April 30, 1929. A. G. McINTYRE 1,711,359

BLOCK OR TILE MAKING MACHINE OR THE LIKE

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Fig. 1.

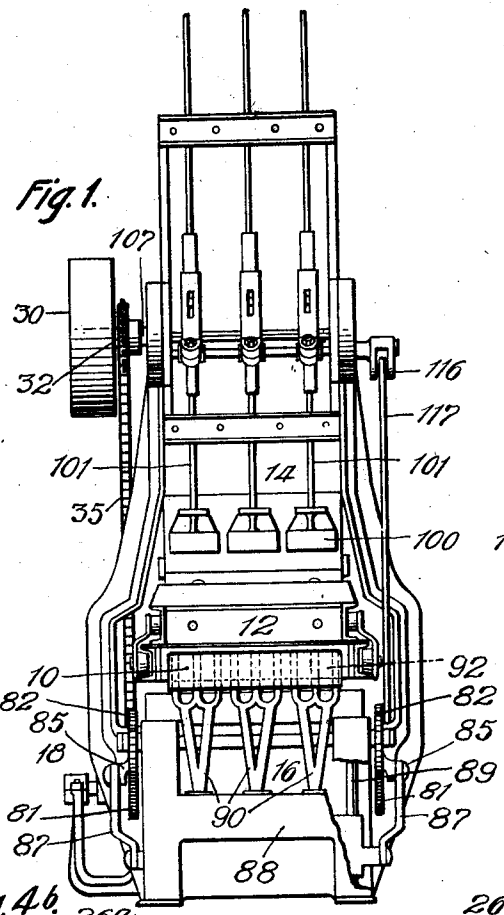


Fig. 3.

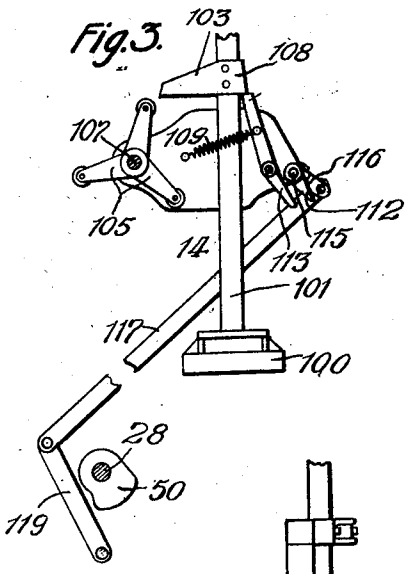


Fig. 2.

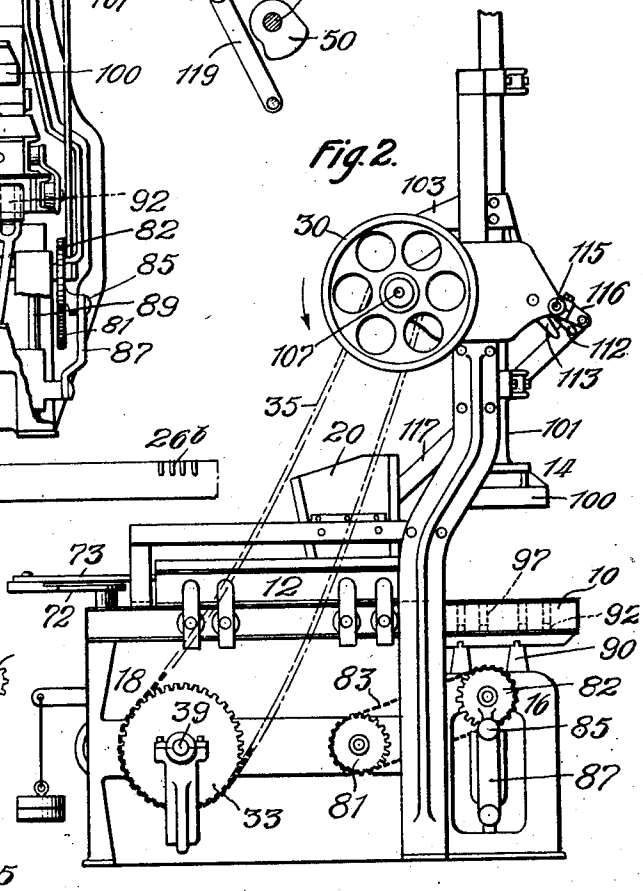


Fig. 4b.

