

No. 858,232.

PATENTED JUNE 25, 1907.

A. J. TAYLOR & J. H. McCLURE.

GRAVITY TAMPING AND MOLDING MACHINE FOR PLASTICS.

APPLICATION FILED SEPT. 7, 1906.

2 SHEETS—SHEET 1.

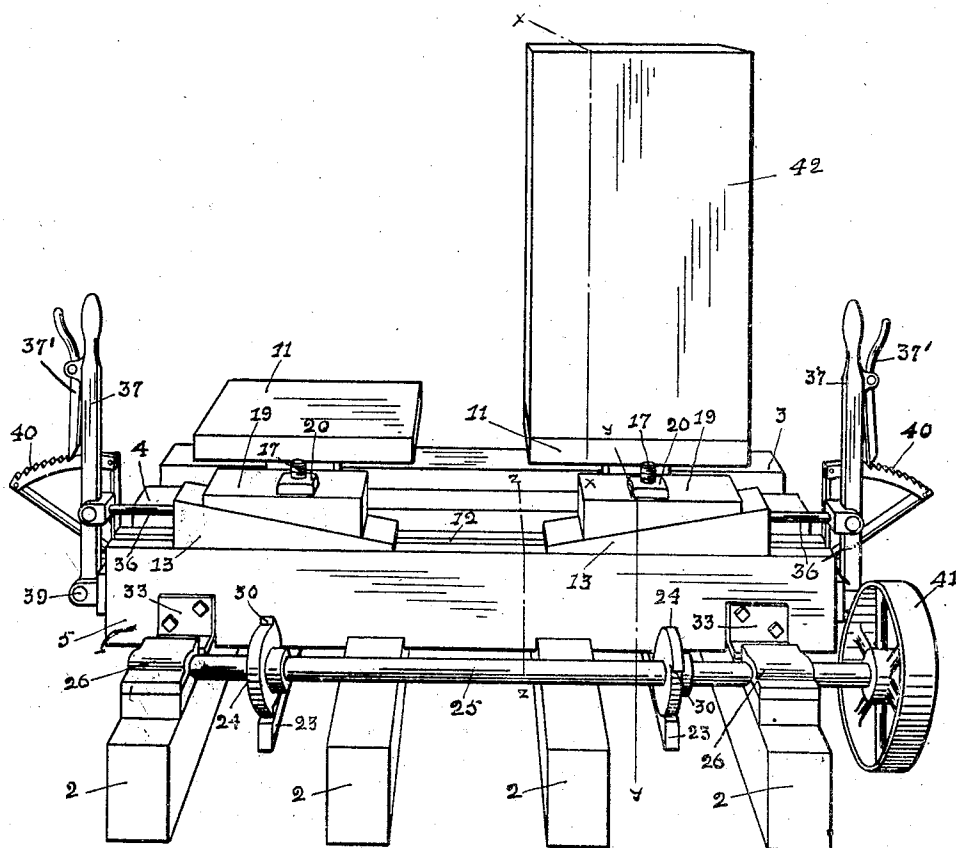


FIG. 1.

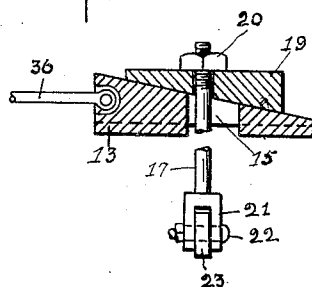


FIG. 2.

WITNESSES.

