F. B. YINGLING.

MEASURING MACHINE.

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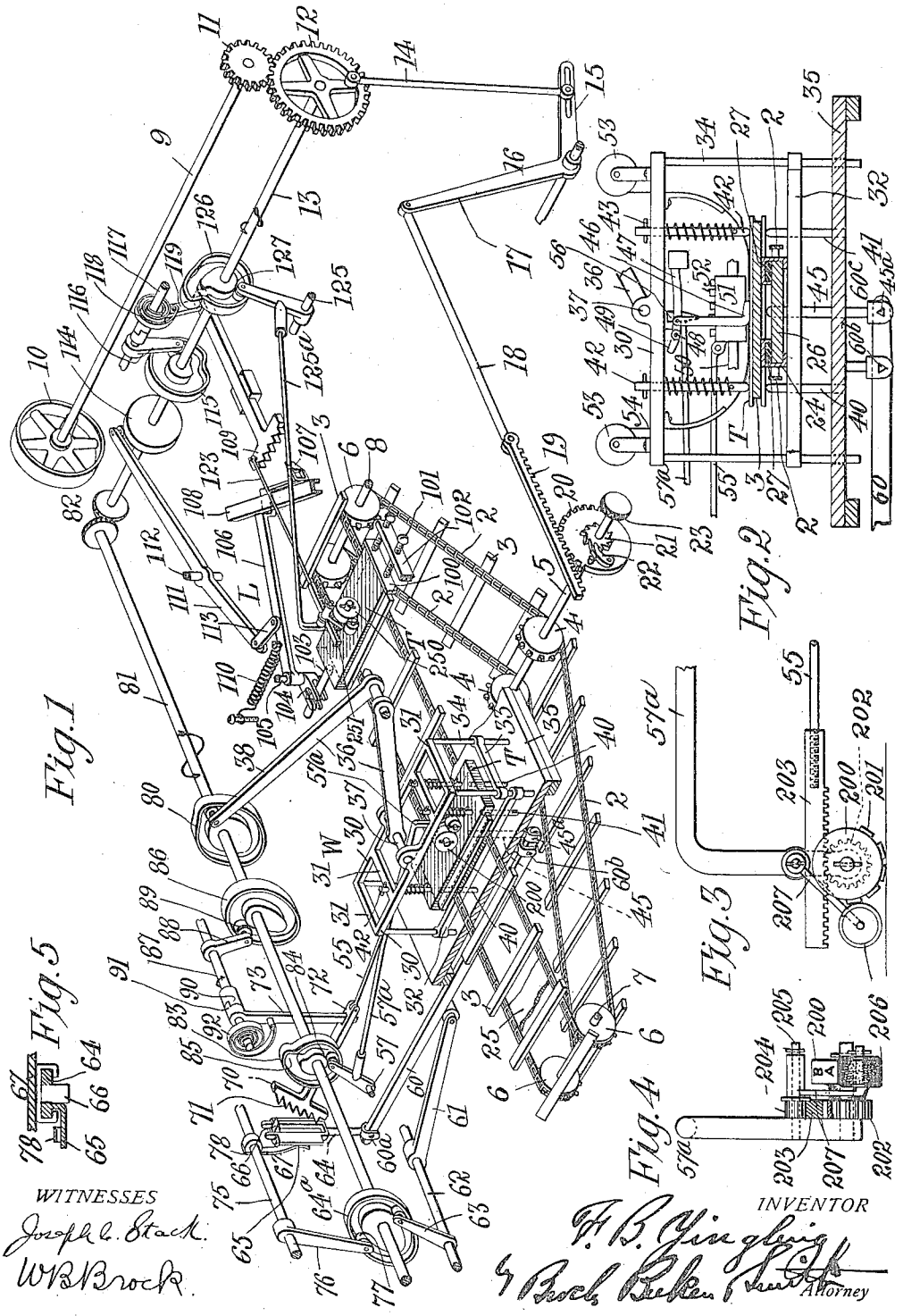


Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

WITNESSES

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MEASURING-MACHINE.

1,194,459. Specification of Letters Patent. Patented Aug. 15, 1916.

