Feb. 25, 1936. E. D. MATTES 2,031,899

INDENTING AND STAMPING MACHINE FOR CLAY PRODUCTS, SUCH AS PAVING BRICK AND THE LIKE

Filed Sept. 17, 1934 5 Sheets-Sheet 1

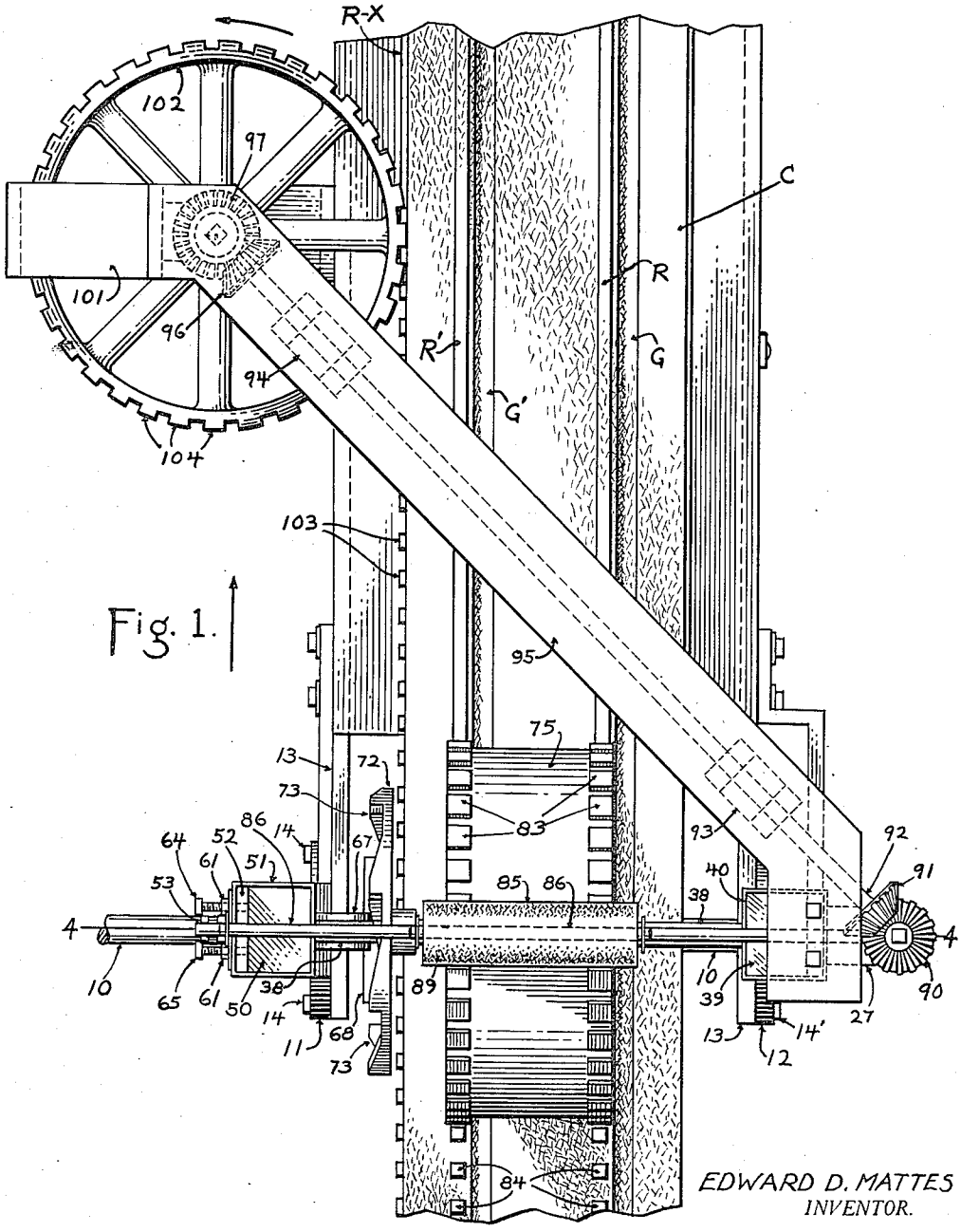


Fig. 1.