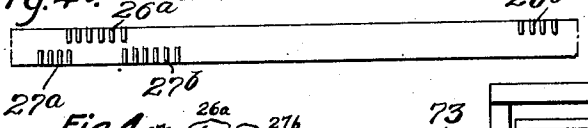


Fig. 4.

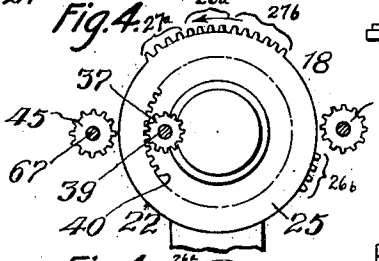
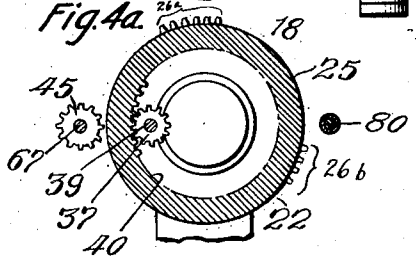


Fig. 4a.



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Fig. 5.

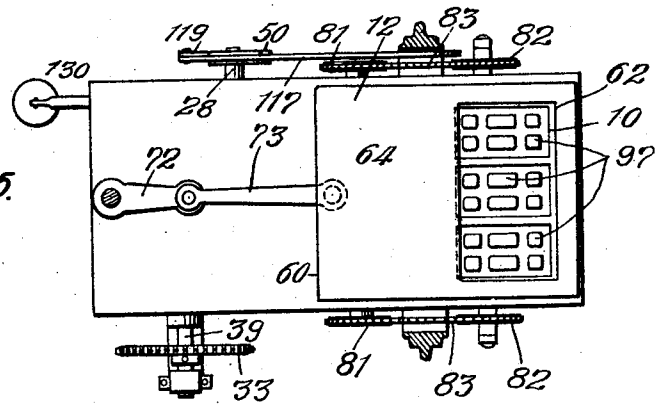


Fig. 6.

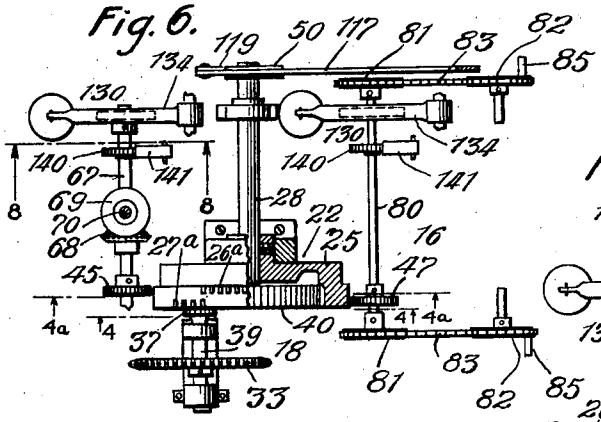


Fig. 6a.

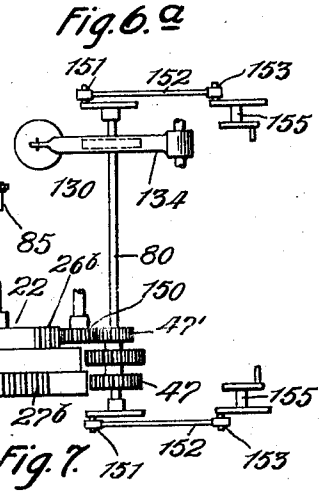


Fig. 8.

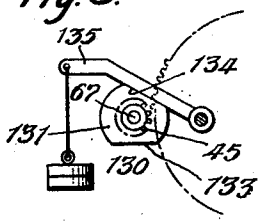
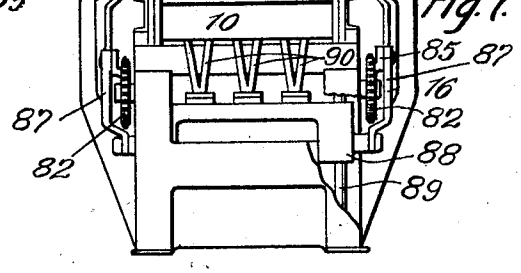


Fig. 7.



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Patented Apr. 30, 1929. 1,711,359

UNITED STATES PATENT OFFICE.

ANDREW G. McINTYRE, OF WALDEN, NEW YORK, ASSIGNOR TO MACTILE MACHINE CO., INC., OF ELMONT, NEW YORK, A CORPORATION OF NEW YORK.

