(No Model.)

C. CARR.

TILE MACHINE.

No. 396,466. Patented Jan. 22, 1889.

FIG. 10.

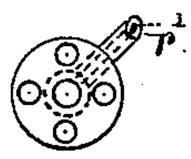


FIG. 11.

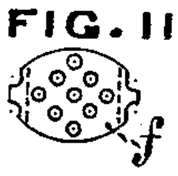


FIG. 1.

FIG. 3.

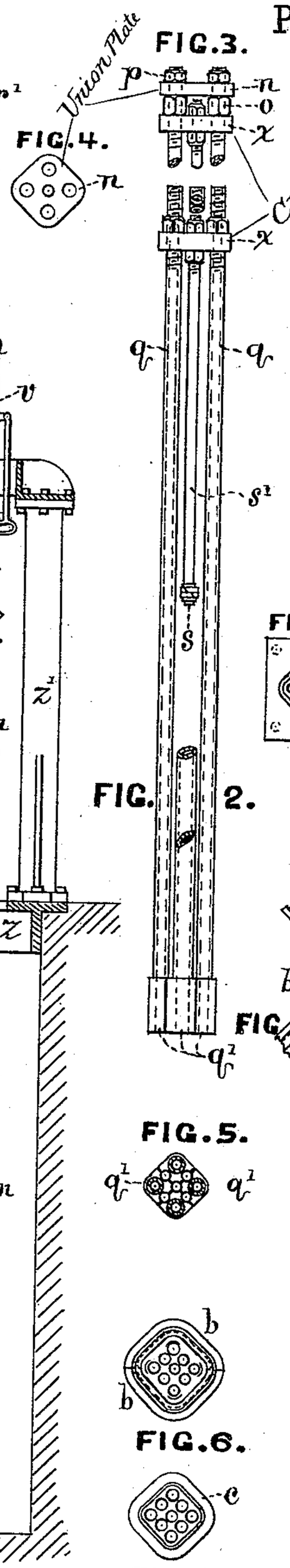
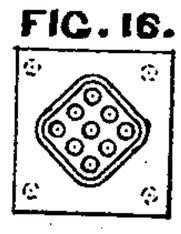


FIG. 4.

FIG. 2.

FIG. 16.



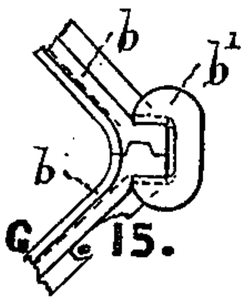


FIG. 15.

FIG. 5.

FIG. 6.

FIG. 14.

FIG. 7.

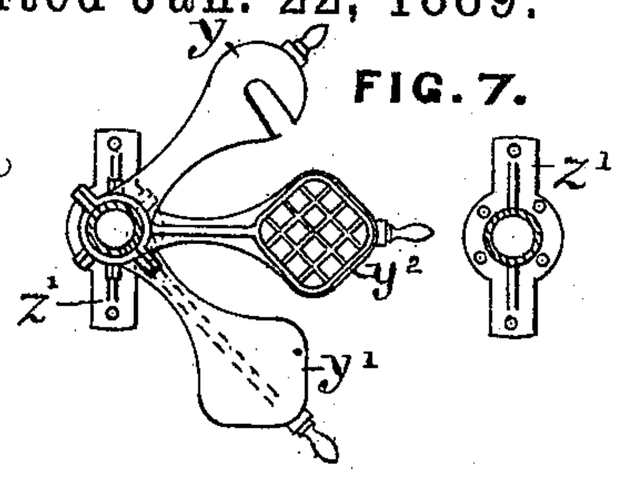
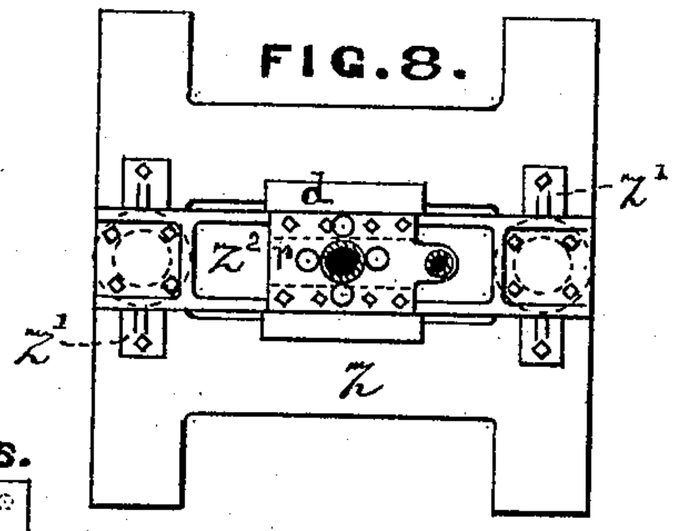


FIG. 8.



