Aug. 8, 1933. J. L. McDONOUGH ET AL 1,921,237

TILE MAKING MACHINE

Filed July 12, 1930 3 Sheets-Sheet 1

Fig. 1

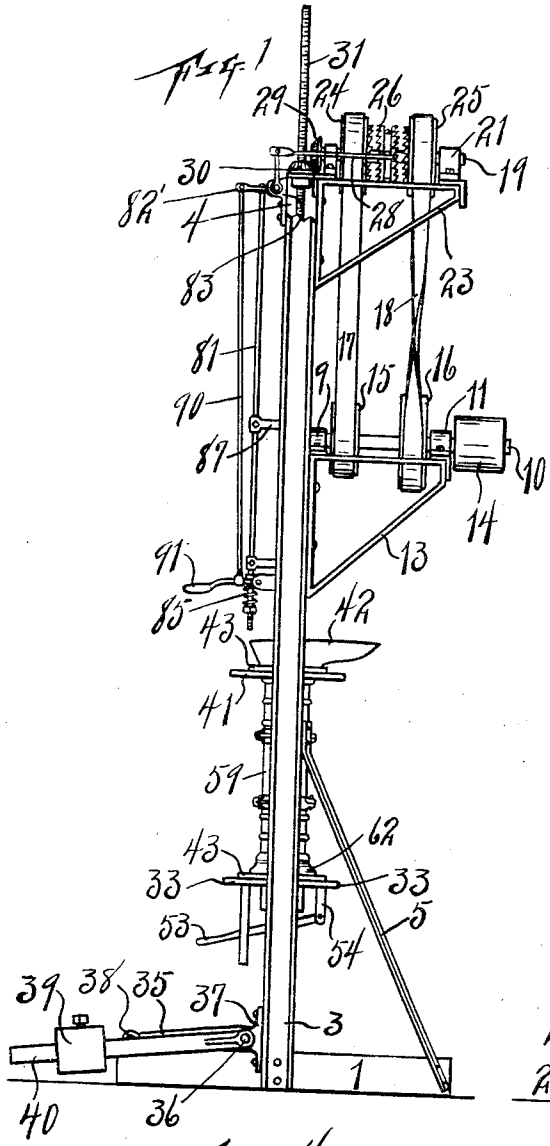


Fig. 2

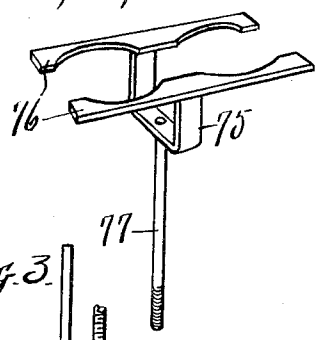


Fig. 3

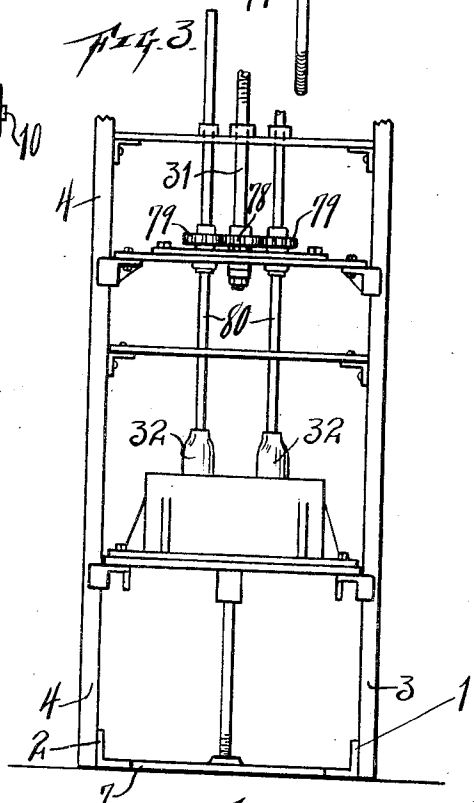


Fig. 4