BLOCK OR TILE MAKING MACHINE OR THE LIKE.

Application filed March 22, 1926. Serial No. 96,408.

This invention relates to block or tile making machines, or the like, and provides improvements therein.

The invention provides a machine for making blocks, tiles or the like (of concrete for example) in which the parts are driven and timed by positively driven mechanism, whereby liability to slippage of parts and consequent damage due to improper timing is minimized or avoided.

The invention further provides a novel and relatively simple mechanism comprising interrupted gears for driving various parts of a combination in timed relation and in a positive manner.

The invention further provides a mechanism capable of being run at a speed which permits of rapid operation and a relatively large output. Furthermore, the invention provides a simplified machine and permits of considerable saving in weight and manufacturing cost.

An embodiment of the invention is illustrated in the accompanying drawings in which:

Figure 1 is an end elevation of the machine.

Fig. 2 is a left side elevation as viewed in Fig. 1.

Fig. 3 shows the cam tripping arrangement for bringing the tampers into operation.

Fig. 4 is a section on line 4—4, Fig. 6, showing both the internal and external gearing of the main driving member.

Fig. 4^a is a section of the main driving member taken along line 4^a—4^a, Fig. 6.

Fig. 4^b is a developed view of the face of the interrupted gear showing the position of the rack segments thereon.

Fig. 5 is a plan view of the machine with the tamping supports, tampers and associated apparatus removed and showing the feed slide in its over-traveled position.

Fig. 6 is a plan view of the main driving members together with the cooperating mechanism.

Fig. 6^a is a view similar to Fig. 6, showing an alternative arrangement of certain parts of the driving and timing mechanism.

Fig. 7 is an end view of the machine showing the tiles raised to the position for removal from the machine.

Fig. 8 is a section on the line 8—8, Fig. 6, showing the cam and weight arrangement by which the gears on the intermediate shafts are prepared to receive the next actuating teeth on the main driving member.

Referring to said drawings, numeral 10 designates the mold or box in which the blocks or tiles of concrete or the like are to be formed; numeral 12 designates a feeding device for furnishing or feeding concrete or the like to the mold; numeral 14 designates the tamping mechanism for densifying or compacting the material in the mold 10; numeral 16 indicates the block or tile-ejecting mechanism; and numeral 18 designates the driving and timing mechanism, adapted to drive the before-mentioned parts, and time them in such sequence that the feeding means 12 is first driven forward from beneath a hopper 20 to a position over the box or mold 10, where the charge carried by said feeding mechanism is discharged into said mold or box 10, the table then stopped in such forward position, the tamping mechanism 14 then acting to tamp the material in the mold or box 10; the tamping mechanism then being stopped; the feeding mechanism then being retracted to its charge-receiving position, and during such movement levelling the material in the mold or box 10; the feeding mechanism then being held in its retracted position; and the ejecting mechanism 16 then being actuated to eject the formed blocks or tiles (preferably resting on platens previously placed in the bottoms of the molds), in which position the platens bearing the formed blocks or tiles are usually lifted manually and carried away or placed upon transfer mechanism to remove the formed product to a place of storage or subsequent treatment, as may be necessary or desired.

The driving and timing mechanism 18 comprises an interrupted gear mechanism 22 of novel construction. It comprises a wheel 25 (or wheels), the wheel or wheels having toothed segments 26^a, 26^b, 27^a, 27^b thereon in different planes. The wheel 25 is conveniently fixed on a shaft 28, and is continuously

driven in any suitable manner, as by means of a fly-wheel pulley 30, sprockets 32, 33 connected by a chain 35 and a pinion 37 on a stub shaft 39 with the sprocket wheel 33, the said pinion 37 conveniently driving said interrupted gear mechanism through an internal gear 40 on the wheel 25. The feeding mechanism 12 is driven and timed from the interrupted gear mechanism through the gear 45, as hereinafter more fully explained, and the ejecting mechanism is driven and timed by and from the interrupted gear mechanism through the gear 47, also as hereinafter more fully described. The tamping mechanism 14 is timed conveniently from the shaft 28 carrying the interrupted gear, by means comprising a cam 50 fixed on said shaft, which will also be more fully explained hereinafter.

The feeding mechanism 12 conveniently comprises a slide 60 having a receptacle 62 therein, open at the bottom and top, preferably of slightly greater area than the mold or box 10 and of sufficient capacity to contain enough material (concrete), to fill, with a slight excess, the said mold or box 10. The slide 60 is preferably provided with a platform or apron 64 flush with the underside of the hopper 20, and adapted to close the underside of the hopper when the receptacle 62 therein is moved forward from the mold or box 10.

