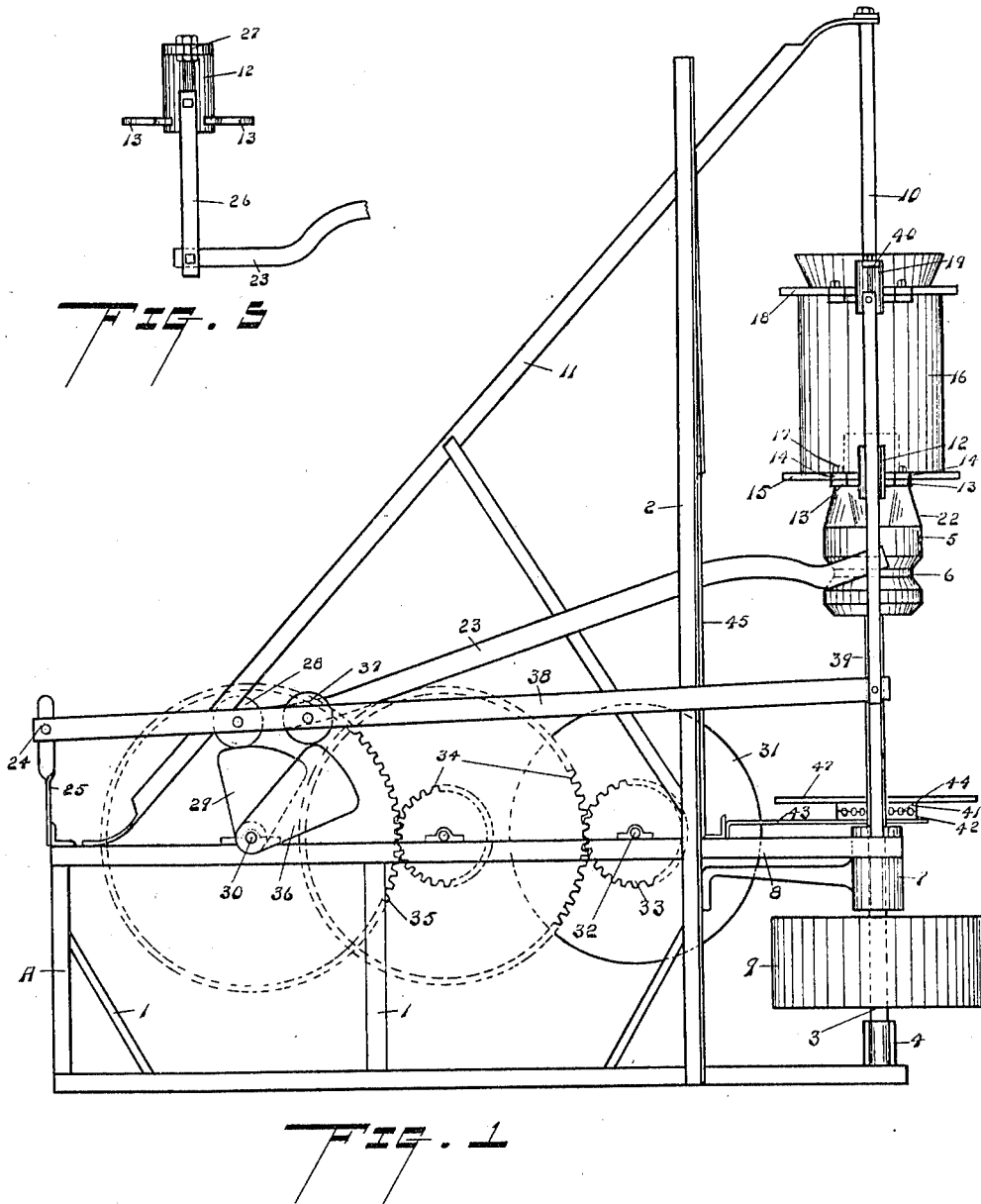


H. & J. H. BESSER.
AUTOMATIC TILE MACHINE.
APPLICATION FILED JUNE 29, 1909.

1,001,609.

Patented Aug. 29, 1911.