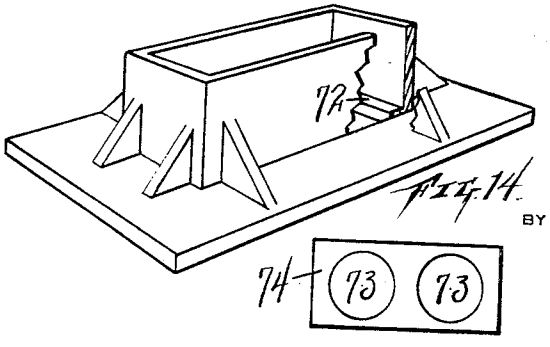
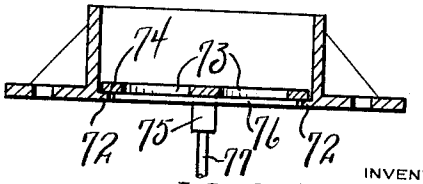


Fig. 14

Fig. 5



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TILE MAKING MACHINE

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Fig. 6.

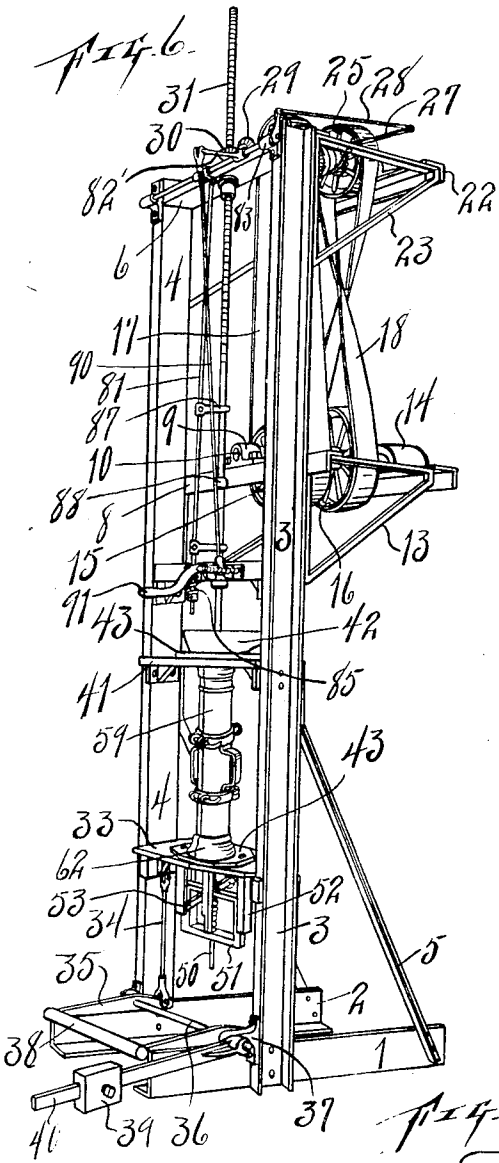

Fig. 7.