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To all whom it may concern:

Be it known that I, FRANK B. YINGLING, a citizen of the United States, residing at Hamilton, State of Ohio, have invented certain new and useful Improvements in Measuring-Machines, of which the following is a specification.

My invention relates to measuring machines particularly designed for measuring tiles and the like.

Among the objects are to provide a machine which is entirely mechanical in its operation.

Another object is to provide, in a single machine, means for positively and accurately measuring warpage of the tiles and the length of the tiles, and to provide these means with common feeding mechanism, and to arrange the other operating devices so that the warp and length measurers will coöperate properly.

Another object is to provide printing devices for stamping on the tiles indications of their measurements and to arrange the printing devices in the warp and length measurers so that the characters will be printed in an orderly, prearranged manner.

A further object is to provide a simplified and extremely accurate selecting mechanism for the printing devices.

Another object is to provide means for properly supporting and steadying the tiles and arranging these devices so that the tiles are not bent while being acted upon by the measuring devices proper.

Another object is to so arrange the feed belt and its operating mechanism that the machine may be easily and quickly adjusted for different sized tiles.

Another object is to provide a special checking device in connection with the printing selector to permit speeding up the machine to its limit of capacity.

Another object is to maintain the tiles at proper elevation as they pass into position in the warp measurer to prevent improper contact with parts of the measuring apparatus, and to lower the tiles into measuring position and clamp them there during measuring.

The above and other objects and characteristics of the invention are hereafter further discussed so far as is necessary in connection with a detailed description of the accompanying drawing, which shows, in a diagrammatic way, one form of mechanism embodying the invention.

The drawing is very much simplified, most of the framing and any other parts not essential to an understanding of the operation of the principal parts of the mechanism being omitted for the sake of clearness.

In the drawings: Figure 1 is a diagrammatic perspective of the machine; Fig. 2 is a transverse section of the warp measuring mechanism; Fig. 3 is a side elevation of the printing mechanism and selector of Fig. 1; Fig. 4 is an end view of Fig. 3 with some of the parts shown in section; Fig. 5 is a sectional detail of the selector dog yoke and guide.

Reference character 1 designates in general the feed belt, comprising chains 2 and slats 3. The chains run over sprockets 4 on a drive shaft 5 and idler sprockets 6 on front and rear shafts 7 and 8. The tiles T are laid upon the upper side of the belt, one tile against the forward side of each slat. The belt carries the tiles first to the warp measuring mechanism, designated in general by W, and then to the length measuring mechanism, designated in general by L. From the length measurer the tiles may pass to a carry-off belt, or may be disposed of in any other suitable way.

Primary drive-shaft 9, driven by a belt pulley 10 or any other suitable device, carries pinion 11, engaging gear 12 on primary cam shaft 13, which may otherwise be designated as the length measuring cam shaft. Pitman 14 connects gear 12 to slotted arm 15 of bell-crank 16, the other arm 17 of which is connected by a pitman 18 to rack 19. Pitman 14 is adjustable in the slot of arm 15 to regulate the stroke. Rack 19 engages a segmental gear 20 loosely mounted on belt drive shaft 5. This shaft also carries a circular ratchet 21 and gear 20 has a pawl 22 engaging the ratchet. On the end of shaft 5 is a hand-wheel 23. During half of its rotation, shaft 13, acting through pitman 14, bell-crank 16, link 18 and rack 19, rotates segmental gear 20 right-handedly, as seen in Fig. 1, and this propels the feed belt. During the other half of the rotation of shaft 13, rack 19 is returned to its original position and segment gear 20 is rotated backward without effect upon the drive belt, the pawl 22 riding back over ratchet 21. This ratchet drive for the feed

belt permits easy adjustment of the belt to suit different widths of tile. Each tile, whatever its width, rests against the leading face of one of the slats. The spacing of teeth of ratchet 21 is proportioned to the different widths of tiles in common use. The machine being adjusted for one width of tile, if a tile slightly narrower is to be measured, hand-wheel 23 is turned so that ratchet 21 advances one notch in relation to pawl 22. This has the effect of advancing the feed belt one ratchet space and brings the new sized tile into centered position in relation to the measuring devices. By setting the belt ahead several spaces it will regain its original relation to the driving mechanism. Other possible adjustments will be obvious from the foregoing.