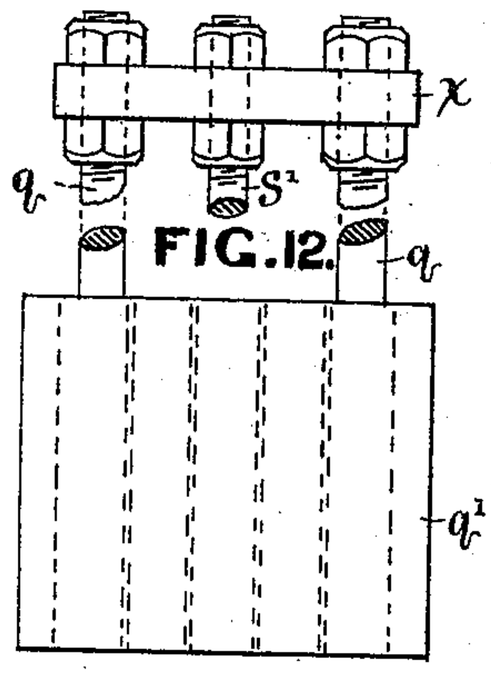


FIG. 12.

FIG. 13.

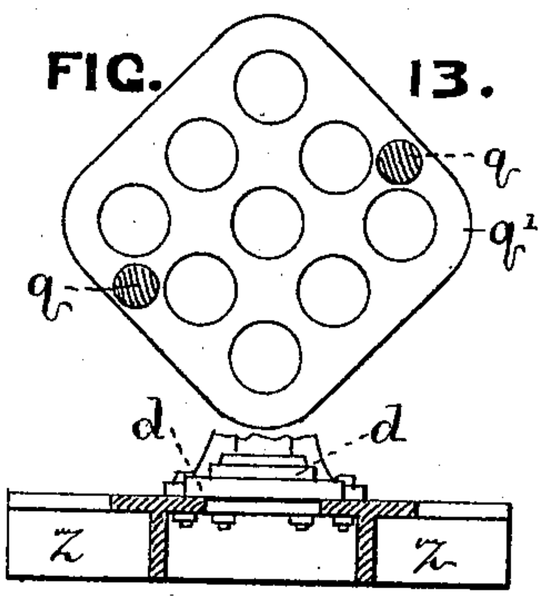


FIG. 9.

WITNESSES.

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CHARLES CARR, OF BOSTON, MASSACHUSETTS.

TILE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 396,466, dated January 22, 1889.

Application filed July 14, 1887. Serial No. 244,352. (No model.)

To all whom it may concern:

Be it known that I, CHARLES CARR, of the city of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Molding Multitubular Pipe; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention relates to the construction of the mold and tamping mechanism, the means for operating the several parts, the methods of operation, and the construction and combination of parts, substantially as hereinafter more fully set forth.

Referring to the drawings, Figure 1 is a sectional elevation of a machine embodying my improvements. Fig. 2 is a sectional elevation of hammer-rods, piston-rod, piston, and cross-head. Fig. 3 is a similar sectional elevation showing the union-plate rigidly uniting the hammer-rods. Fig. 4 is a plan of the union-plate. Fig. 5 is a sectional plan of the hammers or a divided hammer. Fig. 6 is a plan of a part of the mold comprising the two half-cases or sides and lower head and cores. Fig. 7 is a sectional plan showing the two posts of the frame-work and the movable feed-hopper, table, and hammer-rest, all journaled upon one of the posts. Fig. 8 is a sectional plan of the frame and cylinder mounted thereon. Fig. 9 is a sectional elevation in which appear the bed-plate of the frame-work, the lower head of the mold, and one post. Fig. 10 is a plan showing the top of the upper steam-cylinder. Fig. 11 is a plan of the core rest or table, showing perforations to receive the core-retracting rods. Fig. 12 is a sectional elevation, on a larger scale, of a solid or single hammer, cross-head, &c., the hammer-rods being solid, not tubular. Fig. 13 is a sectional plan on a like scale of the single or solid hammer. Fig. 14 is an inverted plan of the upper head or follower of the mold. Fig. 15 is a sectional plan showing one of the clamps b', for fastening together the two half-cases of the mold. Fig. 16 is a plan of the lower head of mold and the cores.

Like letters refer to the same parts in all the figures.

The mold is comprised of a series of cores, *a*, two half-cases, *b*, upper head, *c*, and lower head, *d*. The cores, as shown, are nine in number, and are disposed in a square in rectangular order. The case is in similar rectangular form with rounded corners. (See Fig. 6.) The two half-cases *b b* are each of the form of the letter **V** distended to a right angle, the ends of the two legs of the angle being tongued and grooved together. This form of the two half-cases is much better than the usual form in many ways, particularly so in facilitating their removal from the newly-molded pipe. The edges that are tongued and grooved together are provided with flanges and suitable clamps or fastenings. (See Fig. 15.) The half-cases rest upon the lower head, which is of suitable form to give shape to the lower end of the pipe-section, and the upper head, *c*, gives form to the upper end.