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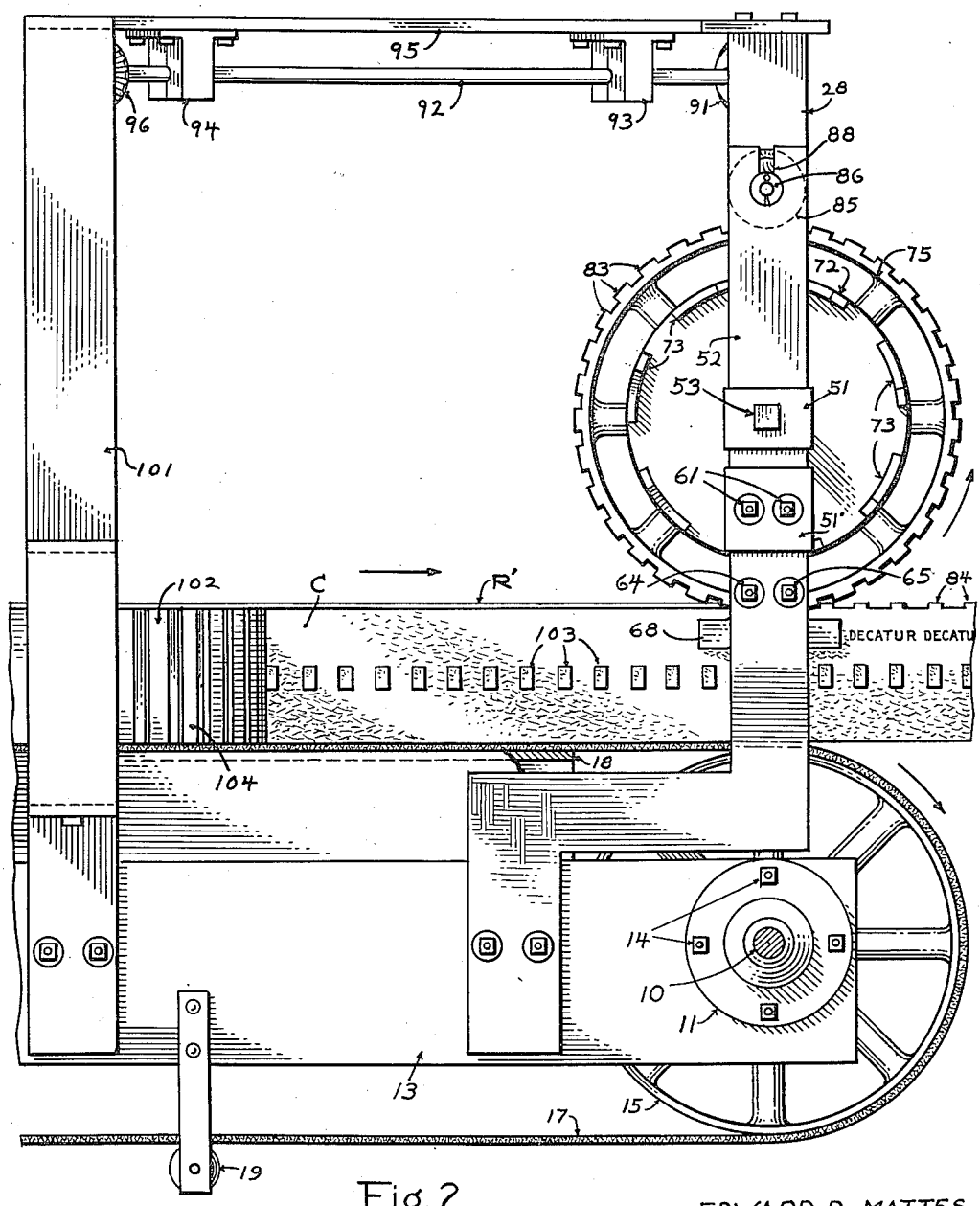


Fig. 2.