Fig. 2 shows some refinements in the belt and tile carrying devices. As here shown, the chains 2, at intervals, carry clips 24 which support the slats somewhat above the lower faces of the tiles. The clips embrace the edges of a guide-plate or rail 25, which extends approximately from the left-hand end of the belt, as seen in Fig. 1, to the warp measurer, and from the warp measurer to the length measurer. To avoid obscuring other points, however, in Fig. 1, only a fragment of the rail is shown near the left-hand end of the belt. In the warp measuring mechanism the rail 25 is interrupted and a movable segment 26 is inserted. The clips 24 also carry leather belts 27, which travel around over the rail and actually support the tile, affording a soft surface which will not scratch or otherwise injure them.

The warp-measuring mechanism has a clamping frame, comprising upper transverse bars 30, upper longitudinal bars 31, lower transverse bars 32, lower longitudinal bars 33 and vertical posts 34 connecting the upper and lower bars, and passing at their lower ends through holes in the bed-plate 35, providing a vertical guiding support. A bell-crank 36 connected to trunnions 37 on the frame is provided for raising and lowering it. The free arm 38 of this bell-crank is actuated by a cam, as later described. Bars 32 on the frame lie under the belt and its movable rail section 26. Consequently, when the frame is elevated the belt and tile carried by it are raised, and when the frame is lowered the belt and tile are lowered. When the tiles are being moved to and away from a measuring position, the frame is elevated, and about the moment the tiles stop in measuring position the frame is lowered and then all the necessary measuring operations are performed while the tiles are stationary and while the belt-driving rack 19 is returning for another stroke.

Bed-plate 35 carries fixed measuring pins 40 placed near two diagonally opposite corners of the tile and a third fixed pin 41 placed at one of the other corners to steady the tile. When the frame is lowered the tile is firmly clamped upon these stationary pins by spring-pressed pins 42 carried by cross-bars of the frame, one above each of the stationary pins so that the clamping pressure causes no bending of the tile. Pins 42 have very slight motions when freed from the tiles, this motion being limited by stops 43 engaging above the frame bars. Passing through a suitable guiding hole in bed-plate 35 is the movable warp measuring pin 45. This passes also through a hole in the movable rail 26 and engages the lower surface of the tile in the same diagonal line as fixed pins 40. Evidently, the upper ends of pins 40 and 45 define a line in the vertical plane containing the diagonal dimension of the tile and this line will be straight or curved with its convexity up or down, according to the flatness or concave or convex warpage of the tile. Two of the points are determined by the fixed pins and the third point determining the line of measurment is indicated by the movable pin, and this variable position of pin 45 is transferred to other devices for indicating the condition of the tile. Of course, in a simple form of machine pin 45 could be made to operate an indicator or other device, but in the present machine the movement of pin 45 actuates a printing selector to stamp an appropriate character on the tile corresponding to its straightness or curvature. To counteract the pressure of pin 45 in measuring, the frame may be provided with a presser foot 46 pivoted at its upper end to a weighted lever 47 fulcrumed at 48 and provided with a stop 49 to limit its motion to a small arc when the frame is raised.

Measuring lever 60 is connected to measuring pin 45 by a knife-edged pivot 45^a and is fulcrumed at 60^b on a knife edge supported from bed 35. At its outward end the lever is connected by knife edged pivot 60^a with link 64, at the upper end of which is a yoke 65 carrying the knife edged selector dog 66. The long arm of the lever between fulcrum 60^b and pivot 60^a very much multiplies the movement of measuring pin 45. In a particular case this multiplication is about one to twenty-five, although, obviously, there is no limitation in regard to proportions of the lever. Yoke 65 moves up and down in a suitable guide 67. Evidently, the dog 66 will assume a vertical position, depending on the warpage of the tile measured by pin 45, and the degree of movement of the dog is also evidently much greater than the movement of the pin, so that the selector parts may be sufficiently large to give accurate and positive results and to have ample strength.