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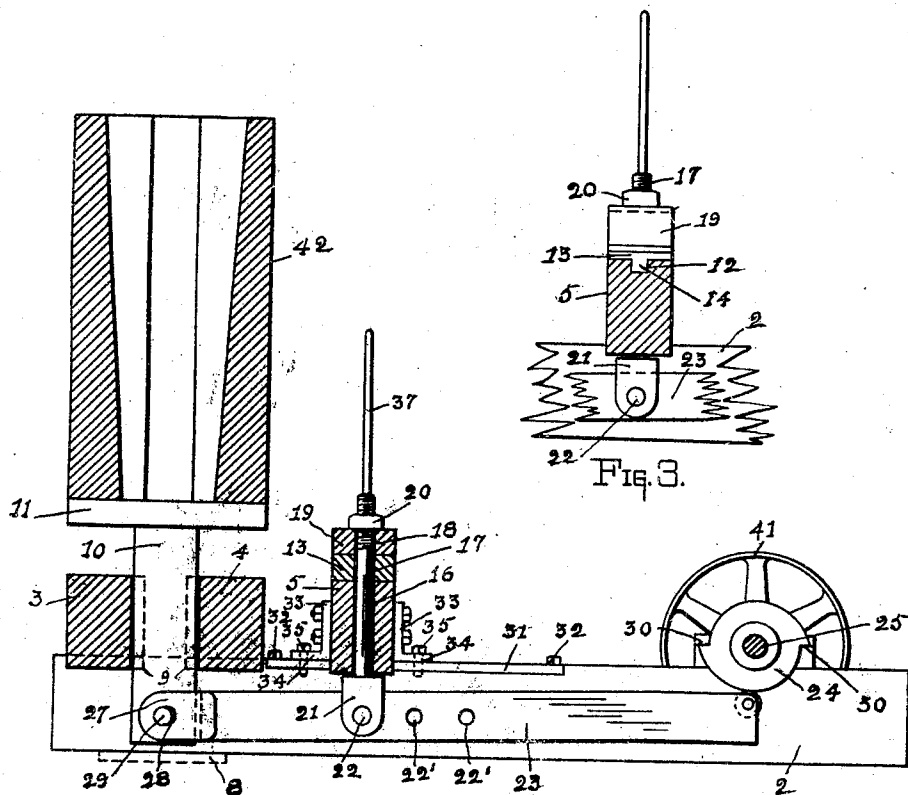


FIG. 4.

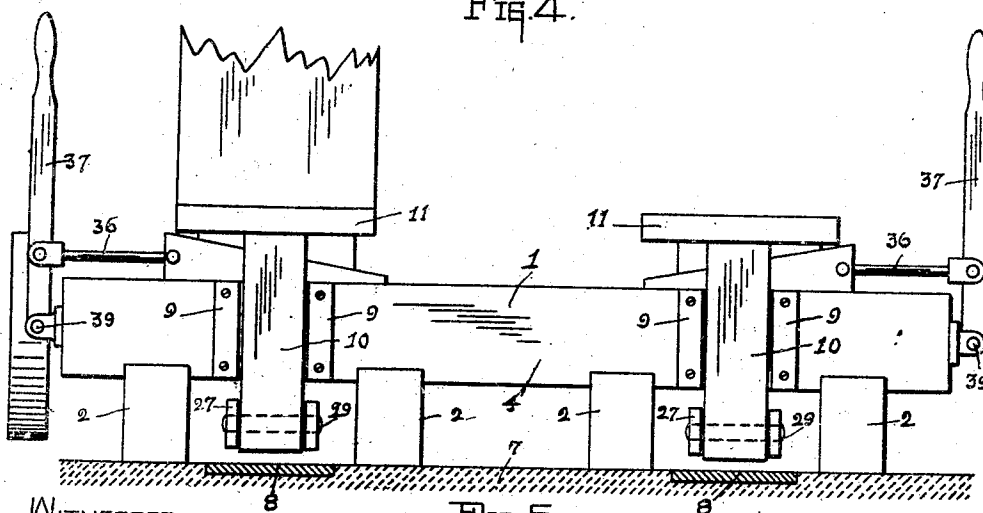


FIG. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

ALFRED J. TAYLOR AND JOSEPH H. McCLURE, OF WATERVILLE, OHIO.

GRAVITY TAMPING AND MOLDING MACHINE FOR PLASTICS.

No. 358,232.

Specification of Letters Patent.

Patented June 25, 1907.

Application filed September 7, 1906. Serial No. 333,639.

To all whom it may concern:

Be it known that we, ALFRED J. TAYLOR and JOSEPH H. McCLURE, citizens of the United States, residing at Waterville, in the
5 county of Lucas and State of Ohio, have invented a new and useful Improvement in Gravity Tamping and Molding Machines for Plastics, of which the following is a specification.

10 Our invention relates to a gravity tamping and molding machine for plastic and molten material, and has for its object to provide a simple and inexpensive machine of the kind whereby concrete and other material in a
15 plastic state is conveniently tamped and accurately molded at a uniform density, by its own gravity. We accomplish these objects by providing a machine that is adapted to raise and drop a mold or molds at short
20 intervals and through gradually reduced distances while the material is being poured therein. A preferred form of mechanism by which we utilize this principle of tamping and molding is hereinafter described and illustrated in the drawings, in which

25 Figure 1 is a perspective view showing an end elevation of a machine constructed in accordance with our invention. Fig. 2 is a longitudinal vertical section through the lift
30 adjuster. Fig. 3 is an end view of the same, with the supporting beam shown in cross section, on line *z-z* of Fig. 1. Fig. 4 is a vertical section on lines *x-x* and *y-y* of Fig. 1. and Fig. 5 is a front elevation of the machine
35 with the front cross beam removed.