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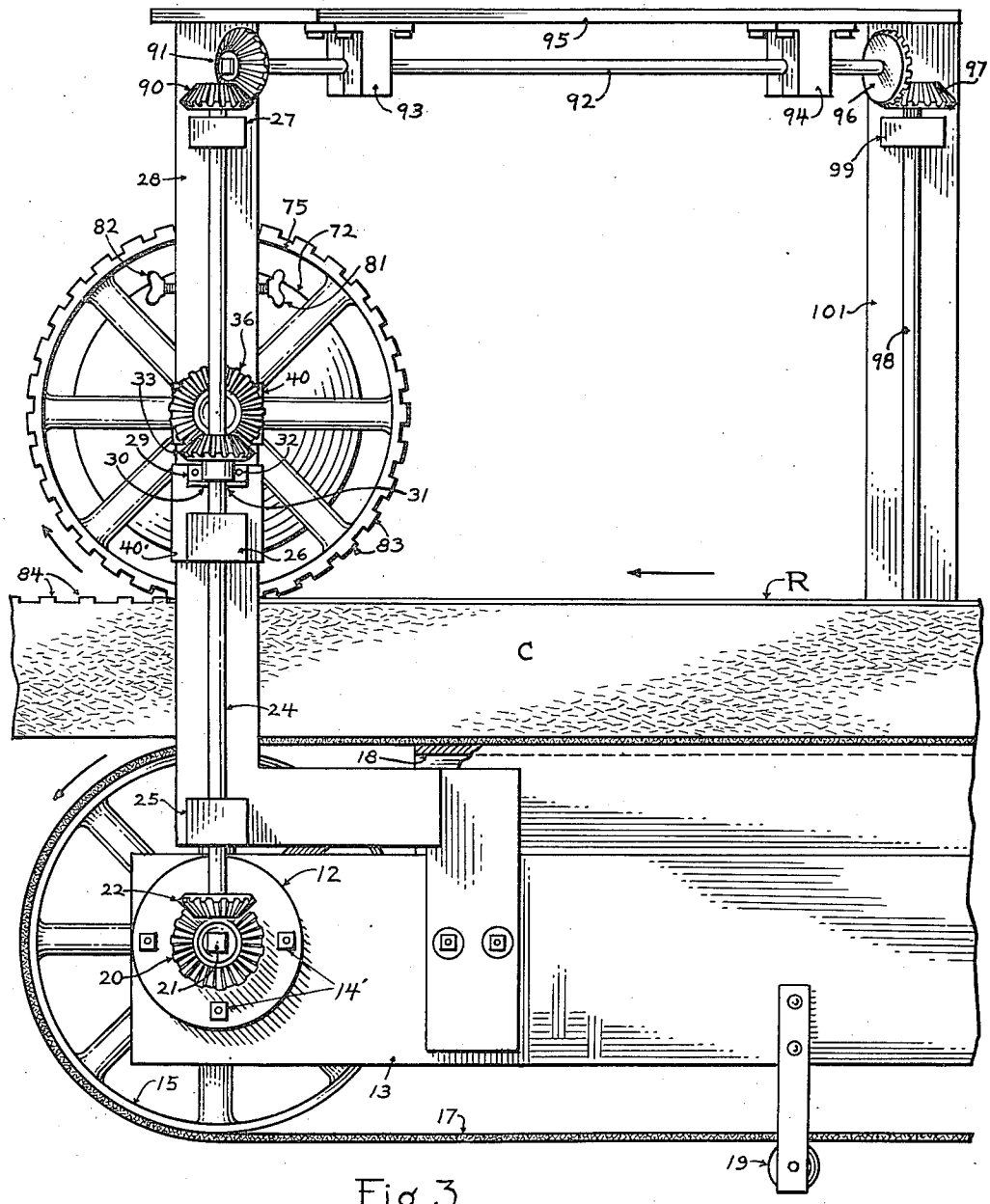


Fig. 3.

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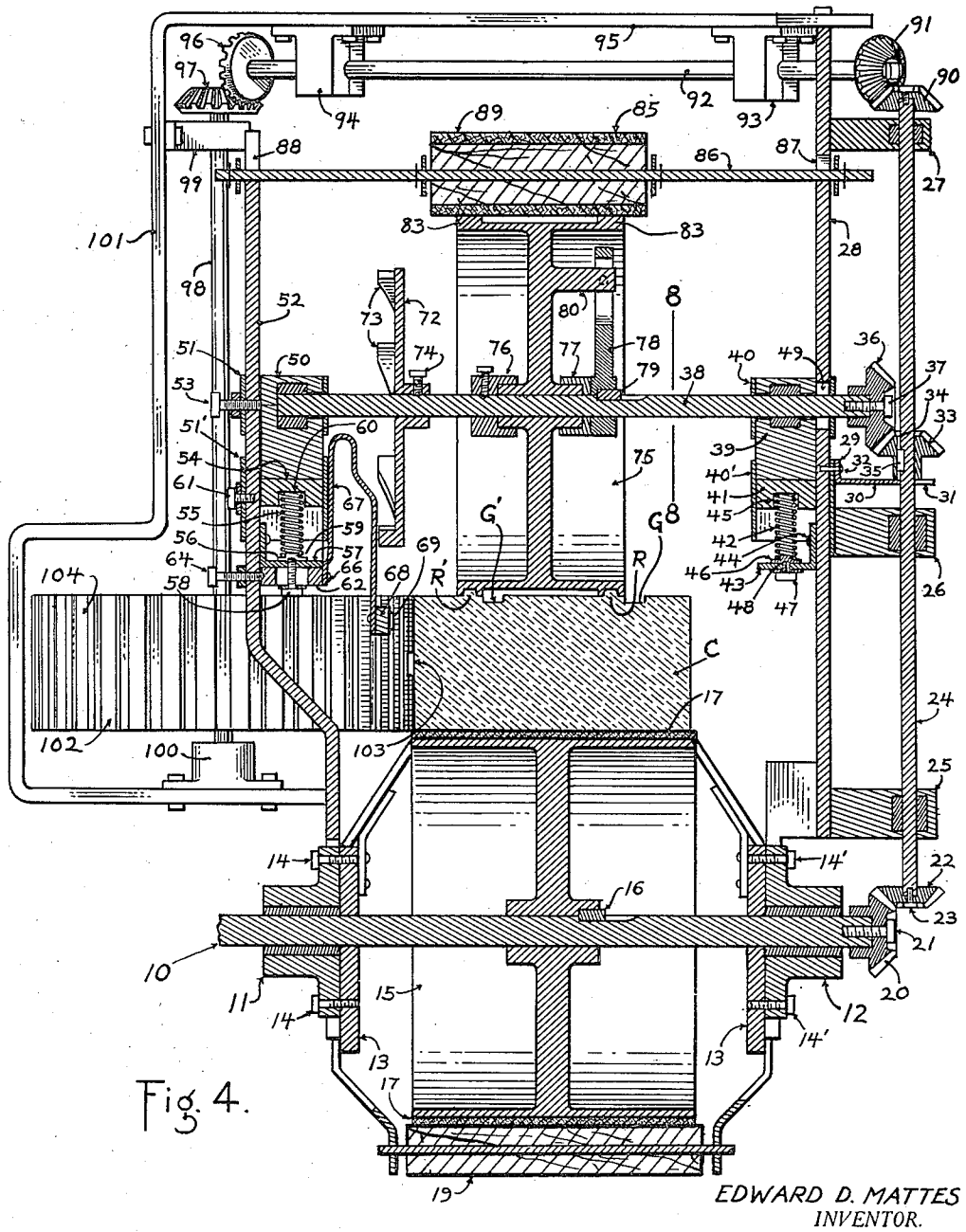