4 SHEETS—SHEET 1.



WITNESSES:
Roy Wallis
Ralph S. Warfield

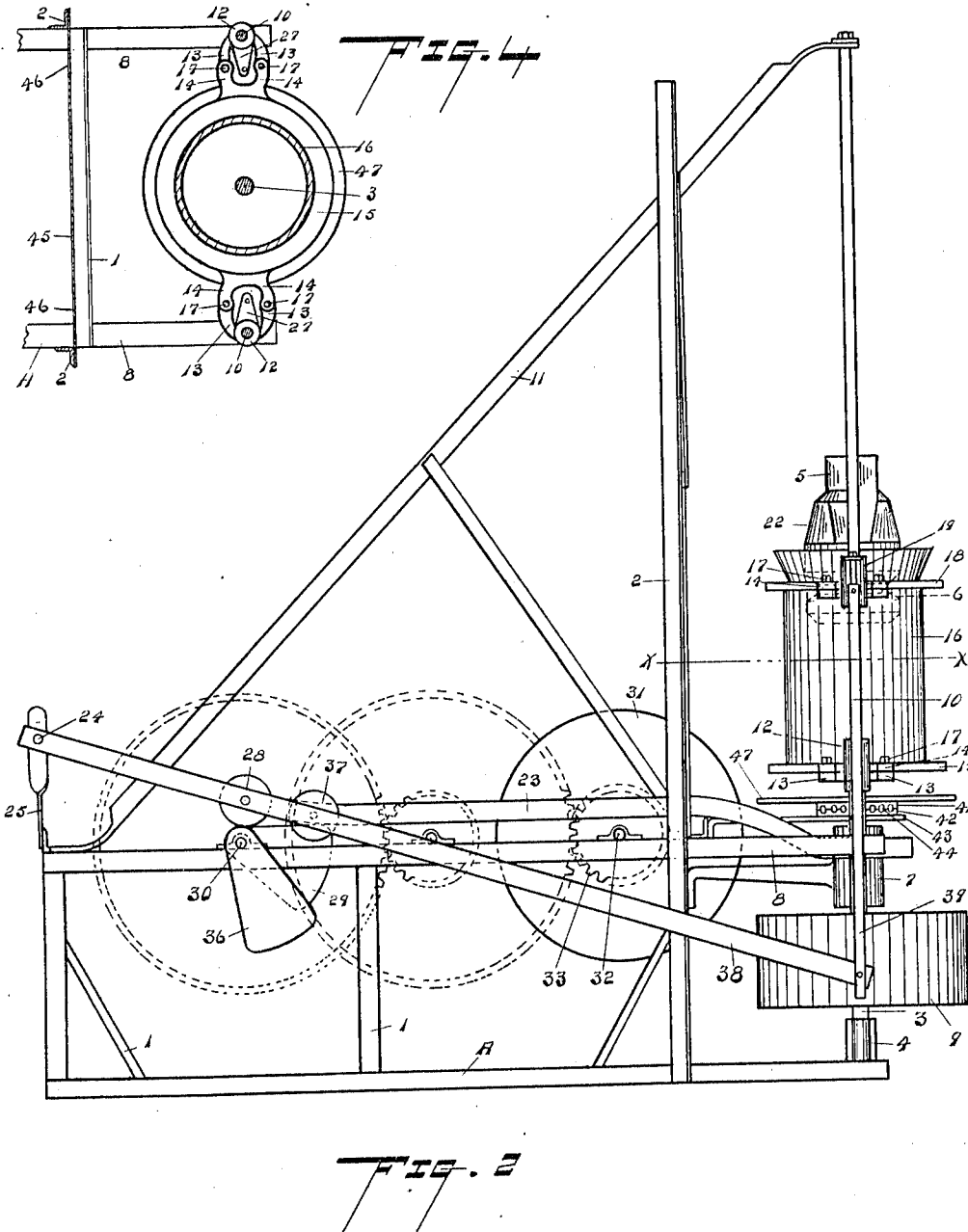