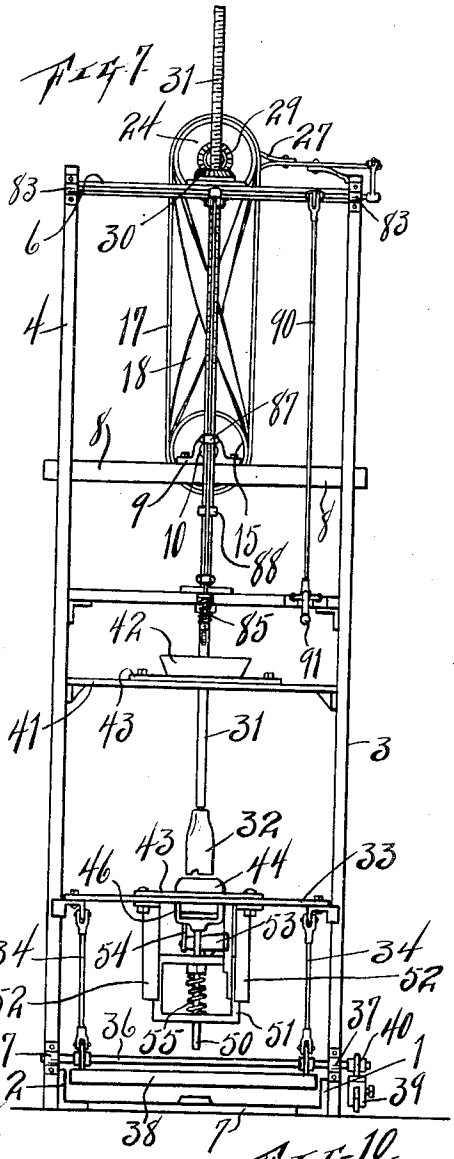

Fig. 8.

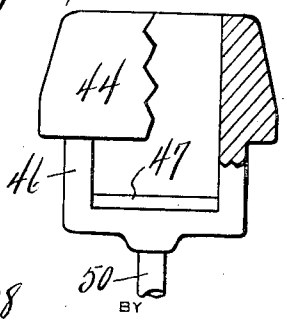

Fig. 10.

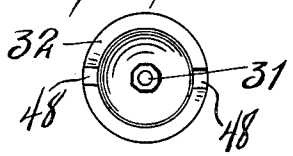

Fig. 9.

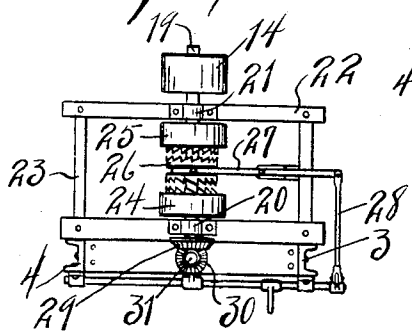

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Fig. 11.

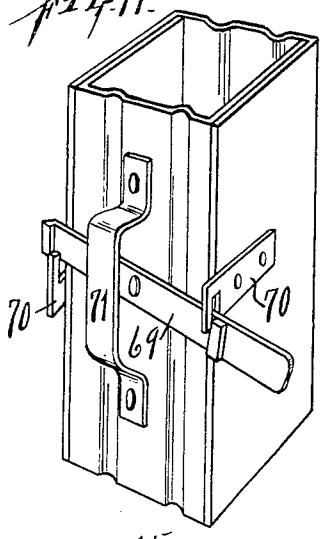


Fig. 12.