Fig. 4.

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INDENTING AND STAMPING MACHINE FOR CLAY PRODUCTS, SUCH AS PAVING BRICK AND THE LIKE

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Fig. 6.

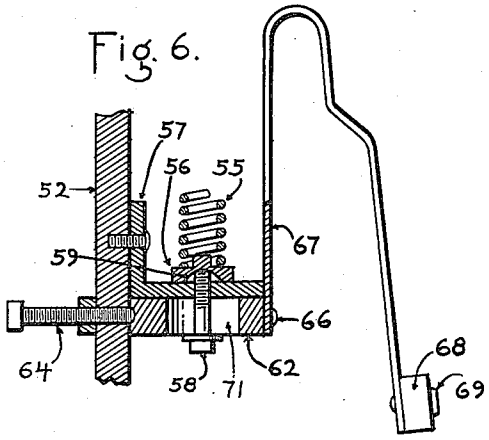


Fig. 5

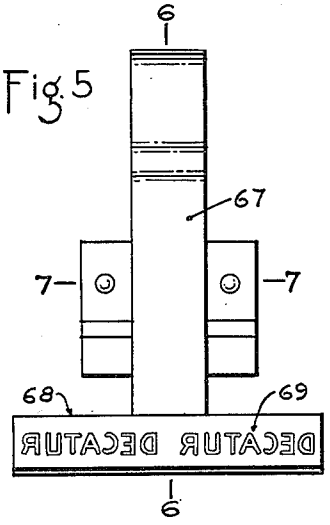


Fig. 7.

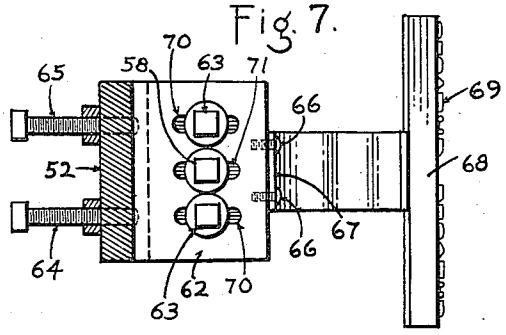


Fig. 8.

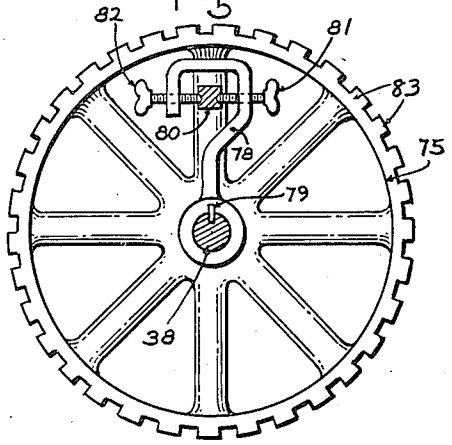
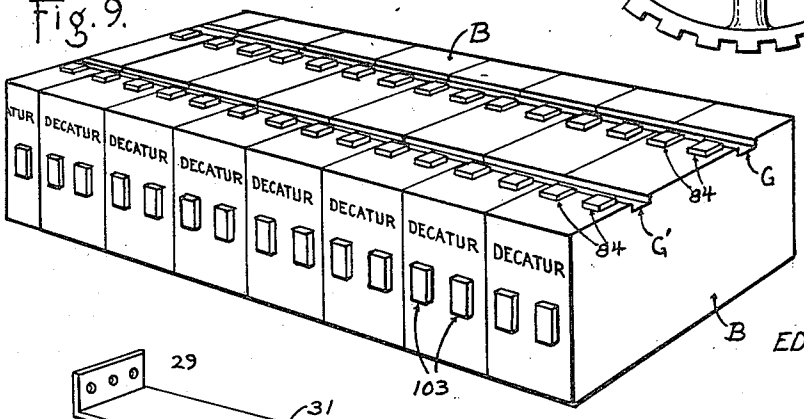


Fig. 9.



