without affecting the operation of the tamping device. It will further be seen that my improved tamping device will be automatically raised and lowered to compensate for the unevenness of the upper surface of the concrete in the form, whereby the tile will be perfectly tamped when completed. It will still further be seen that I have provided a means to absorb the shock or jar incident to the contacting of the tamper rod with the surface of the concrete in the form. It will further be seen that by means of the arrangement heretofore described, the complete frame carrying the tamping device may be moved forwardly or rearwardly on the main frame of the machine, whereby the tamper may accommodate various sizes of molds and may be readily moved out of operative position. Furthermore, it will be seen that I have provided a device which is comparatively simple, but durable in construction, and one which is very effective and useful in operation. It will further be seen that various sized tiles may be formed by merely nesting or telescoping cores over the central core heretofore described, and furthermore, although I have merely shown means for the formation of tiles at one end of the device, additional means may also be provided identical with the means described for forming the tiles at the opposite end of the device, whereby a greater number of tiles may be formed with little or no trouble and expense attached thereto. In this connection, it must be also stated that various changes in form, proportion and in the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the principles of the invention.

What I claim is:—

1. In a tamping arrangement for tile forming machines, the combination with a

movable frame, vertical guide bars mounted thereon and bracing means for said guide bars; of a tamping frame slidably arranged on said guide bars and provided with a horizontally extending bearing, a shaft rotatably mounted in said bearing and provided at one end thereof with a crank, means to rotate said shaft, an additional bearing carried on the front face of said bearing and extending vertically thereof, a tamping head slidably arranged in the last referred to bearing, connecting means between said head and crank, a sleeve mounted in the lower end of said head, a tamping rod having the end thereof reduced in diameter and slidably disposed through said sleeve, a coil spring encircling the reduced portion of said rod and contacting with the lower end of the sleeve portion to normally force said rod outwardly, and means to limit the movement of said rod with respect to the sleeve.

2. In a tamping arrangement for tile forming machines, the combination with a pair of vertical guide bars; of a tamping frame slidably arranged thereon and provided with a horizontally arranged bearing, a shaft rotatably mounted in said bearing and provided at one end thereof with a crank, means to rotate said shaft, an additional bearing carried on said frame and disposed vertically thereof, a tamping head slidably disposed through the latter bearing and having operative connection with said crank, a sleeve disposed in the lower end of said head, said sleeve being provided at its lower end with an annular flange, means to secure said sleeve in position in the head, a tamping rod having the upper end thereof reduced in diameter and extended through said sleeve, the extreme upper end of said rod being provided with a head to limit the outward movement of said rod from the sleeve, and a coil spring encircling the reduced portion of said rod between the shoulder thereon and the flange on said sleeve to normally force said rod in its outward position.

3. In a tile forming machine, the combination with a frame, a pair of vertical guide bars carried thereon, a tamping frame slidably arranged on said guide bars and provided with a horizontally arranged bearing, a shaft extending through said bearing having a crank formed at one end thereof, a tamping rod having connection with said crank, and a gear mounted on the opposite end of said shaft; of a vertical shaft rotatably mounted in the rear of said guide bars, said shaft being provided with a gear thereon adapted to mesh with the aforesaid gear, an additional horizontal shaft rotatably mounted on said frame, means to rotate said latter shaft, friction cones, respectively, carried by said vertical and last referred to horizontal shafts to rotate the one shaft upon the rotation of the other, and a lever pivotally carried on the frame adapted to raise one of said cones out of engagement with the other.

4. In a tile forming machine, a platform, a table revolubly mounted thereon, a plurality of rollers mounted on said platform and arranged in a circular alinement thereon, said rollers being adapted to receive in engagement therewith, the under face of said table, means to rotate said table, and means to raise said table out of engagement with the operating means therefor.

5. In a tile forming machine, a platform, a shaft revolubly mounted thereon having a friction disk carried at one end thereof, a plurality of rollers arranged in circular alinement with said friction disk on the platform, a table revolubly mounted on said platform and adapted to rest on said rollers and friction disk, and a foot lever pivotally carried on the platform adapted to raise said table from its engagement with the disk and rollers.

6. In a tile forming machine, the combination with a main supporting frame having tracks thereon, an additional supporting frame slidably mounted on said tracks, vertical guide bars carried on the forward end of said additional supporting frame, a tamping frame slidably mounted on said vertical guide bars and provided with a horizontally disposed bearing, a shaft rotatably mounted in said bearing having a crank carried on the forward end thereof, a gear carried on the rear end of said shaft, and a tamping rod having connection with said crank; of a vertical shaft rotatably mounted in the rear of said guide bars on the additional supporting frame, said shaft being capable of a vertical movement in its bearings, means coöperating with the lower end of said vertical shaft to rotate the same when in its lowermost position, additional means carried on the shaft and coöperating with the aforesaid gear to rotate the latter upon the rotation of the former, means to raise and lower said vertical shaft, and additional means to manually slide said additional supporting frame on the main supporting frame.

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

GUY LEROY ALLEN.

Witnesses:
F. C. PENFOLD,
M. LATORRA.