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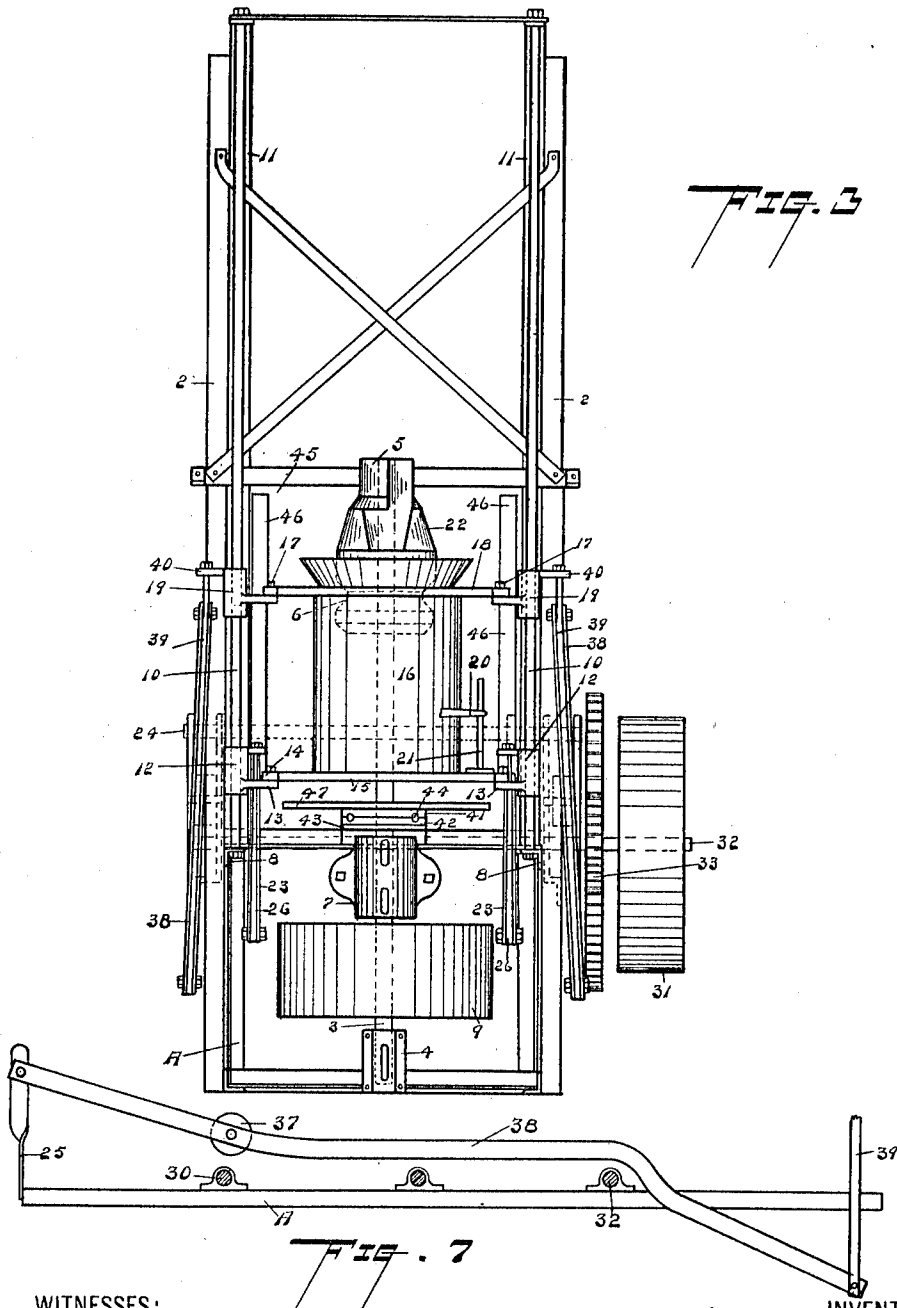
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