Reciprocating in fixed guides toward and away from the selector dog is the selector 70. This has a head inclined at an angle to the path of movement of dog 66. The inclination is largely variable but in a particular case may be about 45°. The engaging face of the selector is provided with pointed teeth 71 producing intermediate notches. The selector head has a stem 72 and this is engaged by a lever 73 and urged by spring pressure toward the dog when the dog is in measuring position. Evidently, the movement of the selector head toward the dog varies in accordance with the vertical position of the dog on account of the angular position of selector teeth 71. Evidently, also, when the selector is moved toward the dog it cannot take an intermediate position because the edge contacts afforded by the dog and teeth 71 compel the dog to enter one or the other of the selector notches. The dog being in measuring position and the selector urged against it by spring pressure, then, the selector moves a distance corresponding to the warpage measurement. This measuring movement of the selector is communicated to the printing mechanism, which will now be described.

Pivoted at 57 to a part of the framework is an arm 57ª extending into the pressure frame, over the tile in measuring position, and there carrying at its free end a printing roller 200, which bears on its periphery different types 201, usually of rubber or other yielding material, to give an even impression on the hard tile. Fixed to revolve with the printing roll is a pinion 202. The pinion is engaged by a rack 203 and the rack is held in engagement by a small roller 204 on a stud 205 carried by arm 57ª. Selector 70 is connected to rack 203 by link 55. The measuring movement of the selector, then, is communicated to the printing roll by rack 203 rotating pinion 202 and the roll, so that the type corresponding to the measurement of the tile is put in downmost position. The printing arm 57ª is then dropped by a suitable cam movement and the character printed on the tile. The printing roll may be inked by an inking roll 206 and this may be conveniently carried by an arm 207 pivoted on stud 205, so that the inking roll hangs against the printing roll. The selector mechanism may have a return movement sufficient to completely rotate the printing roll or to rotate it sufficiently to bring all of the types in contact with the inker. This printing mechanism while a preferred form, is only one of the forms that can be used. Fig. 2 shows modified printing mechanism, which will be later described.

The measuring movement of lever 60 is controlled by a releasing lever 61 carried by shaft 62, which in turn carries an arm 63 provided with a cam follower engaging a cam 64ª. When the tile reaches the measuring position it is first clamped by the frame. At this time lever 61 holds the outerward end of measuring lever 60 up, and correspondingly holds pin 45 down so that the pin is out of contact with the tile. But as soon as clamping is effected cam 64ª lowers lever 61 and permits measuring lever 60 to drop by the weight of its long arm. The selection is thereupon accomplished. After the printing roll has been dropped upon the tile, cam 64ª returns lever 61 toward measuring lever 60 and shortly raises the long arm of the lever and again releases the measuring pin from the tile. Without special provision, the recommencement of the feed belt movement to carry away the measured tile would have to be delayed until lever 61 actually engaged measuring lever 60 and removed the pin from engagement with the tile, otherwise as soon as the clamping devices freed the tile the weight of lever 60 would raise the measuring pin and the tile, and in this movement the dog 66 would slide down over teeth 71 of the selector, causing possible injury or breakage to the parts, undesirable wear and strain on the measuring pin and other disadvantageous conditions. To prevent these undesired occurrences and at the same time to avoid delay in commencement of the next feeding movement, special means are provided to hold the dog in measuring position until lever 61 reëngages measuring lever 60. This means consists of a shaft 75 carrying an arm 76 which has a cam-follower 77 engaging cam 64ª. Shaft 75 also carries a spring 78 engaging dog yoke 65 when arm 76 is swung to the left, as seen in Fig. 1. Cam 64ª is designed so that shortly after arm 61 releases measuring lever 60 and dog 66 comes to measuring position, the cam moves arm 76 and presses spring 78 against the dog yoke with sufficient force to hold it stationary in its guide 67 after clamping pressure upon the tile is removed. Evidently then, as soon as the selection has been made and printing has been accomplished, the pressure frame may be raised, freeing the tile from the fixed measuring points and also from the movable point 45, which, as above explained, is now prevented from returning by the action of spring 78. Then the next feed belt movement may immediately commence. Shortly, arm 61 comes into engagement with measuring lever 60 and raises it, positively moving the measuring pin away from possible contact with the tile and then the cam releases spring 78. Of course, the machine can be operated without this special appliance, which may be considered a speeding up device, but it is preferable to employ it since the operation of the whole machine is by it expedited.