As heretofore explained, the feeding mechanism is driven from the interrupted gear mechanism 22 through the gear 45. This gear 45 is conveniently fixed upon a shaft 67 having thereon a bevel gear or the like 68 meshing with a similar bevel gear 69 attached to a shaft 70 carrying a crank-arm 72 connected by a link 73 with the said slide 64, and hence on intermittent meshing of the segments 26^a, 26^b on the wheel 22, the said slide, through the crank-arm 72, is reciprocated to and from positions where the receptacle 62 is beneath the hopper 20, and where it is over the box or mold 10, with periods of rest in each of these positions.

The throw of the crank 72 is preferably such as to carry the receptacle 62 slightly beyond a position coincident with the mold, in such manner that the rear wall of the receptacle pushes the contents slightly forward in the mold, so as to center or more evenly distribute the excess material at the top of the mold, the crank 72 continuing its movement before stopping, sufficiently to bring the receptacle 62 slightly backward to a position coincident with the mold.

The block or tile ejecting mechanism 16, as hereto explained, is driven from the racks 27^a, 27^b and the wheel 22, through the gear 47. The gear 47 is conveniently mounted on a shaft 80, which carries sprocket wheels 81 at one or both ends thereof. These sprocket wheels 81 conveniently drive through sprocket wheels 82 through chains 83, and the said sprocket wheels 82 are conveniently provided with crank pins 85, which connect by means of links 87 with the cross-head 88, moving up and down beneath the mold or box 10 in slideways 89. This cross-head 88 is provided with projections 90, which enter the box or mold 10 and make contact with the platens 92, which are placed in the bottom of the said mold prior to filling. The interrupted gear or racks 27^a, 27^b act to reciprocate the cross-head 88, to and from positions where the projections 90 bear on the underside of the platens 92 in the bottom of the mold, and where the said projections are raised to a position where they support the platens substantially flush with the upper side of the mold or box 10, with periods of rest in each of these positions.

The box or mold 10 is conveniently provided with one or more partitions 95 dividing the mold into a plurality of molds for forming a plurality of blocks or tiles at each cycle of operation of the machine. Moreover, the box or mold 10 is conveniently provided with a plurality of formers or core pieces 97 for forming hollow spaces within the block or tile, so as to thereby produce the so-called hollow blocks or tiles.

The tamping mechanism conveniently comprises a plurality of tampers 100 having stems 101 suitably guided in the framework of the machine. These stems 101 are conveniently provided with tappets 103 adapted to make contact with, and be raised and dropped by, an arm or arms 105 on a rotating shaft 107, which is driven by the fly-wheel pulley 30. As here shown, the said fly-wheel 30 is mounted upon the same shaft 107 as the said arm or arms 105. In practice, however, a clutch would usually be interposed between the fly-wheel pulley 30 and the shaft on which it is mounted. As heretofore stated, the arm or arms 105 act to raise and drop the tampers 100. This action is arranged and timed as follows: Dogs 107 are provided for engaging shoulders 108 on the stems of the tampers 100 in the raised position thereof. These dogs 107 normally act to engage the said shoulders 108, being pressed toward said shoulders by springs 109, or the like. When the time for action of the tampers arrives (which is immediately after the receptacle 62 of the feeding means 12 comes to rest over the mold or box 10), the dogs 107 are withdrawn from behind the shoulders 108, by means which conveniently comprise tappets 112 adapted to be brought against tail pieces 113 on the said dogs 107, and thereby lift the dogs out of position to engage the shoulders 108 on the stems of the tampers. The tappets 113 are conveniently mounted on a shaft 115, which

is rocked by an arm 116 connected by a link 117 to an arm 119, against which the cam 50 makes contact. As heretofore explained, this cam 50 is mounted on the end of the shaft 28 on which is mounted the interrupted gear or gears, and is suitably shaped and positioned to rock the arm 119, and thereby cause the tappets to move the dogs 107 out of engagement with the shoulders on the tamper stems 101, when the time arrives for the action of these tampers.