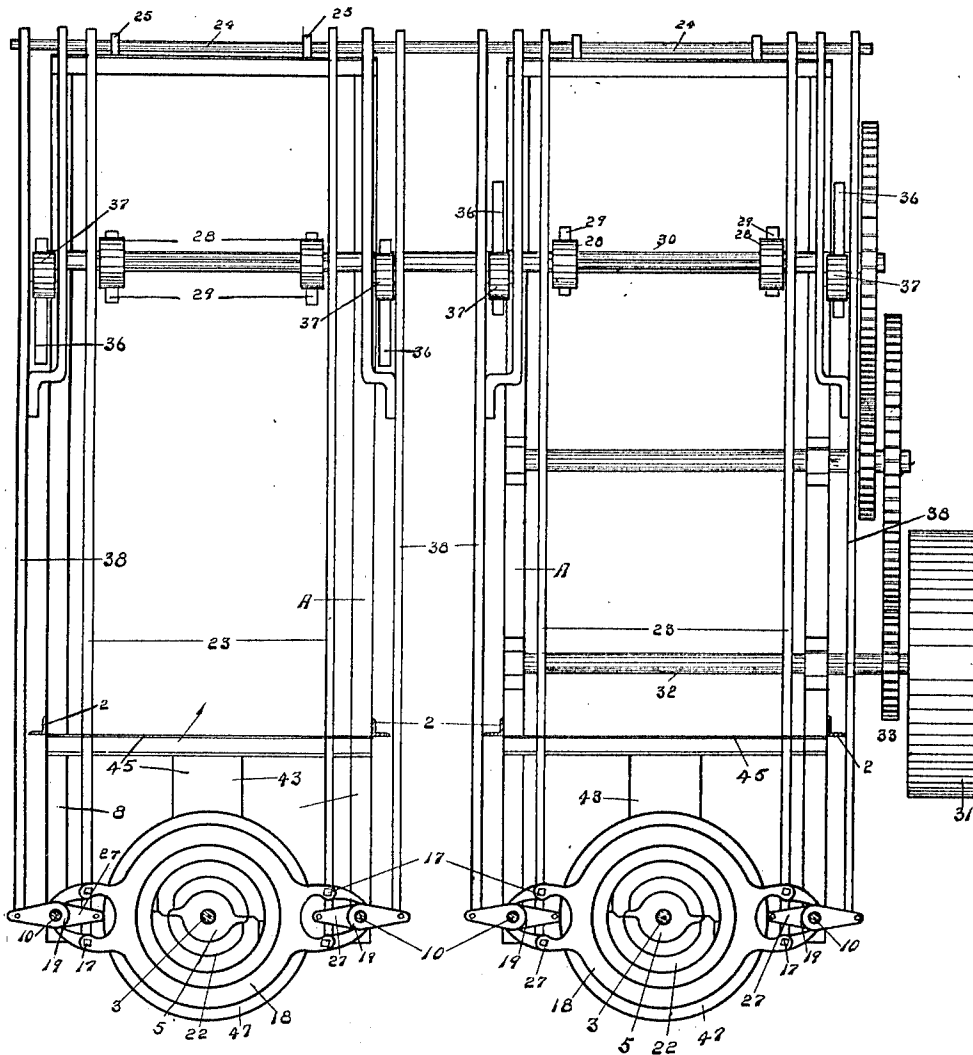


FIG. 5

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AUTOMATIC TILE-MACHINE.

1,001,609.

Specification of Letters Patent.

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Application filed June 29, 1909. Serial No. 504,982.

To all whom it may concern:

Be it known that we, HERMAN BESSER and JESSE H. BESSER, both citizens of the United States, residing at Alpena, in the county of Alpena and State of Michigan, have invented certain new and useful Improvements in Automatic Tile-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to automatic tile machines and is more particularly directed to that type of tile machines employing a whirling head or former and a cylindrical mold casing, one movable relative to the other, whereby the former or head is caused to enter the mold to form the tile.

One object of our invention is the provision of a neat, strong, simple and compact machine of this character, comprising a small number of working parts whereby access may be easily had to all parts of the machine, and floor space is economized, as well as danger to the operator avoided.

To these ends, the present machine avoids the use of a moving table carrying the molds.

Another object is the provision of a machine whereby the tile, after it is made, is not moved or jarred in any way, thus avoiding the mechanism and attention required by the use of a moving table.