In the machine as actually constructed, a second warp measuring device is usually placed in line with the one just described so as to measure warpage on the other diagonal of the tile. The parts of the second warpage measurer are practically the same as the parts of the one just described and for the sake of simplicity therefore this second device is omitted.

It remains to describe briefly the operating mechanism for some of the parts of the warp measurer. The pressure frame bell crank 36 is actuated by a cam 80 on cam shaft 81 which may be identified as a secondary cam shaft connected by bevel gears 82 with the primary cam shaft 13 so that the two shafts revolve at the same speed. Cam 64ª for the release of the measuring lever 60, already described, is also carried by shaft 81. Also mounted on shaft 81 is cam 83 for raising and dropping the printing arm 57ª. The arm drops of its own weight and the cam has a concentric part 84 and a quick drop 85 into which the cam follower carried by arm 57ª drops quickly at the proper time, permitting the type to strike the tile. Shaft 81 also carries selector cam 86. Adjacent to this is a side shaft 87 carrying an arm 88 on which is follower 89 engaging cam 86. Said shaft 87 also carries an abutment 90 and loosely mounted on the shaft 87 is the lever arm 73 previously described. This arm is provided with a shoulder 91 engaging abutment 90 when the selector is inactive. A coiled spring 92 is connected at its inner end to shaft 87 and at its outer end to lever 73, the spring being coiled in such a direction that when shaft 87 is rotated in the direction of the arrow, the spring will be coiled up and urge lever 73 to the left or away from the eye, as seen in Fig. 1. When selector dog 66 has been put in selecting position, cam 86 urges arm 88 in the direction of the shaft arrow. This rotation of the shaft coils up spring 92 and urges lever arm 73 and connected selector 70 to the left into engagement with the dog. The spring of course accommodates any variation in the movement of the selector due to the position of the dog. After printing, the cam brings back arm 88 and shaft 87 and in this movement abutment 90 engages shoulder 91 and compels positive return of the selector.

The sequence of operations in connection with warp measuring will now be briefly repeated. The pressure frame 30 and track 26 being elevated, feed belt 1 moves a tile into measuring position. There is a dwell in all of the cams during the feed belt movement. The tile being in position, the feed belt stops and cam 80 depresses the pressure frame, clamping the tile. Cam 64ª releases arm 61 and measuring lever 60; the outer end of the lever drops and pin 45 engages the tile and positions dog 66. Cam 86 then urges selector 70 into engagement with the dog. The type wheel 200 is thus positioned. Cam 83 drops the type roll, imprinting the proper mark upon the tile. The roll is then quickly raised. Cam 64ª is now returning arm 61 toward engagement with measuring lever 60 and has just previously also engaged spring 78 with the dog yoke 65. The cam 86 now releases the selector from the dog and moves the type roll back to normal position. Cam 80 now raises the pressure frame, unclamping the tile and raising it free from the fixed measuring points. Movement of the feed belt recommences and at about this time cam 64ª releases spring 78 from the dog yoke and the measuring parts return to normal position.