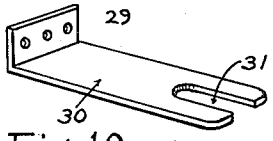


Fig. 10.

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Patented Feb. 25, 1936 2,031,899

UNITED STATES PATENT OFFICE

2,031,899

INDENTING AND STAMPING MACHINE FOR CLAY PRODUCTS, SUCH AS PAVING BRICK AND THE LIKE

Edward D. Mattes, Decatur, Ill., assignor to Decatur Brick Manufacturing Company, Decatur, Ill.

Application September 17, 1934, Serial No. 744,308

8 Claims. (Cl. 25—1)

My invention relates to devices and apparatus for forming lugs, indentations or projections on plastic articles and for imprinting a trade-mark or name thereon, and particularly to machinery or apparatus for performing such work in continuous, large volume production, such as in the manufacture of brick, tile and other clay ware.

My invention relates specifically to machinery for forming anchoring lugs on paving brick and stamping a name thereon while the brick are in a plastic state.

The chief object of my invention is to provide a machine whereby the mechanisms for forming the lugs and imprinting the name on the brick are synchronized with each other so that not only may precise co-ordination in the performance of the two separate operations be maintained, but automatic, continuous production effected as well.

Another important object of my invention is the provision of a machine for forming lugs and stamping a name on brick in different locations, but at predetermined intervals along a column of plastic clay from which the brick are formed, by means of a transverse cutting operation, the latter forming no part of my present invention.

A further object of my invention is to provide a lug-forming and name-stamping machine, such as that above mentioned, with means for conveying the column of clay through the machine at a measured rate of longitudinal movement in co-ordination with the lug-forming and name-stamping and cutting-off mechanism so that all the operations of the machine are completely synchronized with one another.

A still further object of my invention is to provide a machine wherein the lug-forming rollers and the name-stamping mechanism are capable of positive adjustment with relation to one another to enable correction of any slight discrepancy in the co-operative relation of any of the several operations of the machine as a whole.

Other objects of my invention will appear from the following specification of which the accompanying drawings form a part, and in which:—

Fig. 1 is a top plan view of my improved lug-forming and name-stamping machine with a column of clay in the machine.

Fig. 2 is a side elevation of the machine as viewed from the left of Fig. 1.

Fig. 3 is a side elevation of the machine as viewed from the right of Fig. 1.

Fig. 4 is a transverse cross-sectional view taken on the line 4—4 of Fig. 1 and looking in the direction of the arrow, showing the column of clay in cross-section.

Fig. 5 is a view in front elevation of the name-stamping device.

Fig. 6 is a cross-section taken on the line 6—6 of Fig. 5.

Fig. 7 is a cross-section taken on the line 7—7 of Fig. 5.

Fig. 8 is a cross-section taken on the line 8—8 of Fig. 4, showing the adjusting device for the upper forming roller.

Fig. 9 is a perspective view showing several brick after the column of clay has been subjected to the cutting-off operation.

Fig. 10 is a perspective view of a spring support for the upper roller driving shaft.

Referring to the drawings, in which like numerals designate like parts in the several views, 10 indicates a measuring drum shaft which is driven from a suitable power unit (not shown), this shaft being journaled in oppositely disposed bearings 11 and 12 rigidly secured to the machine frame 13 by means of bolts 14 and 14', respectively. Mounted on shaft 10 is a measuring drum or roller 15, this drum being secured to shaft 10 by means of a key 16. A corresponding roller (not shown) is mounted at some distance away from drum 15 and a flexible, endless, belt 17 is mounted about said rollers under sufficient tension to form a conveyor for the column of clay as will later be more fully explained.

The top portion of the belt 17 is supported by a platen 18 and the bottom portion of the belt is supported by idler rollers 19 mounted on the machine frame. The outer circumference of the measuring drum 15 plus the thickness of the belt 17 is precisely equal to the length of a column of clay sufficient to make a predetermined number of full sized brick plus a surplus equalling substantially a half size brick, the object of which will be later explained.

A bevel gear 20 is mounted on one end of the shaft 10 and secured thereto by means of a headed screw 21. The gear 20 meshes with another bevel gear 22 secured by means of a headed screw 23 to a vertical shaft 24 so that the latter is driven by shaft 10. Shaft 24 is mounted in bearings 25, 26 and 27 secured to the vertical extension 28 of the machine frame, said bearings being preferably of the roller type. An angle bracket 29 having a resilient horizontal section 30 with a slot 31 in its outer end is secured to the vertical extension of the frame 28 immediately above the bearing 26 by means of the screws 32. A bevel gear 33 corresponding in size with gear 22 is slidably mounted on the shaft 24, but is caused to rotate with said shaft by means of a through

slot 34 in the bore of the gear and a key 35 imbedded in the shaft 24. The hub of the gear 33 rests upon the resilient extension 30 of the bracket. The shaft 24 rests within the slot 31. The resilient member 30 provides a yieldable end thrust support for gear 33.

