April 11, 1950 H. E. MEYER 2,503,504

SLAB STAMPER

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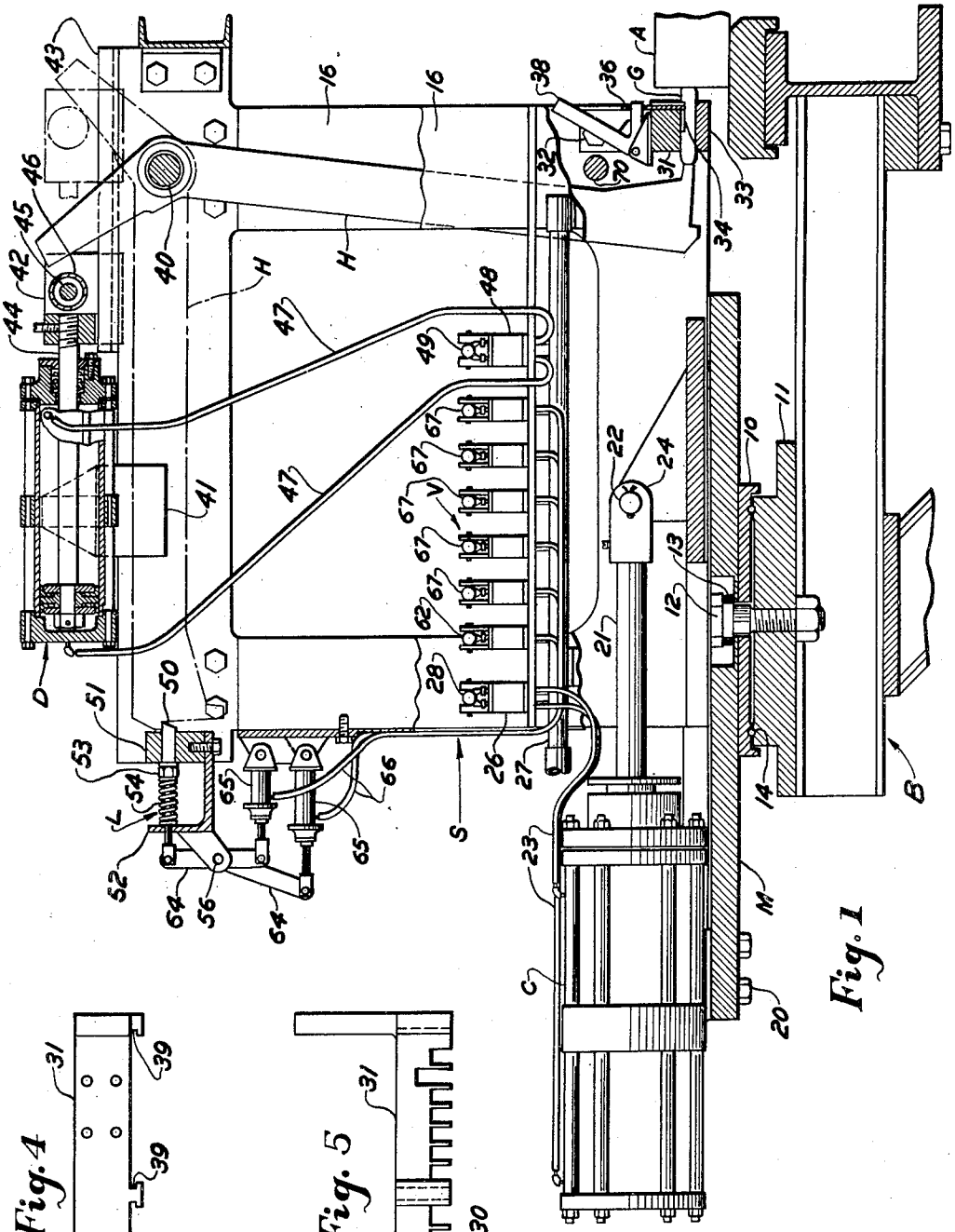


Fig. 1

Fig. 4

Fig. 5

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SLAB STAMPER

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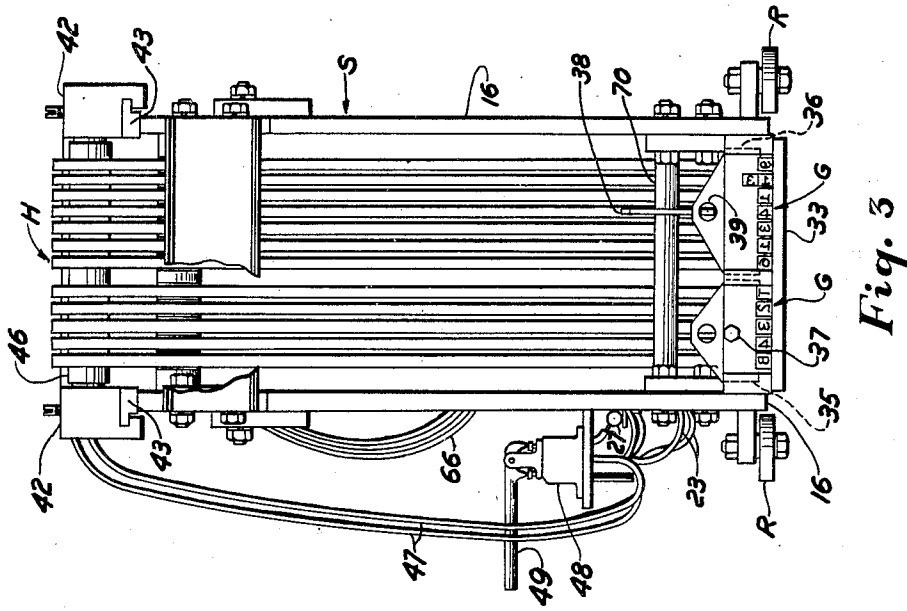