From the warp measurer the tiles are advanced to the length measurer. The fixed abutment for this device consists of a plate 100 adjusted by screws 101 engaging a fixed piece 102. At the opposite end of the tile is length measuring pin 103. This is moved back and forth by a fork 104, pivoted at 105 and connected to the length measuring lever 106. At its outer end this lever carries a knife edged dog 107 suitably guided by a rail 108. Dog 107 is similar in essentials with dog 66 already described, and it coöperates with a selector 109 practically the same as selector 70 and arranged at an angle to the path of dog movement for the same purpose as already described in connection with the warp measurer. Lever 106 is urged to measuring position by spring 110 and is retracted by a releasing lever 111 pivoted at 112 and connected to the measuring lever by a link 113. The free end of the lever has a follower engaging a cam 114 on primary cam shaft 13. This cam shaft also carries cam 115, operating an arm 116, side shaft 117, spring 118 and lever 119 connected to the stem of the selector, these parts all corresponding substantially to the similar parts already described in connection with the warp measurer. Above the tile in the length measuring position is a printing wheel 250 carrying a plurality of types, and rotated by rack 251. The rack is connected by a link 123 with the selector 109. The printing wheel is carried by an arm 125ª pivoted at 125. Cam 126 of shaft 13 engages cam follower 127 of the printing arm. It will be evident that the printing mechanism is substantially the same as that already described in connection with the warp measurer and further description here is, therefore unnecessary. For the length measuring mechanism, clamping, raising and lowering mechanism for the tile is unnecessary.

As the tile comes into length measuring position, pin 103 is retracted, being so held by the sideward acting lobe of cam 114 en-

gaging the free end of lever 111. Printing arm 125ª is elevated and selector 109 is retracted. The tile being at rest, cam 114 releases lever 111 and spring 110 then urges measuring pin 103 against the tile. Dog 107 at the same time moves to a position corresponding to the measured length. Cam 115, acting through spring 118, now urges selector 109 into engagement with dog 107 and printing wheel 250 is thus positioned. Cam 126 then drops the printing wheel and prints the proper character on the tile. Arm 125ª is now immediately retracted, selector 109 is retracted, cam 114 again causes lever 111 to retract the measuring pin 103. The feed belt then moves the tile forward away from the measuring device and it is removed or carried away by any suitable mechanism.

It is evident that the printing point for each measuring device depends upon the position of the printing roll. Printing position for the warp measurer is selected in relation to the printing position for the length measurer so that the second printing device will place a character in suitable relative position to the character printed by the first device. For example, usually these characters in a completely measured and marked tile appear closely side by side in a predetermined order, so that one familiar with the marks used can at a glance determine the degree of warpage on each diagonal and whether it is concave or convex, and the length. The tiles are of course graded or thrown away according to the marks.

Fig. 2 in addition to parts already described, shows a modified form of printing mechanism. This comprises a printing guide 50, which may be secured to a part of the frame or to any other suitable support. Upon this guide is reciprocably mounted a printing slide 51 carrying a plurality of spring return type plungers 52. Above the row of plungers is hammer 56, which in this form of construction is carried by printing arm 57ª, reference now being made to the warp measuring mechanism. The printing slide is connected to a selector by link 55. When the selector is in measuring position hammer 56 is elevated by cam 83 and printing slide 51 is in a position corresponding to the measuring position of the tile. When cam 83 reaches printing position, arm 57ª is dropped, as already described, and in this case this dropping of the arm causes hammer 56 to depress one of the type plungers 52. An inking ribbon 54 is provided, carried by suitable spools 53 and passing between the types and the tile, and upon the dropping of the hammer the type strikes through the ribbon upon the tile and imprints the proper character. This mechanism can be substituted for the preferred form shown either in the warp measuring mechanism or the length measuring mechanism, or both.

Evidently the machine in its details of construction and operation is subject to great variation and the foregoing is only one typical example.

I claim:

1. In measuring mechanism for tiles or the like, a feed belt, driving mechanism therefor, fixed warpage measuring points, a movable measuring point, and means for changing the elevation of a tile carried by the belt as it approaches the place for measuring to prevent sliding contact of the tile with said points.

2. In measuring mechanism for tiles or the like, a feed belt, driving mechanism therefor, fixed warpage measuring points, a movable measuring point, means for changing the vertical position of a tile carried by the belt as it approaches the place for measuring to prevent sliding contact of the tile with said points and means for clamping the tile upon the fixed measuring points.

3. In measuring mechanism for tiles or the like, the combination of a feed belt, tile engaging slats thereon, a movable guide piece below the slats, fixed measuring points adjacent the said piece, a movable measuring point, means for raising said movable piece as the tile is moved over said points and means for clamping the tile on said fixed measuring points.