A further object is the provision of a light, simple machine of few parts, capable of a greater capacity than heretofore.

A still further object is the provision of a machine which will make harder and more compact tile than heretofore.

Still another object is the provision of a compact machine whereby the tile are made at a convenient height to enable the operator to remove and place the molds in position with ease and rapidity.

Another object is the provision of means for preventing the entrance of extraneous material into the bearings.

A further object is the provision of a packer head and mold which center perfectly.

Another object is the provision of a machine having a direct drive which economizes power and avoids the noise and repairs incident to machines which are otherwise driven.

A further object is the provision of a machine of this nature which affords no obstruction to the entrance of the material into the mold.

A still further object is the provision of a machine whereon tile throughout a wide range of sizes can be made.

To these and other ends, therefore, our invention consists in certain novel features and combinations such as will be more fully described hereinafter and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side view of one embodiment of our invention, showing the mold in position to receive material, Fig. 2 is a similar view showing the mold in its lowest position, Fig. 3 is an end view, Fig. 4 is a detail of the supporting or bottom ring of the mold, Fig. 5 is a detail view showing the connection between the levers and the bottom ring, and Fig. 6 is a top plan view showing our invention arranged as a battery, and Fig. 7 is a detail view of a modified form of the lever adjacent the driving gears.

Our invention in brief, comprises a whirling or rotary packer head or former, a pair of rings, the upper of which is movable relative to the lower, levers for actuating the movable upper ring and the packer head or the lower ring, and means for actuating the levers synchronously.

In making a tile, an empty cylindrical mold casing is placed on end on the lower or supporting ring, while the upper ring is maintained in raised position, after which the upper or retaining ring is lowered onto the upper end of the empty mold casing to hold it in position, means being provided to prevent the rotation of the casing relative to the rings. The lower end of the casing is practically closed by the upper reduced end of the whirling packer head which projects into the casing a slight distance. The cement, concrete or other plastic material is now deposited in the mold. Relative movement vertically of the mold and packer head now takes place, until the grooved bottom of the packer head lies opposite the retaining ring, the body of the packer head extending above the mold, whereupon additional material may be fed to the mold, after which a reverse movement of the one relative to the other takes place, until the parts are returned to their normal positions. The retainer ring is now caused

to rise, releasing the mold which is removed and an empty mold substituted therefor, whereupon the same procedure is repeated.

The whirling packer head can be caused to move relative to the mold, which in that instance would be held stationary during the operation of forming the tile, but in the present instance we have shown the mold as being reciprocated relative to the whirling packer head, which latter is retained at a constant elevation.

Referring to the drawings, A indicates a framework braced as at 1, 1, and provided near one end with the standards 2, 2. One end of a vertical shaft 3 is stepped in a bearing 4 in front of the standards 2, 2, the shaft extending parallel with the standards and provided at its upper end with a packer head or former 5, the base of which is peripherally grooved as at 6, the upper end being reduced as shown. The general shape of this former is set forth in detail in our co-pending application filed Feb. 27, 1909, Serial No. 480,365, except that we have added the peripheral groove thereto. The shaft passes through a bracket bearing 7, projecting from the frame A and lies between the projecting horizontal arms 8, 8, of the frame. A pulley or other wheel 9 on the shaft is connected directly with a source of power whereby the shaft is rotated.

One means of forming the mold is as follows: A pair of vertical guides 10, 10, are mounted at their lower ends in the arms 8, 8, such guides extending parallel and preferably in alinement with the shaft 3 in front of the standards 2, 2. The upper ends of the guides are received in the projecting upper ends of diagonal braces 11, 11, carried by the frame and standards, such projecting upper ends overhanging the forward ends of the arms 8, 8. Sleeves 12, 12 are slidably mounted on the guides, the sleeves each being provided with inwardly projecting fingers 13, 13, overlapped by the ears 14, 14, projecting from diametrically opposite points in the circumference of a supporting ring 15, on which the lower end of the mold casing 16 is seated. The ears and fingers are releasably and positively connected by bolts 17 or other suitable fastening means so that supporting rings of varying sizes can be secured to the sleeves to enable the machine to make tile of different diameters.