Means 130 are provided for insuring the initial engagement or meshing of the racks 26^a, 26^b, 27^a, 27^b, each time these racks come into mesh with the gears 45 and 47. This means conveniently comprises a disk 131 having flats 133, 134 thereon, against which is adapted to bear a weighted arm 135. As the last tooth of each of the racks 26^a, 26^b, 27^a, 27^b moves out of mesh with the gears 45, 47, the teeth on said gears may not be left in position to properly mesh with the leading tooth on the succeeding rack or segment of the interrupted gear, due to inertia and other causes. The flats 133, 134 are accordingly so arranged that when the weighted arm 134 bears flush thereagainst the teeth on the gears 45, 47 are in position to properly mesh with the leading tooth of each of the racks or segments 26^a, 26^b, 27^a, 27^b. If the shafts 67 and 80 are moved beyond a position where the weighted arm 135 bears flatly on either of the flats 133 or 134, the weight of the arm bearing upon one edge of the flat, will cause the disk to be turned until the said weighted arm bears equally against the entire face of the flat, thereby turning the shaft and gears 45 or 47 thereon to a position where the teeth on the said gears 45 or 47 are in position to properly mesh with the leading teeth on the racks 26^a, 26^b, 27^a, 27^b. As an additional means of securing accuracy, the shafts 67 and 80 may be provided with toothed wheels 140, over which ride pawls 141, slipping over the teeth when the shaft turns in its normal direction, and adapted to engage the teeth when the shaft is turned backward. These pawls 141 may therefore act in conjunction with the weights and the weighted arms 135 and disk 131 with the flats thereon, to limit in a precise manner the extent to which the shafts 67 and 80 are moved backward by the action of said weighted arm and flats.

The number of teeth in the two sets of segments (there might be more) 26^a, 26^b, 27^a, 27^b co-acting with each of the gears 45, 47, is so chosen as to effect a determined angular movement of each gear (in this instance, one complete revolution) for each revolution of the wheel on which the racks or segments are mounted, and the proper meshing of each rack with each of the gears 45, 47 is insured by the means 18. Where the diameter of the gear is small with relation to the diameter of the wheel having thereon the interrupted gears or racks, one less tooth is provided in the rack than the number of teeth of the gear to be driven, owing to the fact that the outer circle of the teeth of the interrupted gear comprehends an arc on the outer circle of the gear teeth which is the length of two teeth of said smaller gear. The racks 26^a, 26^b (likewise for the racks 27^a, 27^b) act serially on their gear 47, and hence the present construction provides a compact arrangement for effecting a cycle of operation by an interrupted gear, and the entire driving and timing arrangement provides for a reliable action of the interrupted gears, and a positive drive of the mechanism driven from the gears 45, 47, which mesh with the racks or segments of the said interrupted gears.

In driving the cross-head 88 of the block-ejecting mechanism through sprockets and chains, it is preferable to stop the rotation of the sprocket wheels 82 prior to the cranks 85 thereon reaching their upper dead-center positions, so as to guard against the cranks being thrown over their dead-center positions, and the cross-head carried down by its own weight. Therefore the rack 27^a, which drives the gear-wheel 47 to raise the cross-head 88, is provided with a lesser number of teeth than the rack 27^b, the teeth in the two racks 27^a, 27^b being sufficient to turn the gear 47 through a complete revolution to thereby effect a complete cycle of the parts driven thereby.

Fig. 6^a shows an alternative arrangement for intermittent driving of the mechanisms, only one of the mechanisms, the block ejecting mechanism, being here shown. In this arrangement the driving and timing mechanism 18 is provided with an additional wheel 22 and the racks or segments 27^a and 27^b are placed on wheels in different planes. An additional gear 47′ is placed on the shaft 80 with the gear 47, and a gear 150 for reverse driving, located between the gear 47′ and the rack segment 27^b. Moreover, instead of sprockets 81, 82 and chains 83, the shaft 80 may be provided with disks having crank pins 151 thereon connecting, through connecting rods 152, with crank pins 153 on disks on stub shafts 155 having thereon the crank pins 85 connecting with the cross-head 88, through the connecting rods 87.

Means 130 heretofore described are preferably provided for insuring initial engagement of the rack segments 26^a, etc. with the gears 47, 47′, etc.

When the rack teeth 27^a mesh with the gear 47, the crank 85 will be turned through nearly 180° and preferably stopping on dead center to raise the cross-head 88 and eject the platen carrying the formed block or tile. Thereafter (after a short period of rest) the segment or rack 27^b will engage

the gear 150, driving the gear 47′ reversely, and will turn the crank 85 reversely to bring the cross-head 85 to its lower position.