4. In measuring mechanism for tiles or the like, the combination of a feed belt, two fixed measuring points, a movable measuring point in line with the said fixed points, a printing device and selector mechanism, controlled by the movable measuring point, for moving the printing device in accordance with the position of the movable point.

5. In measuring mechanism for tiles or the like, the combination of a feed belt, two fixed measuring points, a movable measuring point in line with the said fixed points, a printing device, means for clamping the tile in measuring position, and selector mechanism controlled by the movable measuring point, for moving the printing device in accordance with the position of the movable point.

6. In measuring mechanism for tiles or the like, the combination of a feed belt, tile engaging slats thereon, fixed measuring points, a movable measuring point between said fixed points, means for raising the tile as it moves over the points, a printing device, selector mechanism for positioning the printing device in accordance with the position of the movable point, means for operating the printing device for making an imprint on the tile and means for retarding the return movement of the selector mechanism.

7. In measuring mechanism for tiles or

the like, the combination of a feed belt, tile engaging slats thereon, fixed measuring points, a movable measuring point between said fixed points, means for changing the elevation of the tile as it moves over the points, means for clamping the tile in measuring position upon the fixed points, a printing device, selector mechanism for positioning the printing device in accordance with the position of the movable point, means for operating the printing device for making an imprint on the tile and means for retarding the return movement of the selector mechanism.

8. In measuring mechanism for tiles or the like, the combination of a feed belt, fixed measuring points, a movable measuring point in line with said fixed points, a lever connected with said movable point, a dog connected with the lever, a selector and means for urging it against the dog, a printing device connected with the selector and actuating means for the printing device acting upon the positioning of the slide.

9. In measuring mechanism for tiles or the like, the combination of a feed belt, fixed measuring points, a movable measuring point, a lever connected with said movable point, a dog carried by the lever, a toothed selector to coöperate with the dog, yielding means for urging the selector into engagement with the dog, printing means connected with the selector, and means for retracting the measuring lever from measuring position.

10. In measuring mechanism for tiles or the like, the combination of a feed belt, fixed measuring points, a movable measuring point, a lever connected with said movable point, a dog carried by the lever, a toothed selector to coöperate with the dog, yielding means for urging the selector into engagement with the dog, printing means connected with the selector, means for retracting the measuring lever from measuring position, and means for preventing movement of the dog during a part of the feed movement.

11. In measuring mechanism for tiles or the like, the combination of fixed measuring points, tile feed means, means for raising the tile as it passes the fixed points, means for clamping the tile in measuring position by pressure applied above said fixed points, a movable measuring point and selector mechanism connected therewith.

12. In measuring mechanism for tiles or the like, the combination of fixed measuring points, tile feed means, means for lowering the tile when it is in measuring position, means for clamping the tile in measuring position by pressure applied above said fixed points, a movable measuring point, selector mechanism connected therewith, and means for preventing deflection of the tile by the engaging pressure of the movable measuring point.

13. In measuring mechanism for tiles or the like, the combination of fixed warp measuring points, a movable warp measuring point, clamping means for holding a tile upon said fixed points, a fixed length measuring abutment, a movable length measuring point, a feed belt for carrying tiles past said warp measuring and length measuring points in succession, means for moving the feed belt intermittently, a shaft and cam operated mechanism for operating the movable warp measuring point and clamping means, a shaft and cam operated mechanism for actuating the movable length measuring point and common driving means for rotating said cam shafts and moving said feed belt intermittently in proper order.

14. In measuring mechanism for tiles or the like, the combination of a feed belt, two fixed measuring points arranged on a diagonal axis of a tile carried by said belt for measuring, a movable rail section adjacent the said point, a movable measuring point in line with the fixed points, means for raising the rail section during movement of the belt and lowering it when the belt is stationary, a clamping frame and clamping device carried by the frame for applying clamping pressure to the tile opposite said fixed measuring points.

15. In measuring mechanism for tiles or the like, the combination of a feed belt, two fixed measuring points arranged on a diagonal axis of a tile carried by said belt for measuring, a movable rail section adjacent the said points, a movable measuring point in line with the fixed points, means for raising the rail section during movement of the belt and lowering it when the belt is stationary, a clamping frame, a clamping device carried by the frame for applying clamping pressure to the tile opposite said fixed measuring points, a fixed steadying point out of line with said fixed measuring points and a pressure device for applying pressure opposite the said steadying point.