In the drawings 1 represents a support or base, which is preferably constructed of timbers and comprises the sill beams 2 extending
40 parallel at regular intervals, the companion cross beams 3 and 4, and the adjustable cross beam 5, which are mounted on and suitably secured to the sills at right angles thereto.

45 The base 1 is mounted on a suitable concrete bed or other suitable foundation 7, having embedded therein the bumper plates or blocks 8, which are located between sills and aligned below the space between the cross
50 beams 3 and 4, which are located across the front end portions of the sills. Opposite, to the inner sides of the beams 3 and 4, and above each of the bumper blocks 8, are vertically secured the companion guide cleats 9, between which and the beams 3 and 4 are

reciprocally mounted the pedestals 10, to the
55 top ends of which are suitably attached mold bases 11, adapted to support and retain various forms of molds.

The cross beam 5 is provided in its top face with a longitudinal rectangular guide groove
60 12, and there is movably mounted thereon over the space between the sills 2 between which the bumper blocks 8 and the pedestals 10 are located, the lift adjuster blocks 13, the
65 lower faces of which are planes coinciding with the upper face of the beam 5 and the upper face an inclined plane of suitable pitch. The lower faces of the adjuster blocks 13 are each provided with tongues 14 which extend
70 into the groove 12 and guide the blocks along the upper face of the beam 5. Centrally of their lengths and widths the adjuster blocks 13 are provided with elongated mortises 15, which extend vertically through the blocks,
75 the mortises being each equal to the width of the groove 12 of the beam and of a length to permit of the desired distance of movement of the adjuster blocks back and forth along the beam.

Central between the sills 2 over which
80 the adjuster blocks are mounted as aforesaid, and in vertical alinement with the mortises 15, the beam 5 is provided with suitable mortises 16, to movably receive the suspension rods 17, which extend vertically through the
85 mortises 16 and 15 and through mortises 18 alined with the mortises 16, in the bearing blocks 19 mounted on the blocks 13, and each having its under face formed as an incline complementary to and engaging the inclines
90 of the adjuster blocks 13.

The suspension rods 17 each have their upper end portions threaded to receive a bearing nut 20 which pendently supports the rod
95 on its bearing block 19. At their lower ends the suspension rods are each provided with a bifurcated fulcrum head 21 and the bifurcations of the heads are each provided with axially alined bores, in which are mounted,
100 transverse the heads, the fulcrum pins 22. Each fulcrum head bestrides a lever beam 23, central of the length of the beam, which at and at suitable intervals forward of, its center is provided with suitable transverse bores
105 22' for mounting the lever on a fulcrum 22'. The lever beams 23 are of a length to extend centrally between sills 2 from centrally above the bumper blocks 8 to the rear end portions

of the sills, with their rear end portions vertically below cam wheels 24, which are fixedly mounted on a shaft 25, that is revolubly mounted in suitable bearings 26, secured in alinement to rear end portions of the sills. The rear ends of the lever beams 23 are in alinement with vertical lines diametric of the cam wheels, and their front end portions are provided with the bifurcated heads 27, the bifurcations of which extend on opposite sides of the pedestals 10, and the bifurcations of each head are provided with elongated pivot slots 28, by which they are pivotally mounted on pivot pins 29, fixedly mounted in axial alinement therewith in the lower end portions of the pedestals 10.

The cam wheels 24, the body portions of which are concentric to the shaft, have eccentric cam portions provided with abrupt terminations 30, the abrupt termination of each cam portion being at the beginning of the next cam. The beginnings of the cams are eccentric to the shaft, and the outer faces of the cams extend therefrom in curves of increased eccentricity to their abrupt terminations, which are of such increased radius as to produce a desired maximum depression and release of the rear ends of the lever beams 23.

Normally when the pedestals 10 are resting on the bumper blocks, and the adjuster blocks are pushed inward under the bearing blocks until the outer ends of their mortises 15 are in engagement with the suspension rods 17, the tops of the rear end portions of the lower beams are engaged with the beginnings of cams of the cam wheels 24.

The cross beam of each end portion is mounted on plates 31 let into the tops of the outer sills 2 flush with their upper faces, and the plates are secured to the sills by the bolts 32, as shown in Fig. 4.

To adjustably secure the beam 5 to the sill plates, it has bolted thereto on opposite sides above the sill plates the angle plates 33, with the lower legs of the angle plates resting on the plates 31. The lower legs 34 of the angle plates are each provided with a bolt hole to receive a stud screw 35, and the sill plates,—at suitable intervals to register with the bolt holes of the legs 34, and locate the beam 5 in different regular positions,—are screw tapped to receive the screws 35, by which the beam 5, when adjusted to a desired position, is firmly secured to the outer sills, each position of the beam being adapted to register the bores in the fulcrum heads for the fulcrum pins with a fulcrum bore 22' of the lower beams.