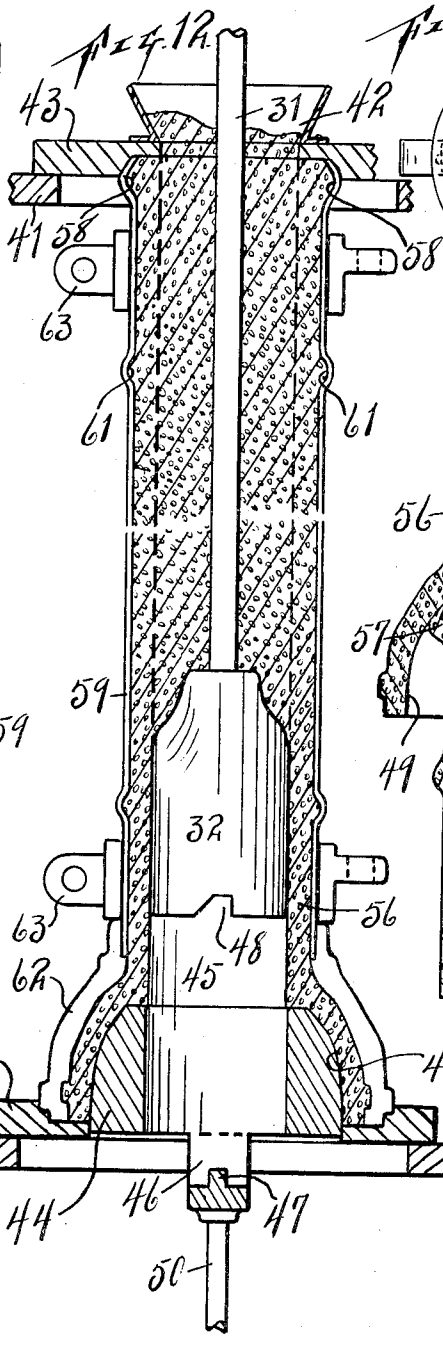


Fig. 13.

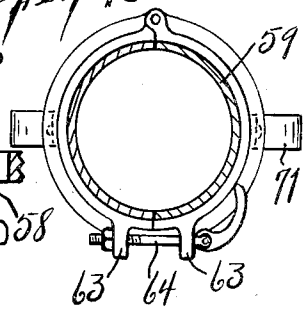


Fig. 16.

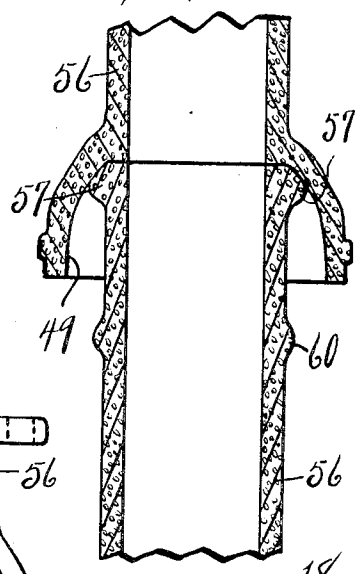


Fig. 15.

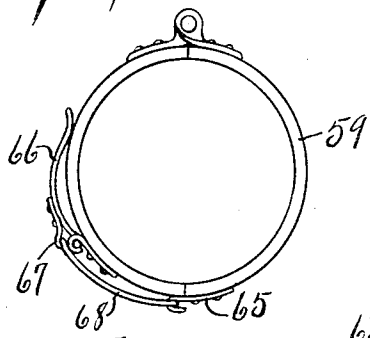


Fig. 17.

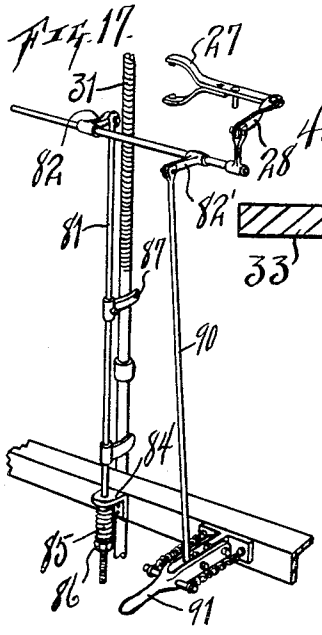
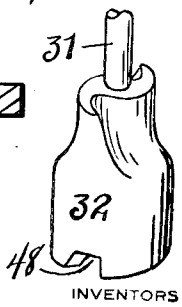


Fig. 18.



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Patented Aug. 8, 1933 1,921,237

UNITED STATES PATENT OFFICE

1,921,237

TILE MAKING MACHINE

John L. McDonough and French B. Williams,
Fort Worth, Tex.