Another bevel gear 36 corresponding in size with gear 29 is fixedly mounted by means of a headed screw 37 on the end of a horizontally disposed transversely extending shaft 38, with gear 33 in mesh with gear 36, so that the shaft 38 will be driven at the same speed of rotation as that of shaft 10. The shaft 38 is journaled in a roller bearing 39 which is slidably mounted in substantially square, tubular housings 40 and 40' which are rigidly secured by means of welding to the vertical extension 28 of the machine frame. The bearing 39 rests upon a supporting block 41, which in turn rests upon a helical spring 42 supported by a bracket 43 which is fixedly secured to the upright extension 28 by means of bolts or screws 44 thus providing a resilient cushion for the bearing 39 and the shaft 38, so that a slight vertical movement of said shaft is permitted in either direction. The spring 42 is seated at its upper end in a recess 45 in the slidable block 41, and at its lower end on a plate 46, which rests upon the bracket 43 and is held in position by means of a screw 47 which projects through the bracket 43 into a recess 48 in the bottom of the plate 46. A slot 49 in the upright extension 28 permits vertical movement of the shaft 38 in the stationary frame extension.

The opposite end of the shaft 33 is mounted in a roller bearing 50 which is mounted similar to bearing 39, in that it is slidably mounted in substantially square tubular housings 51 and 51' which are fixedly secured to another vertical extension 52 of the machine frame 13 by means of the screws 53 and 61 respectively. The bearing 50 rests upon the slidable supporting block 54 which in turn rests upon a helical spring 55, said spring 55 being supported by a plate 56 mounted on a bracket 57 which bracket is secured to the vertical frame extension 52. A screw 58 projects through the bracket into a recess 59 in the plate 56 to center and hold the spring 55 in fixed position. The upper end of the spring 55 is seated in a recess 60 in the supporting block 54, so that the bearing 50 is cushioned to permit a slight vertical movement of the shaft 38 in either direction.

The screw 53 projects through the wall of the housing 51 and the vertical member 52 with its end abutting the outer face of the bearing 50 directly opposite the end of the shaft 38, which screw is adapted for slight adjustment of the bearing 50 when necessary to prevent binding of shaft 38 in the bearing 50.

A name stamp supporting plate 62 is adjustably mounted on the lower side of the bracket 57 and is held in adjusted position by means of spaced screws 63 which project through the bracket 57. The screws 64 and 65 project through the vertical extension 52 with their ends abutting the edge of the plate 62. The purpose of said screws is to force either end of the plate 62 outwardly from the extension 52 to make slight changes in its alignment, as will later be more fully explained. Secured to the inner edge of the plate 62 by means of the bolts 66 is a flat spring metal member 67 bent into substantially a U-shape and having a name-stamping plate 68 secured to the opposite end of said spring member, the stamping plate being provided with raised letters or other characters 69 to imprint a trade-mark or name in the plastic material upon impact therewith. Slots 70 in the plate 62 permit the screws 63 to move laterally of the machine when loosened for adjustment of the stamping plate. A similar slot 71 provides clearance for movement of the middle screw 58 heretofore mentioned which centers the spring plate 56.

A cam wheel 72 having formed on or secured on its face a series of equidistantly spaced cams 73 of wedge-like form is mounted on the shaft 38 and adjustably secured to said shaft by means of a set screw 74. The spring member 67 which carries the stamping plate 68 is so formed that it tends to spring outwardly to force the stamping plate against the side of a column of plastic clay C carried on the conveyor belt 17. The spring member 67 is, however, at all times in contact with the series of cams 73 and it is thereby forced away from contact with the column of clay each time the wider portion of a cam moves into position opposite the spring member 67. Thus the cams 73 effect intermittent movement of the stamping plate away from and toward the column of clay, the inward movement being effected automatically by the spring action of the member 67 so that the trade-mark or name is stamped on the side of the clay column at regular intervals which will leave one name on the end of each brick when later formed by the cutting off operation.

An indenting or lug-forming roller 75 is loosely mounted on the shaft 38 intermediately thereof, and held against end thrust thereon by recessed collars 76 and 77 which fit over the respective ends of the hub of the roller 75. Collar 76 is fixedly secured to the shaft 38 by means of a set screw, and the collar 77 is held against endwise movement by an arm 78 which is secured to said shaft by means of a key 79. The arm 78 is formed at its outer end in substantially the shape of a ? with its upper end positioned about a horizontal projection 80 made integral with one of the spokes of the roller 75.

Two oppositely disposed adjusting screws 81 and 82 project through the curved portion of the arm 78 and bear against the respective opposite sides of the projection 80. By means of said screws a slight angular adjustment of the roller 75 may be effected while the machine is in motion, due to its slow speed and at the same time maintain said roller in rigid position on the shaft 38.