The number of cores will of course correspond in every machine to the required number of pipe-flues or calibers required. The cores are guided and held in position laterally by suitable sockets in the lower head, or a plate on which it rests, and by similar sockets in a lower plate far enough removed to give them stability. These plates may be in one piece if the bearing-sockets in the upper and lower part are sufficiently far removed. A core rest or bearer, *f*, supports and lifts the cores vertically. Each core has fast to its lower end a retracting-rod, *g*, passing through an upper part of the core-bearer *f*, and has a head or stop beneath it. The core-retracting rods *g* are of graduated lengths, so that when the core-bearer *f* is moved downward and the cores fail to drop with it the perforated plate of the core-bearer will come in contact consecutively with one after another of the stops on the retracting-rods, so starting downward consecutively one after another of the cores. When all the cores are thus started, they will rest on the core-bearer and with it descend until their upper ends drop entirely out of the molded pipe-section, where they remain, their points in the lower head, until the pipe is removed. For the purpose of elevating the cores again to their position within the case ready for molding another section of pipe the core-bearer is provided with means for lifting it, preferably a steam-cylinder, *h*, attached to

the core-bearer and fitted to a stationary piston, *i*. Steam is admitted through the piston into the cylinder for forcing it and the cores upward by means of any suitable steam-valve. For permitting the cylinder and cores to descend the steam is exhausted from the cylinder through any suitable exhaust-valve. Such valves are indicated in one at *j*. The steam-pipe is indicated at *k* and the exhaust at *l*, and a rod, *m*, serves as a means for operating them. The cylinder and piston may be transposed, though the order as shown is preferred.

Should any of the cores be hard to start, steam may be admitted and exhausted, causing the cylinder and core-rest to act like a hammer upon the retracting-rod stops.

In Fig. 5 is illustrated a tamper-head divided into four parts, forming four separate and independent tamping-heads, which may be used as such or may be united into one by means shown in Fig. 3. Fig. 2 illustrates this convertible head in connection with Figs. 3 and 5. To convert it from four separate tampers into a single tamper, I use the union-plate *n*. This plate is slipped on over the upper ends of the rod part of the tampers or hammers, and, resting upon a shoulder or the lifting-nuts *o*, is secured rigidly to the four rods by means of screw-nuts *p*. The rod part of the tampers or hammers is marked *q*.

For lifting and dropping the tampers or hammers, I use, preferably, a steam-cylinder, *r*, provided with the piston *s* and steam and exhaust pipes at *t u*, and steam and exhaust valves at *v*, and a rod to operate them by at *w*. The piston-rod *s'* connects to the cross-head *x*. When steam is let into the cylinder *r*, the piston, piston-rod, and cross-head *x* are lifted up. When the exhaust-valve opens, they fall. The tampers fall if united by the union-plate *n* as a single tamper. When the union is not applied, they fall and act separately.

A swing rest or support is provided at *y*, on which the tamper or tampers may rest when not in use. When in use, the rest is turned away, being journaled on one of the posts for that purpose. This rest may be journaled otherwise than on the post, if preferred. The head or heads *q'* and the rods *q* constitute the hammer or hammers, tamper or tampers, when the union *n* is not used.

When the union *n* is applied, the head or heads *q'*, rods *q*, cross-head *x*, piston-rod *s'*, piston *s*, and union *n*, with the nuts, all combine in a single hammer or tamper.

As a feeding device, the table *y'* is provided and journaled to the frame, a box or feed-hopper, y^2, is journaled also, so that *y'* is made to form the bottom of the feed-hopper y^2. The two are turned upon their journal away from the mold and a quantity of prepared pipe material is placed in the hopper y^2 upon the table or bottom *y'*. The two are then turned upon their journal over the mold. Then, while the hopper y^2 is held by the hand of the operator, or by a suitable latch or catch for the purpose, the operator draws or turns the table *y'* from beneath the hopper and the material falls into the mold, after which the hopper is also moved from its position over the mold to its position upon table *y'* to be filled. The hammer or tamper, singly or divided, as described, is allowed to fall one or more times, as required, to suitably compact the material. These processes are repeated until the mold is filled, when the head *c* is placed in position on the mold, and, receiving a blow or two from the hammer or tampers, as in tamping, gives form and completeness to the top end of the pipe.