In order to releasably retain the mold casing in position on the supporting ring we provide a retaining ring 18 secured to sleeves 19 slidable on the guides 10 in the same manner as described, in connection with the supporting ring and its sleeves.

The cylindrical mold casing 16 is of any convenient form as that shown in my co-pending application above referred to, such casing being provided with the handles 20 whereby it is placed on and removed from

the supporting ring. In order to prevent the rotation of the mold casing on the ring when the whirling packer head is introduced therein, we preferably provide the supporting ring with a stop 21 with which the handles engage.

As heretofore noted, it is possible to reciprocate the packer head vertically relative to the mold or vice versa, to reciprocate the mold relative to the packer head and in the accompanying drawings, we have illustrated a machine wherein the mold casing and its rings are reciprocated relative to the packer head.

The normal position of the casing is shown in Fig. 1, wherein the upper reduced end only of the packer head extends into the bottom of the mold, to prevent the material deposited in the mold from passing entirely therethrough, the inclined wall 22 of the head leaving but a slight opening between itself and the supporting ring 15.

Fig. 2 shows the lowest position assumed by the mold casing, at which time the groove 6 of the head lies opposite the retaining ring 18, and as one means for effecting the movement of the mold casing between these two positions, we provide a pair of levers 23, 23, the rear ends of which are pivotally mounted on a rod 24 supported in brackets 25 on the rear of the frame A, the levers extending forward in planes parallel with the vertical planes of the arms 8. Preferably the forward portions of the levers are provided with a downward curve intermediate their ends, the forward ends of the levers being connected by means of links 26 to the radially projecting ears 27 on the sleeves 12, 12, supporting the sustaining ring 15. These levers 23, 23, adjacent their rear ends are conveniently provided with anti-friction rolls 28, 28, resting upon cams 29, 29, mounted on a cam shaft 30, journaled on and extending across the frame A. This shaft may be conveniently driven from a pulley 31 receiving its motion from any suitable source. Such pulley is mounted on a drive shaft 32 journaled in the frame A, the drive shaft carrying a gear 33 whose motion is transmitted by suitable gearing to the cam shaft. The rotation of the cam shaft 30 causes the cams 29 to wipe against the levers 23 or the friction rolls 28 carried thereby, to raise and lower the mold casing, the throw of the cams being arranged to actuate the mold casing between the positions shown in Figs. 1 and 2 respectively.

It is necessary that the retaining ring 18 be raised off of the mold when it is desired to remove a filled mold and substitute an empty one therefor, and as one means for mechanically accomplishing this movement of the retaining ring, we provide the cam shaft 30 with the cams 36, 36, adapted to engage anti-friction rolls 37 on a pair of levers

38, 38, pivoted at their rear ends on the rod 24, the forward ends of the levers being connected by links 39 to the projecting lips 40 on the sleeves 19, 19, to which the retaining ring 18 is connected.

The movements of the levers 23 and 38 are synchronized relative to each other, that is to say, the cams 36 are preferably larger than the cams 29 and are so arranged on shaft 30 relative to such cams 29 that when the latter have raised the mold casing to its highest limit of movement, they will retain it in such position for a limited time, during which period the cams 36 will actuate the levers 38 to raise the retaining ring a suitable distance above the upper end of the mold casing, whereby to release the latter and permit the operator to first raise the casing so that its lower end will clear the reduced upper end of the packer head and then remove the casing from the machine and place an empty casing in position on the supporting ring. The depressed portions of the cams 36 by this time, permit the levers 38 to descend, carrying with them the ring 18 which is automatically fitted and rests upon the upper end of the empty casing, the retaining ring being held in position by its own weight to which is added the weight of the links 39 and levers 38.