The roller 75 has formed about its outer periphery two rows of equidistantly spaced indenting lugs 83 disposed at the opposite edges of said roller which lugs are aligned with ridges R formed by a previous operation on the top surface of a column of clay C, so that as the column of plastic clay is conveyed past the roller 75 the lugs 83 will indent the ridges R, that is to say, press spaces in the ridge down to the level of the top surface of the column, thus forming regularly spaced anchoring lugs 84 on the top surface of the column at regular intervals, as shown in Fig. 9. After the bricks B are formed by means of the cutting-off operation (not shown) there are two anchoring lugs near each end of each brick.

An idler roller 85 is mounted on a shaft 86 which is journaled in the frame members 24 and 52, one end of said shaft extending through a slot 87 in the member 24 and the other end through an open slot 88 in the member 52 so that the roller is free to ride up and down when sub-

jected to any irregularity in the movement of the roller 75. The roller 85 is preferably covered with felt or other material 89 which is kept saturated with a suitable lubricant to preclude possible sticking of the surface of the roller to the clay material.

Fixed on the extreme upper end of the shaft 24 is a bevel gear 90 corresponding in size with gear 22, which gear 90 meshes with another bevel gear 91 corresponding in size with gear 20. Gear 91 is secured to a horizontal shaft 92 mounted in bearings 93 and 94 secured to horizontal support 95 which extends diagonally across the machine. A bevel gear 96 is secured to the opposite end of the shaft 92 and said gear meshes with another bevel gear 97 secured to the upper end of a vertically disposed shaft 98, mounted in bearings 99 and 100 secured to the extension 101 of the horizontal support or portion of the frame 95. The gears 96 and 97 correspond in size to the gears 91 and 90 respectively so that the speed of rotation of shaft 92 equals that of the shaft 10 and the speed of the shaft 98 equals that of the shaft 24.

Another lug-forming roller 102 is secured to the lower end of the shaft 98, this roller being adapted to form lugs 103 on one side of the column of clay. This roller, instead of having two rows of short lugs is provided with equidistantly spaced projections 104 which extend the entire width of the roller 102, and these projections extend radially a sufficient distance to contact a flat surface of the side of the column of clay C and press indentations in the single ridge R—X which extends horizontally along the middle portion of the clay column to form the lugs 103.

As shown in Fig. 9 two lugs appear on the end of each brick after it is cut off the column.

The clay column has formed in its upper surface and extending lengthwise thereof a groove G located outwardly of but adjacent to the ridge R, and another similar groove G' extending inwardly of but adjacent to the opposite ridge R'.

The measuring drum 15 is geared to rotate in the direction of the arrow indicated in Fig. 2 and the indenting roller 75 rotates in the opposite direction. The indenting roller 102 rotates in the direction of the arrow shown in Fig. 1.

It will be seen that the arrangement of gearing described in the foregoing is such that the measuring drum 15, the indenting roller 75 and the indenting roller 102 all rotate at the same rate of speed so that the peripheral speed of each of the indenting rollers corresponds precisely to the travel of the conveyer belt 17. It will be seen further that the cam wheel 72 rotates in precise relation to the measuring drum and the identing rollers, as well as to the longitudinal travel of the column of clay. Thus the entire mechanism for conveying the column of clay through the machine, for indenting the lugs in the upper surface of the clay column and the side surface of the clay column and for stamping the trade name at predetermined intervals along the side of the clay column are all synchronized with one another, so that each mechanism performs its function automatically and with precision, enabling quantity production to be carried on continuously without necessity of manual control of any of the separate functions of the machine as a whole.

In operation, the column of clay C, which is moulded or drawn into substantially rectangular formation in cross-section with the ridges R and R' and the grooves G and G' by a process not forming a part of my invention, is laid on the conveyer belt 17 which conveys it in the direction shown by the arrow in Fig. 2, and as the column moves forward it passed under the upper indenting roller 75 which indents the ridges R and R' to form the lugs 84. At substantially the same time one of the cams 73 and the cam wheel 72 permits the stamping plate 68 to contact the side of the clay column by force of the spring member 67 and imprint the trade mark such as "Decatur", illustrated on the side of the column of plastic clay. As the column moves farther it engages the indenting roller 102 which indents the ridge R—X to form the lugs 103. The column of clay is then conveyed onto a gang cut-off device (not shown), where the entire column is cut up into brick ready for the firing kiln. As shown in Fig. 9 a surplus, substantially a half brick, is left at the end to allow for a perfect brick at the end of the column.

It will be observed that any slight discrepancy in the entire mechanism may be corrected by one adjustment, and that is the adjustment of the upper indenting roller 75 by means of the adjusting screws 81 and 82 as more clearly shown in Fig. 8. The roller 75 rotates very slowly, and consequently the screws 81 and 82 may be manipulated and the needed adjustment made while the machine is in motion.

Any needed correction in the alignment of stamping plate 68 may be effected by loosening the bolts 63 and the center bolt 68 and adjusting the supporting plate 62 on which the spring member 67 that carries the name-stamping plate is mounted.