Application July 12, 1930. Serial No. 467,459

2 Claims. (Cl. 25—36)

Our invention relates to provide machines for molding tile and more particularly to machines for molding hollow tile of different shapes—tubular or rectangular and other shapes; and the object is to provide machines which can be operated economically and with speed in turning out tile in large quantities and to provide machines which have interchangeable molding devices. Another object is to provide machines with molding and turning apparatus and devices for making tile which will interlock with each other and which will be automatically self aligning or self centering of adjacent end members; and to provide machines for making building blocks, partition blocks, floor blocks, cylindrical tile for drainage purposes, and to provide tile with bells on the ends and beads on adjacent ends of the bells for causing self aligning or self centering of the beaded ends in the bells, and to provide machines for making building blocks of tile. Other objects and advantages will be fully explained in the following description and the invention will be more particularly pointed out in the claims.

Reference is had to the accompanying drawings which form a part of this application.

Fig. 1 is a side elevation of the machine provided with a single molding equipment.

Fig. 2 is a perspective view of a mold form supporting device.

Fig. 3 is a front elevation of a portion of the machine having a double mold form.

Fig. 4 is a perspective view of the double mold form, partly in section.

Fig. 5 is a longitudinal section of the same.

Fig. 6 is a perspective view of the machine shown in Fig. 1.

Fig. 7 is a front elevation of the same, the mold being omitted.

Fig. 8 is detail view of the bell forming device.

Fig. 9 is a plan view of the gear shifting clutches.

Fig. 10 is a plan view of the bell forming device shown in Fig. 8.

Fig. 11 is a perspective view of a mold form for making rectangular tile.

Fig. 12 is a vertical section of a mold for making tubular or cylindrical tile.

Fig. 13 is a plan view of the same.

Fig. 14 illustrates a supplemental support or base for one type of mold.

Fig. 15 shows a variation in the mold clamping means.

Fig. 16 shows a section of two tiles joined, illustrating the self centering function of the tiles.

Fig. 17 is a perspective view of the gear shifting devices.

Fig. 18 is a perspective view of a bit used in the machine.

Similar characters of reference are used to indicate the same parts throughout the several views.

The machine is provided with a base frame having beams 1 and 2 and uprights 3 and 4 and the uprights 3 and 4 are provided with braces 5. The uprights 3 and 4 are braced at their upper ends by cross bar 6. The frame is also provided with base 7 for supporting operating mechanism.

The frame is provided with platforms and supporting devices for adapting the machine for use with a variety of forms for molding and forming hollow tile of different designs. All the operating mechanism is actuated by a common driving mechanism. All the forms are removable and replaceable so that any design of hollow tile may be made with the one machine.

A cross bar 8 is attached to the frame members 3 and 4. A bearing 9 is attached to the cross bar 8 for a shaft 10. A bearing 11 for the other end of shaft 10 is supported on a bracket 12 which is supported on the frame members 3 and 4 and by braces 13. The pulley 14 may be driven by any suitable line shaft or other driving means. Pulleys 15 and 16 are mounted on shaft 10 and these drive belts 17 and 18, the latter being crossed for giving the required direction to the running of the shaft 19. The shaft 19 is journaled in bearings 20 and 21. The bearing 20 is mounted on cross bar 6 and the bearing 21 is mounted on a bracket 22 which is made rigid by braces 23. Pulleys 24 and 25 are loosely mounted on the shaft 19 and are driven by the belts 17 and 18 respectively. A double clutch 26 is keyed to the shaft 19 and is slidable thereon. The faces of pulleys 24 and 25 are provided with clutch teeth to be engaged by the teeth of the double clutch 26. The clutch 26 is shifted by a yoke 27 and lever 28. One of the pulleys 24 and 25 is used to elevate the operating mechanism and the other is used to lower the operating mechanism. A bevel gear wheel 29 is rigid with shaft 19 and drives a gear wheel 30, which is rotatably mounted on the cross bar 6. A vertical shaft 31 is threaded and the gear wheel 30 is interiorly threaded and meshes with the threads of the vertical shaft 31. When the gear wheel 30 is driven, the shaft 31 is revolved or driven and runs in the direction determined by the clutch 26 and pulleys 24 and 25. The shaft 31 carries and operates a bit 32 for coring out

cylindrical openings in tile or pipes and also compresses the plastic material outwardly against the molds. The bit 32 forms a bottom in the mold when it is at its lowest position and the major portion of the work done by the bit 32 is when the bit is traveling upwardly in the molds, being driven by the gear wheel 30. The bit 32 is fixedly but removably attached to the shaft 31.