By this arrangement of the parts, the distance of upward lift of the pedestals is increased as the fulcrums are shifted toward the cam wheels, and diminished as they are shifted toward the pedestals, such lift being equal to the radial projection of the abrupt

faces of the cams when the fulcrums are located central of the levers, and proportionately less when the fulcrums are shifted toward the pedestals. While the lift of the levers may be thus adjusted by shifting the fulcrums, we have provided for further variation of the lift during the operation of the levers, by means of the adjuster blocks 13, which at their outer and enlarged ends have attached thereto by the connecting rods 36 the hand levers 37, the connecting rods being pivotally attached to the levers 37 between their handles 38 and their fulcrums 39, which are pivotal attachments of the lower ends of the levers to the ends of the beam 5. The levers 37, above the connecting rods 36, are provided with the ratchet dogs 37' adapted to engage the ratchet teeth of arc racks 40, which are provided one for each lever, and suitably attached to the beam 5 at each end.

The suspension rods 17 are each adjusted by the nut 20 to such length that when the adjuster blocks are pushed inward under the bearing blocks 19 by the levers 37, until they are in engagement with the suspension rods at the outer ends of the mortises 15, the upper faces of the rear end portions of the lever beams 23 are each in engagement with the beginning of a cam of their respective cam wheels so that when the adjuster blocks are in such position the full lift of each lever is obtained, and when an adjuster block is pulled outward by its lever the lift is reduced equal to the distance the bearing block 19 is lowered thereby, and according to the graduated distances established by the teeth of the racks.

The cam shaft has mounted thereon at one end a pulley 41, by which it is revolved. The pulley being connected by a belt (not shown) to any convenient source of power, and the levers being adjusted to any desired maximum lift by the adjustment of the beam 5, and any desired molds 42 being secured on the mold bases of the pedestals, material in a plastic or semi-liquid state is poured into the tops of the molds from any suitable or convenient source, (not shown), and the cam shaft being set in motion at the same time, the levers are depressed and released by each cam, thereby successively lifting and dropping the pedestals and the molds on the bumper blocks, as the material is poured into the molds, the jar of the drop of the pedestals and the sudden arrest of the material in the molds operating to tamp it evenly in every part of the mold by its own gravity, which compacts its particles together and conforms them to all parts of the molds. As the filling of the molds progresses and the weight of the material increases, the lift and drop of the molds is gradually reduced by the adjustment of the adjuster blocks by the levers 37, so that by the time the molds are filled the material therein is thoroughly and

evenly tamped and a perfect casting of uniform density and free from air holes and like defects is produced.

When the molds are filled, by throwing the levers 37 outward until the inner ends of the mortises 15 are in engagement with the suspension rods 17, the lever beams are dropped entirely free of the cams of the cam wheels, and the lifting and dropping ceases while the molds are being removed and others are substituted therefor on the mold bases, which being done, the levers 37 are thrown inward to the inward limit of the movement of the adjuster blocks, and the operation of filling and tamping as described is repeated.

Preferably the cam wheels are arranged on the shaft to alternately lift and drop the molds, whereby while one mold is being removed, and replaced by another mold, a mold is being filled and tamped.

It is manifest that a machine constructed in accordance with our invention may be indefinitely extended to operate any number of single or pairs of molds by the same line of shafting extended, wherefore we do not limit ourselves to the operation of a single pair of molds as herein shown. It is further manifest that it is adapted to the filling and tamping any form of mold and of different forms of molds at the same time and that it is especially adapted to the molding and tamping of concrete and other plastic materials around metal reinforcements where the ordinary process of tamping is inadequate and difficult, and that it greatly reduces the cost of labor in tamping all kinds of molds. It is further manifest that the principle of the operation is adapted to the molding of molten material and to obviate the defects due to heated air or gases confined in the mass, and to obtain a uniform density, smoothness of surface, and to sharply define the outlines of the mold in the casting produced. Our machine is also adapted to form from plastic material in suitable molds cast molds which are adapted to the tamping and molding therein of castings made from molten material.

What we claim to be new is:

1. In a machine for tamping and molding semi-fluid and plastic materials, the combination with a bumper, a mold base movably mounted on the bumper, a mold mounted on the mold base, and means to successively at short intervals raise and drop the mold base on the bumper while the mold is being filled, of means to gradually reduce the height of the lift and drop of the mold base during the filling of the mold.