16. In measuring mechanism for tiles or the like, the combination of a feed belt, two fixed measuring points arranged on a diagonal axis of a tile carried by said belt for measuring, a movable rail section adjacent the said points, a movable measuring point in line with the fixed points, means for raising the rail section during movement of the belt and lowering it when the belt is stationary, a clamping frame, a clamping device carried by the frame for applying clamping pressure to the tile opposite said fixed measuring points, a measuring lever connected with the movable measuring point, a knife edge dog connected with the lever, a toothed selector coöperating with the dog, means for yieldingly

urging the selector into engagement with the dog, a type carrier connected with the selector, a plurality of types carried by the carrier and type depressing mechanism operated upon the positioning of the carrier by the selector.

17. In measuring mechanism for tiles or the like, a measuring lever, selector mechanism comprising a knife edge dog moving in accordance with the position of the measuring lever, a selector inclined toward and away from the dog and having a toothed engaging face inclined at a considerable angle to the line of dog movement, and means for yieldingly urging the selector into engagement with the dog.

18. In measuring mechanism for tiles and the like, the combination of two fixed measuring points, a movable measuring point therebetween, said points being normally retracted from the tile, and means for moving said movable point into contact with a tile lying upon the fixed points to detect warpage of the tile and the degree thereof.

19. In measuring mechanism for tiles and the like, the combination of a tile-engaging member and selecting mechanism actuated thereby comprising means for effecting a single positive selection for each tile measurement indicated by said tile-engaging member.

20. In measuring mechanism for tiles and the like, the combination of feeding means, measuring means for measuring either the concave or convex warpage of the tiles and the amount thereof, printing means positioned by the measuring means, and means for insuring a single positive selection of position of the printing means at each measuring action.

21. In measuring mechanism for tiles and the like, the combination of feeding means, means for measuring warpage of the tiles in either direction and the amount thereof, positive selecting means actuated by the measuring means, and printing means positioned by the selecting means to imprint upon the tile a single definite indication of its warpage measurement.

22. In measuring mechanism for tiles and the like, the combination of feeding means, two fixed warpage measuring points arranged on a diagonal axis of the tile and a movable point therebetween for measuring curvature of the tile in the plane of said three points, said movable point being normally retracted, and means independent of the contact between the tile and the point for moving said movable point toward and from the tile.

23. In a machine for measuring tiles and the like, the combination of a measuring device normally in retracted position, means for forwarding tiles separately and intermittently to the measuring device, and means for moving the measuring device into contact with the tiles when tiles are in stationary relationship thereto, printing means comprising a plurality of distinctive characters to be placed upon the tiles to indicate measurement thereof and selective means actuated by the movable measuring device to effect the actuation of said printing means so that a single distinctive printing character will be impressed upon each tile to indicate its measurement.

24. In a machine for measuring tiles and the like, the combination of a measuring device, an intermittent feeding device for feeding tiles to the measuring device, means for actuating the measuring device for measuring while the tiles are stationary in measuring position, and printing means comprising a plurality of distinctive characters to be placed upon the tiles to indicate measurement thereof and selective means actuated by the movable measuring device to effect the actuation of said printing means so that a single distinctive printing character will be impressed upon each tile to indicate its measurement.

25. In a machine for measuring tiles and the like, the combination of feeding means, a measuring device, a plurality of type, a selective controller coöperating with the type to permit only one to print at a time and a connection between the measuring device and the controller, and driving means for operating the feeding means and measuring device in predetermined relation to each other.

26. In a measuring mechanism for tiles and the like, the combination of intermittent feeding means, a fixed measuring abutment, a movable measuring element, means for holding said element normally retracted, means for urging said element in measuring contact with the tiles when they are in stationary position, printing means for imprinting different distinctive characters upon the tiles to indicate their measurement, and a printing selector operatively connected with the movable measuring element to effect selection of one of said characters for each ascertained measurement.

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Witnesses:
M. O. BURNS,
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."