Platforms are provided and attached to the uprights 3 and 4 for supporting molds or forms for making the tile. A platform 33 is slidably connected to the uprights 3 and 4. The platform 33 forms a frame for supporting the bases of the various types of molds. Means are provided for actuating the platform 33. Rods or bars 34 are pivotally connected to the platform 33. These rods are also pivotally connected to the ends of a pair of levers 35. The levers 35 are fulcrumed on a shaft 36 which is journaled in bearings 37 which are attached to the uprights 3 and 4. The levers 35 are connected to a foot operated bar 38. The levers 35 may be rigid with the shaft 36. A weight 39 cooperates with the levers 35 and cross bar 38. Arm 40 is rigid with shaft 36 and a weight 39 is slidably mounted on the arm 40 to be attached at any desirable point on the arm 40. The different molds are elevated by the platform 33 which is actuated by the levers 35. A support 41 is provided for a hopper 42 and this support 41 forms a stop to limit the upward movement of the molds. The support 41 is fixedly attached to the uprights 3 and 4. The platforms 33 and 41 have relatively large openings therethrough for permitting the passage of all bits. Supplemental platforms or supports are provided to be placed on the platforms 33 and 41. A pair of supplemental platforms 43 is provided for each design of mold and a pair of supplemental platforms have openings to correspond with the size of the bit openings which receive the bits. Different sizes of bits are required for different sizes of molds. All supplemental platforms are adapted to rest on the platforms 41 and 33. The ends of the molds are countersunk in the supplemental platforms 43, the upper platform 43 being reversed and fitting down about the upper end of the mold. The supplemental platforms 43 are for the purpose of holding the molds in alignment.

A bit 44 of special design is provided for forming the bells of cylindrical tiles. The bit 44 enters the opening 45 which has been made by the bit 32. The bit 44 is provided with a depending yoke 46. The yoke 46 has a rib 47 for entering a slot 48 in bit 32. The bit 32 is rotated by the gearing hereinafter described and the bit 32 rotates the bit 44 by reason of the slot and rib connection. The bit 44 forms the bell on the end of the tile. Fig. 12 shows the bell 49 and shows the bit 44 stopped and the bit 32 moving on upwardly to finish the tile. The bit 44 has rod 50 integral with the yoke 46 and the rod projects downwardly through a frame 51 which moves vertically in guides 52 which are rigid with platform 33. The frame 51 is actuated by a lever 53 which is pivotally connected to a depending bar 54 which is carried by the platform 33 and fulcrumed on the frame 51. The lever 53 is used to lower the bit 44 when the tile is to be removed. A spring 55 is used to hold the bit 44 in the elevated position and to move the same into and out of operative position.

Fig. 16 illustrates a tile 56 on which is formed the bell 49. The tile 56 has the end beveled so that the tile will center itself in the bell. In this manner, the tile is automatically centered in the bell and nothing is necessary to hold the tile up in line with the adjacent tiles. The bead or annular rib 57 on the end of the tile is formed by an annular interior groove 58 in the tile form 59. The bead 57 forms an additional bearing surface on the outside of the tile for centering purposes. The cylindrical tile has an annular rib 60 on the exterior surface and this rib is formed by an annular interior groove 61 in the tile form 59. The object is to provide means for preventing the packing from slipping on the exterior surface of tile.