The result of the several operations of forming the lugs 84 and 103 and imprinting the trade name on the plastic column of clay is clearly shown in Fig. 9 which illustrates the completed brick with lugs and name.

Although the lug-forming rollers illustrated in the drawings are shown as provided with indenting lugs it is to be understood that said rollers may for other forms of work be provided with recesses for embossing and the like. The name-stamping plate may if desired be provided with sunken characters for forming raised letters or other characters.

One of the outstanding advantages of my improved machine is that with this machine the anchoring lugs and the trade-mark are automatically formed at precisely the same location on each brick, thereby imparting to finished paving brick a uniform and pleasing appearance not attained by any mechanisms heretofore made available to manufacturers of such brick.

It is to be understood that specific changes in the details of my improved machine set forth in the foregoing description may be made within the scope of the following claims without departing from the spirit of the invention.

I claim:—

1. A lug-forming and name-stamping machine comprising in combination a frame, a horizontally disposed driving shaft journaled on said frame, a measuring drum mounted on said shaft, a conveyor belt mounted on said drum, a top lug-forming roller, a side lug-forming roller, and a cam wheel journaled on said frame and driven by said driving shaft at the same speed of rotation as said driving shaft, a series of cams carried by said cam wheel, a name-stamping plate mounted on said frame and controlled by said cams, and means for actuating said stamping plate.

2. A lug-forming and name-stamping machine

comprising in combination a frame, a driving shaft journaled on said frame, a measuring drum mounted on said shaft, a conveyor belt mounted on said drum, a top lug-forming roller, a side lug-forming roller and a cam wheel journaled on said frame and driven by said driving shaft at the same rate of speed as said driving shaft, a series of cams carried by said cam wheel, a name-stamping plate mounted on said frame and controlled by said cams, and means for actuating said stamping plate.

3. A lug-forming and name-stamping machine comprising in combination a frame, a driving shaft journaled on said frame, a measuring drum mounted on said shaft, a conveyer belt mounted on said drum, a top lug-forming roller, a side lug-forming roller and a cam wheel driven by said driving shaft, a name-stamping plate mounted on said frame and controlled by cams carried by said cam wheel.

4. A lug-forming and name-stamping machine comprising in combination a frame, a horizontally disposed driving shaft journaled on said frame, a measuring drum mounted on said frame, a second horizontally disposed shaft journaled on said frame above the driving shaft, a top lug-forming roller mounted on said second shaft, a cam wheel mounted on said second shaft, a series of cams carried by said cam wheel, a spring actuated name-stamping plate mounted on said frame and controlled for intermittent impact in a lateral direction by said cams, a vertically disposed shaft journaled on said frame forward of and driven by said driving shaft, a side lug-forming roller mounted on said vertical shaft, a conveyer belt mounted on said measuring drum adapted to convey a column of plastic material past said lug-forming rollers and name-stamping device, the extreme diameter of each of said lug-forming rollers being precisely equal to that of said measuring drum plus the thickness of said conveyer belt.

5. In a machine of the character described, a frame, a horizontally disposed driving shaft journaled in bearings mounted on said frame, a second horizontal shaft journaled in spring supported bearings mounted on said frame above said measuring drum, a top lug-forming roller and a cam wheel mounted on said second shaft, a vertically disposed shaft journaled in bearings at one side of said frame, a side lug-forming roller mounted on said vertical shaft, another vertically disposed shaft extending from said driving shaft to the extreme upper portion of said frame, bevel gears connecting said driving shaft and said last mentioned vertical shaft, bevel gears connecting said last mentioned vertical shaft with said second horizontal shaft, an overhead horizontal shaft extending from said last named vertical shaft to the other said vertical shaft, bevel gears connecting said overhead shaft with each of said vertical shafts, the ratio of said gears being such as to rotate said second horizontal shaft and the first mentioned vertical shaft at the same speed as said drive shaft, a measuring drum mounted on said driving shaft, a name-stamping plate mounted on said frame and controlled by a series of cams carried by said cam wheel, and means for actuating said stamping-plate.

6. In a machine of the character described, a frame, a horizontally disposed shaft journaled on said frame, a second horizontal shaft journaled in spring supported bearings mounted on said frame, means for effecting lateral adjustment of one of said bearings, a top lug-forming roller mounted on said shaft, and means for effecting angular adjustment of said roller with relation to said shaft.

7. In a machine of the character described a lateral impact spring actuated stamping device, a cam wheel provided with a series of cams for controlling the action of said stamping device and means for adjusting the alignment of said device.

8. In a machine of the character described a top lug-forming roller loosely mounted on a horizontal shaft, a thrust collar secured to said shaft and abutting said roller on one side thereof, a collar loosely mounted on said shaft and abutting said roller on the opposite side thereof, an arm having a loop at its upper end keyed to said shaft and abutting said loose collar, a projection on said roller extending through said loop, and adjusting screws projecting through the opposite sides of said loop and engaging said projection to enable angular adjustment of said roller with relation to said shaft.

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