The operation of so much of our machine is briefly as follows: Assuming the parts to be in the positions shown in Fig. 1, the material is fed into the empty mold casing in any convenient manner, the whirling packer head 5 preventing the material from falling through the mold, and throwing the material by centrifugal action against the inner periphery of the mold casing. The cams 29 now descend, which permits the levers 23 to move downward, drawing with them the supporting ring. The mold and superposed retaining ring follow the supporting ring downward as though made in one piece therewith. This downward movement of the mold casing causes the whirling packer head to enter the casing and firmly pack the material against the sides thereof, the extreme diameter of the packer head adapted to have a sliding fit in the rings 15 and 18. When the cams 29 have reached the lower limit of their throw, the parts are in the position shown in Fig. 2, at which time the groove 6 of the packer head lies opposite the retaining ring 18, the groove being of such width as to permit the entrance of additional material to the mold casing if desired. The mold casing remains in its lowest position for a moment and is then elevated by the cams 29 and levers 23, the upper or retaining ring being raised with the mold and supporting ring to its original position. It will be noted that each tile is twice engaged by the packer head, which results in the formation of a compact,

smooth article which is of the same strength or hardness, top and bottom. When additional material is added at the time the parts are in the position shown in Fig. 2, a most compact, non-porous tile is produced of exceeding strength and hardness. When the mold casing ascends to its highest position as above described, the tile is ready for removal to accomplish which, the cams 29 are formed with their outer ends broadened to retain the supporting ring temporarily in raised position. Just as the mold attains such elevated position, the cams 36 are timed to engage the retaining ring levers 38 to raise the retaining ring 18 off the mold, at which time the casing containing the completed tile is removed and an empty casing substituted therefor, whereupon the cams 36 permit the retaining ring to descend and fit upon the upper end of the empty casing and the foregoing operation is repeated, the cams 36 being arranged to afford time in which to effect this removal and substitution. The descent of the mold casing relative to the packer head operates to bring a downward pressure upon the head and shaft 3, as well as the step-bearing 4, to relieve which we provide a ball bearing, the same comprising an inverted ball race 41 keyed to the shaft 3, a second ball race 42 being supported against rotary movement on the shelf 43 projecting from the frame, a series of balls 44 being interposed between the races so that downward pressure on the shaft is transmitted to the frame through the shelf 43 and ball bearing. And in order to prevent the material from entering the ball bearing or the shaft bearings 7 and 4, we preferably key a plate 47 on the shaft 3 below the head and above the bearings. Furthermore, in order to prevent the material from scattering upon the machine, we affix a shield 45 (conveniently consisting of a sheet of metal) to the standards 2, 2, such shield being slotted as at 46 to permit the levers 23 to extend therethrough. It is also obvious that the operating parts of the machine may be inclosed to a height even with the supporting ring when the latter is in its highest position, if desired.

The machine is simple and compact, strong and durable, consisting of but few working parts easily accessible and not liable to get out of order easily. The molded articles are not jarred by the machine in any manner after completion. The tile are delivered at an elevation convenient for removal and the packer head will center perfectly with the rings, because all tile of a given size are made on the same set of rings. The material can be easily fed to the molds without inconvenience from moving parts and rings, and packer heads of various sizes can be substituted for those shown, to produce tiles of different diameters. The machine shown

will make tile of different lengths throughout a predetermined range and by changing the cams to vary the throw of the levers, tiles of a length outside this range can be

5 made on the machine.

In Fig. 6 is shown a battery of automatic tile machines consisting of two machines arranged side by side, employing but one cam shaft, and means for driving the same. The

10 cams on the shaft 30 are preferably so arranged on the shaft that the mold casings of the two machines operate alternately, thereby rendering it possible for one man to take care of both machines.

15 It is evident that changes might be made in the form and arrangement of the several parts described, without departing from the spirit and scope of our invention.

Having thus fully disclosed our invention, what we claim as new, is:—

1. A tile machine comprising a whirling packer head, a supporting member, a mold casing removably mounted thereon, means for reciprocating the supporting member

25 relative to the head, a retaining ring, and means synchronized with the means actuating the supporting member, for raising and lowering the retaining ring relative to the mold intermediate the two strokes, constituting each reciprocation of the supporting

30 member.