The bit 32 is rotated by the shaft 31. The bit moves upwardly. The bit forms a base for supporting the plastic material in the lowest position. On starting upwardly, the bit 32 rotates the bit 44. The bit 32 presses the plastic material outwardly as it moves upwardly. The bit 44 follows and presses the material outwardly still further until the plastic material is pressed against the bell portion 62 of the tile forming device 59. The form or bit 44 will be automatically stopped against the bell portion and the bit 32 will continue to rotate and form an opening through the tile and to press the plastic material against the interior of the form 59. The bit is tapered at the upper end for the purpose of forcing the material outwardly against the tile making form.

The tile form 59 is made of two parts which are hingedly connected together. The parts of the form at the free edges are clamped together by the flanges 63 and bolts 64. Fig. 15 shows a variation in the means for clamping the parts of the form together. In this form a hook 65 is attached to one side of the form and a lever 6 is pivotally connected to the other form and a hook 67 is attached to the lever for operating a link 68 which is caught on the hook 65 and on the hook 67.

Fig. 11 illustrates a form for making tile which is rectangular in cross-section. This form consists of two trough-like members nested together and attached together by a pivoted bar 69 and hooks 70. The form is provided with handles 71.

Figs. 4 and 5 illustrate another form of a tile mold which is formed of a single piece of metal. This form has an open bottom but has a flange 72 for supporting removable bases 74 which have openings 73 for the passage of bits 32. There may be a variety of such forms interchangeable. A form of support or stop is shown in Fig. 2. This form cooperates with the flanges 72 in supporting the base 74 as shown in Fig. 5. This form has a yoke 75 which carries two bars 76 which conform to the openings for the bits. The yoke 75 is supported on a stem 77 which is screwed into the base portion 7 of the machine frame. When the tile is finished the platform 33 is lowered and carries the tile form down with it, leaving the tile resting on its base 74. The tile can then be removed from its base support 74.

The tile forms shown are all interchangeable in the machine. The platforms 33 and 41 are used with all the forms.

Fig. 3 shows how a plurality of bits may be operated. A gear wheel 78 is mounted on the shaft 31 and meshes with gear wheels 79 which are rigid with shafts 80 so that shaft 31 may drive additional bits.

The bits are driven by the vertical shaft 31 through the gearing above described. Provision is made for throwing said gearing in and out of operation automatically or manually. A rod 81

is pivotally connected to a bell crank lever 82 which is fulcrumed on a bracket 83 which is attached to the upright 4, and slidably mounted in a bracket 84 which is mounted on the upright 4. The rod 81 is held yieldingly downward by a spring 85 which rests on a nut 86 which is screwed on the rod 81 and bears against the underside of the bracket 84. A trip 87 is rigid with the rod 81. A nut 88 is screwed on shaft 31. When the shaft 31 is rotated for driving the bit 32, the shaft will rise upwardly through the gear wheel 30 until the nut 88 strikes the trip 87. The rod 81 will actuate the lever 82 and disconnect the driving gear for shaft 19. This stopping of the driving gear must be timed to occur after the bit 32 has finished boring a tile. At the same time the clutch 26 will be manually shifted by means of the link bar 89, lever 23, and yoke 27, to reverse the driving of gear wheel 30. This will rotate the shaft 31 in the reverse direction and move the bit 32 back to starting position.

The shifting of the clutch 26 may be accomplished manually. A rod 90 is pivotally connected to a lever 91 and pivotally connected to the lever 82'. The actuation of the lever 91 will shift the gearing as above described.

What we claim is,—

1. A tile making machine comprising an upright frame, a reversable driving mechanism, a bell former embodying a vertically disposed spring, means for actuating bell former vertically.

2. A tile making machine of the class described, comprising an upright frame, a stationary upper platform secured rigidly to the upright frame, a lower horizontal platform provided with means for raising and lowering same, a mould supported on said lower platform, bits for coring out material in the mould, a reversable driving mechanism embodying means for raising and lowering said bits vertically through moulding devices by means of straight and cross belts working in conjunction with reversable clutch.

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