2. In a machine for tamping and molding semi-fluid and plastic materials, the combination with a bumper, a mold base mounted on the bumper and adapted to be raised and dropped thereon, a mold mounted on the mold base, a lever adapted to lift the mold

base, and means adapted to engage and disengage the lever and operate the lever to successively lift and drop the mold base at short intervals on the bumper while the mold is being filled, of means to gradually reduce the height of the lift of the lever during the filling of the mold, by gradually shifting the fulcrum of the lever, substantially as set forth.

3. In a machine for tamping and molding semi-fluid and plastic materials, the combination with a bumper, a mold base mounted on the bumper and adapted to be raised and dropped thereon, a mold mounted on the mold base, a lever adapted to lift the mold base, and a wheel having cam projections adapted to successively engage and disengage the lever at short intervals, and operate the lever to successively lift and drop the mold base on the bumper while the mold is being filled, of means to gradually reduce the height of the lift of the lever during the filling of the mold, comprising a stationary support, a horizontally movable lower bearing support mounted on the stationary support, and having an incline bearing face, a vertically movable upper bearing support mounted on the horizontally movable lower bearing support, and having an incline face complementary to and engaging the incline face of the horizontally movable support, a suspension rod pendently supported by the upper bearing support and pendently supporting and fulcruming the lever, and means connected to the horizontally movable lower bearing support, adapted to adjust it to gradually lower the upper bearing support and thereby lower the body of the lever, and gradually diminish the height of its lift of the mold base.

4. In a machine for tamping and molding plastic and semi-fluid materials, the combination with a bumper, a vertically movable mold base normally supported by the bumper, a mold mounted on the mold base and a lifting beam pivoted at one end to the mold base, of a stationary support, a lower bearing block mounted on and horizontally movable on the stationary support, and provided with an upper bearing face inclined to the horizontal, a vertically movable upper bearing block, having an inclined lower bearing face reversely inclined complementary to and engaged with the inclined face of the lower bearing block, means to pendently and centrally support and fulcrum the lifting beam on the upper bearing block, a shaft revolubly mounted on the stationary support, a wheel mounted on the shaft over the free end of the lifting beam, a wheel having a plurality of wiper cams adapted to successively engage and depress the free end portion of the lifting beam, and disengage themselves therefrom, whereby the beam is operated to successively lift and drop the mold base on the bumper,

and a lever connected to the lower bearing block, adapted to move it along the stationary support and gradually lower the upper bearing block and the lifting beam, substantially as set forth.

5 5. In a machine for tamping and molding plastic and semi-fluid materials, the combination with a plurality of bumpers each having a vertically movable mold support normally supported thereon, of a plurality of lever beams, one for each mold support, and having one end portion pivotally connected to the mold support, a stationary support, a cam shaft journaled on the stationary support, a plurality of cam wheels mounted on the shaft, one for each lever beam, each cam wheel having a plurality of cam projections, provided with abrupt terminations at their points of greatest eccentricity, and means to fulcrum each lever beam between its mold support and its cam wheel, with its free end in engagement with its cam wheel in position to be depressed and then released by each cam projection as the wheel revolves, substantially as set forth.

6. In a machine for tamping and molding plastic and semi-fluid materials, the combination with a plurality of bumpers each having a vertically movable mold support normally supported thereon, of a plurality of lever beams, one for each mold support, and having one end portion pivotally connected to the mold support, a stationary support, a cam shaft journaled on the stationary support, a plurality of cam wheels mounted on the shaft, one for each lever beam, each cam wheel having a plurality of cam projections, provided with abrupt terminations at their points of greatest eccentricity, and means to fulcrum each lever beam between its mold support and its cam wheel, with its free end in engagement with its cam wheel in position to be depressed and then released by each cam projection as the wheel revolves, substantially as set forth.

nation with a plurality of bumpers each having a vertically movable mold support normally supported thereon, of a plurality of lever beams, one for each mold support, and having one end portion pivotally connected to the mold support, a stationary support, a cam shaft journaled on the stationary support, a plurality of cam wheels mounted on the shaft, one for each lever beam, each cam wheel having a plurality of cam projections, provided with abrupt terminations at their points of greatest eccentricity, and means to adjustably fulcrum each lever beam between its mold support and its cam wheel, with its free end in engagement with the cam wheel in position to be variably depressed and then released by each cam projection as the wheel revolves, substantially as set forth.

In witness whereof, we have hereunto signed our names in the presence of two subscribing witnesses, this eighteenth day of August, 1906.

ALFRED J. TAYLOR.
JOSEPH H. McCLURE.

In presence of—
WM. J. FRITSCHÉ,
JOHN F. MULLARKEY.