2. A tile machine comprising a rotating packer head, a mold casing, a supporting member on which the casing is removably

35 mounted, a retaining member on the casing, means for lowering the casing and subsequently raising the same, and sustaining it temporarily in raised position, and means for raising, sustaining and lowering the retaining member during the maintenance of the mold casing in raised position.

40 3. A tile machine comprising a rotating shaft, a packer head carried by the upper end of the shaft, a movable supporting

45 member, a mold removably seated thereon and adapted to receive the head, means for moving the mold and supporting member relative to the packer head, and means for retaining the mold on the supporting member.

50 4. A tile machine comprising a rotary packer head, guides arranged laterally of the head, upper and lower sleeves movable on the guides, rings releasably connected to the upper and lower sleeves respectively, a

55 mold casing removably received between the rings and adapted to receive the head, levers connected to the lower sleeves for moving the mold and rings up and down, other

60 levers connected to the upper sleeves for moving the upper ring relative to the mold, and cams for actuating the levers, the cams so arranged relative to each other that the movement of the upper sleeves relative to

the mold takes place intermediate the up 65 and down movement of the mold.

5. A tile machine comprising a rotary shaft, a packer head at the upper end thereof, guides located adjacent the shaft, a set of upper and a set of lower sleeves on the 70 guides, a supporting ring releasably connected to the lower sleeves, a retaining ring releasably connected to the upper sleeves, a mold casing removably received between the rings, the casing and rings lying in aline- 75 ment with the head, two sets of pivotally supported levers, links connecting the free ends of each set of levers to the upper and lower sleeves respectively, and cams for actuating the levers, the action of the levers 80 being synchronized to permit the retaining ring to release the mold intermediate the up and down movement of the latter.

6. A tile machine comprising a whirling packer head, a mold casing adapted to receive the head, and means for raising and 85 lowering the mold casing relative to the head, the latter provided with means adapted to permit the entrance of additional material to the mold intermediate the down 90 and up strokes constituting one reciprocation of the mold casing.

7. A tile machine comprising a whirling packer head, a mold casing adapted to receive the head, and means for raising and 95 lowering the mold casing relative to the head, the latter provided with a peripheral groove on its base, adapted to permit the entrance of additional material to the mold intermediate the down and up strokes constituting one reciprocation of the mold casing.

8. An automatic tile machine comprising a rotary shaft, a packer head on the upper end thereof, a ball race fixed to the shaft, a rigidly supported ball race, balls interposed 105 between the ball races, and a mold casing movable relative to and adapted to receive the packer head.

9. A tile machine comprising a rotary shaft, a packer head at the upper end thereof, bearings for the shaft, a plate on the 110 shaft above the bearings, and a mold casing movable relative to and adapted to receive the packer head, the plate located below the lowest limit of movement of the mold 115 casing.

10. A tile machine comprising a frame, a rotary shaft, a packer head at the upper end of the shaft, a mold casing movable relative to and adapted to receive the packer head, 120 levers pivoted on the frame and adapted to actuate the mold casing, means for operating the levers, and a slotted shield interposed between the lever-actuating means and the mold casing, the levers projecting 125 through the slots in the shield.

11. A battery of tile machines, comprising a plurality of frames, a single cam shaft

5 journaled on the frames, a vertically extending rotary shaft for each frame, a packer head on each rotary shaft, a mold casing co-
operating with each packer head levers for
operating the mold casing relative to the
packer head, and cams on the shaft for actu-
ating the levers, the cams so arranged on the
shaft as to operate the mold casings alter-
nately relative to their respective packer
10 heads.

12. A tile machine comprising a frame, a
cam shaft journaled thereon, two sets of
cams on the shaft, two sets of pivotally sup-
ported levers actuated by the cams, a rotat-
15 ing tile-forming member, a supporting ring

in which the tile forming member is re-
ceived, a mold casing seated on the support-
ing member, one set of levers pivotally con-
nected to one of the members to reciprocate
such member relative to the remaining 20
member, and a retaining ring associated
with the mold casing, the remaining set of
levers connected therewith.

In testimony whereof, we affix our signa-
tures in presence of two witnesses.

HERMAN BESSER.

JESSE H. BESSER.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