What is claimed is:—

1. A block or tile making machine, comprising a box or mold, feeding means comprising a gear, block-ejecting means comprising a gear, and driving and timing means comprising interrupted gearing for intermittently engaging said gears of said feeding and ejecting mechanism.

2. A block or tile making machine comprising a box or mold, feeding mechanism comprising a gear, block-ejecting means, comprising a gear, and tamping mechanism comprising a part for holding it out of action, and driving and timing means comprising interrupted gearing for intermittently engaging said gears of said feeding and ejecting mechanism and a part for releasing said part of said tamping means, which acts to hold it out of action.

3. In a block or tile making machine, a box or mold, pallet in said mold, a feed slide means for ejecting said pallet with the formed blocks or tile thereon, tampers, means for actuating the same, a main driving and timing member internally continuously geared to receive motion and externally discontinuously geared in sections to transmit motion, one section of said discontinuous gearing arranged to move said slide to and from said mold, the other section of said discontinuous gearing arranged to drive said ejecting mechanism and raise said pallets from the mold.

4. In a block or tile making machine, a box or mold, a feed slide, means for ejecting formed blocks or tile from said mold, and a main driving and timing member comprising means for turning it, and discontinuously geared in sections to transmit motion, one section of said discontinuous gearing arranged to move said slide to and from said mold, and another section arranged to intermittently operate said ejecting mechanism.

5. In a block or tile making machine, a box or mold, a feed slide, means for ejecting formed blocks or tile from said mold, tampers, and a main driving and timing member comprising means for turning it, and discontinuously geared in sections to transmit motion, one section of said discontinuous gearing arranged to move said slide to and from said mold, and another section arranged to intermittently operate said ejecting mechanism, said main driving and timing member further comprising means for timing the action of said tampers.

6. In a block or tile making machine, a box or mold, a feed slide, means for ejecting formed blocks or tile from said mold, and a main driving and timing member comprising a continuous set of gear teeth through which it is rotated, and sections of discontinuous gears, said sections being angularly spaced and arranged in different planes axially, gears arranged in different planes corresponding to said angularly spaced gear sections adapted to be successively engaged by said gear sections, said gears being connected to said feed slide and to said ejecting mechanism, and imparting thereto intermittent reciprocatory movement.

7. In a block or tile making machine, a box or mold, a feed slide, means for ejecting formed blocks or tile from said mold, and a main driving and timing member comprising a continuous set of gear teeth through which it is rotated, and sections of discontinuous gears, said sections being angularly spaced and arranged in different planes axially, gears arranged in different plane corresponding to said angularly spaced gear sections adapted to be successively engaged by said gear sections, said gears being connected to said feed slide and to said ejecting mechanism, and imparting thereto intermittent reciprocatory movement, and means for positioning said gears to mesh with the lead-tooth of said gear sections.

8. In a block or tile making machine, a box or mold, a feed slide, means for ejecting formed blocks or tile from said mold, and a main driving and timing member comprising a continuous set of gear teeth through which it is rotated, and sections of discontinuous gears, said sections being angularly spaced and arranged in different planes axially, gears arranged in different planes corresponding to said angularly spaced gear sections adapted to be successively engaged by said gear sections, said gears being connected to said feed slide and to said ejecting mechanism, and imparting thereto intermittent reciprocatory movement, the discontinuous gears in each of said planes comprising a plurality of sections.

9. Actuating mechanism for molding machinery, said mechanism embodying a shaft a plurality of master gears mounted upon said shaft, means for rotating the shaft, a plurality of separate mechanical movements independent of the shaft, means affording a direct gear connection between each of the said master gears and one of the said movements, and means providing a positive locking of the said movements in timed relation with respect to each other, all in one complete cycle of operation of the said shaft.

10. Actuating mechanism for molding machinery, said mechanism embodying a shaft, a plurality of master gears mounted upon said shaft, means for rotating the shaft, a plurality of separate mechanical movements independent of the said shaft, means affording a direct gear connection between each of the said master gears and one of the said movements, means providing a positive lock-

ing of the said movements in timed relation with respect to each other, all in one complete cycle of operation of the said shaft and master gears, a tamper, means also operating in timed relation with said master gears for actuating the tamper, locking means for the tamper, and means affording a direct connection between the said shaft and the last recited locking means for rendering the latter active and inactive at predetermined times in the cycle of operation of the said shaft.

In witness whereof, I have hereunto signed my name.

ANDREW G. McINTYRE.