The operation of retracting the cores, at first one by one consecutively, then all together, as above described, is proceeded with, after which the pipe in the half-cases is removed. The mold may now be supplied with other half-cases and the process of molding proceed while the first half-cases are being removed from the pipe-section, or these first may be removed and replaced in the mold and the operation proceed. Usually a pit or a basement receives the cylinder *h* and piston *i*, while the main frame-work is seated at the floor of a room, together with the mold, as shown.

The hammer or tamper rods have suitable guides at the top and bottom of cylinder *r*, and they may be hollow, so as to pass down, inclosing each one of the cores, or may be solid rods located in the manner indicated in Figs. 12 and 13.

The feed-hopper is shown having divisions to prevent the material from moving to one side. These may be omitted, if preferred, or a less number may be used. The hopper and table are shown as journaled about the post; but any other journal may be used, if preferred. An escape-pipe for the steam is shown at *r'*, which will prevent the piston from rising too far. Any suitable frame-work may be used. I have shown a very simple and sufficient one, consisting of the bed-plate *z*, the two posts *z' z'*, and the arch or truss z^2, on which the upper steam-cylinder is seated. The lower head of the mold *d* may be seated directly upon the bed-plate or upon a secondary movable plate bolted, doweled, or otherwise connected detachably to the lower head, *d*, and bed-plate *z*. A short guide is useful but not indispensable. It serves to prevent the hammers from turning, so as to chafe each other or the half-cases. The cores serve as hammer-guides when reached by the hammer or hammers.

The feed-box or hopper y^2 is shown as having a number of partitions. These are to prevent the material from being displaced laterally by the swing-table or bottom *y'*. They are not, however, indispensable.

It is obvious that the cylinder may, if preferred, be closed at the upper end and steam be used in striking the tamping-blows, as well as in lifting the hammers.

I do not claim the combination of a series of

tamps, a head or carriage for supporting the same, devices for lifting the head vertically and for releasing it to permit it to drop, a yielding connection between each of the tamps and the head, and guides for directing the vertical movement of the tamps.

I claim—

1. In a machine for molding multitubular pipe-sections, the combination of the side rod hammers, cross-head, piston-rod, piston, steam-cylinder, and mold, substantially as described.

2. In a machine for molding multitubular pipe-sections, a series of independently-free vertically-sliding cores seated upon a vertically-sliding core rest or table, substantially as described.

3. In a machine for molding multitubular pipe, the series of relatively-smaller retracting-rods attached to independently-movable cores, in combination with a detached reciprocating core-rest, substantially as described.

4. In a machine for molding multitubular pipe-sections, the steam-cylinder constructed with the side-hammer-rod guides, in combination with the hammer or hammers, piston-rod, side-hammer rods, cross-head, and mold, substantially as described.

5. In a machine for molding multitubular pipe, in combination with a steam-cylinder, piston, rod, cross-head, and side rod hammers, the union n, substantially as described.

6. The combination of the steam-cylinder, the core-rest, and the detached core-retractors, and independent cores, substantially as described.

7. In a machine for molding multitubular pipe-sections, the convertible hammer consisting of heads q', rods q, and head x, piston-rod s', piston s, and union n, substantially as described.

8. In a machine for molding multitubular pipe, a set of separately-free vertically-sliding cores, and upper and lower guide-sockets, in combination with a vertically-movable core-rest, substantially as described.

9. The combination of the stationary piston, traveling cylinder, core-rest, and cores, substantially as described.

10. In a machine for molding multitubular pipe, a steam-cylinder and core-rest, in combination with a series of graduated retracting-rods and separately-movable cores in guides, substantially as described.

11. In a machine for molding multitubular pipe-sections, in combination with separately-movable vertically-sliding cores, the upper and lower core-guides, substantially as described.

12. In a machine for molding multitubular pipe, the journaled hammer-rest, in combination with the tamping-hammers, substantially as described.

13. In a machine for molding multitubular pipe, the journaled table and feed-hopper, substantially as described.

14. In a machine for molding multitubular pipe, the series of tubular hammer-rods and hammer head or heads, in combination with the cross-head x, a mold having a cluster of cores, and a hammer-actuating mechanism, substantially as described.

15. The combination of the falling-hammer lifter and the simultaneously-falling but detached hammer, substantially as described.

16. In a machine for molding multitubular pipe, the combination of the union n, a cross-head, x, a mold, a series of hammers, and a hammer-actuating mechanism, substantially as described.

17. The combination of a dead weight, inelastic hammer, dropping simultaneously with but unattached to a falling-hammer lifter, a mold, and hammer-lifting mechanism, substantially as described.

18. The hammer unattached to and in combination with a simultaneously-falling cross-head or lifter, a piston-rod, piston, and steam-cylinder, substantially as described.

CHARLES CARR.

Witnesses:

ALEX. BEAL,

D. N. B. COFFIN.