Fig. 3

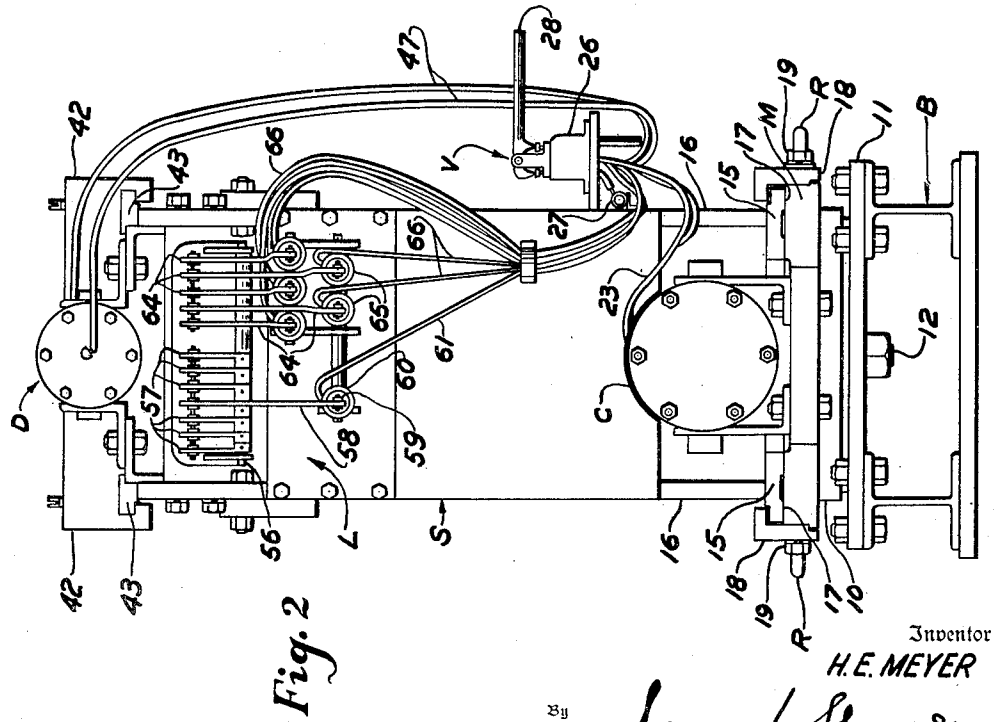


Fig. 2

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SLAB STAMPER

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6 Claims. (Cl. 101—4)

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This invention relates to apparatus for marking slabs, billets, blooms and the like and more particularly to an improved apparatus for stamping or marking steel slabs and similar metallic bodies with suitable identifying indicia while supported on a roll table or other suitable supporting means.

In the process of rolling steel bodies, it is desirable to stamp upon the body identifying indicia by which the body may be afterward recognized for testing or recording the results of its use or to indicate the quality of the body. Each heat of steel prepared in an open hearth furnace is normally assigned an identification number. When the heat is tapped into one or more ladles and the steel is teamed into a plurality of ingot molds it is at times desirable to identify the ingots by number. When each ingot is rolled down into a bloom, the bloom is sheared into slabs and the quality and characteristics of these slabs will depend, in part, upon the portion of the ingot from which the slab was rolled. Where the ingot is cut into five slabs, the top slab may be identified by the letter T, the bottom slab by the letter B and the intermediate slabs by the numerals 2, 3, and 4. Thus, it is necessary to mark the slabs with a figure designating from what portion of the ingot the slab was formed, with the heat identification number and at times it may be desirable to apply the ingot number to the slab. Heretofore, such steel bodies have been marked with identifying indicia by hand which is relatively expensive and cumbersome and has not proven to be completely satisfactory. The present invention provides an improved apparatus for accurately marking slabs and other similar bodies while supported on a roll table or other suitable means. The slab may be stamped while either cold or at an elevated temperature.

It is an object of the present invention to provide an improved mechanism for stamping slabs and the like with identifying indicia and especially to provide such an apparatus, which can be located adjacent a roll table, for marking a slab while on the table.

Further objects of this invention are to provide an improved slab stamping machine which is so supported as to be readily swingable into proper alignment with the body to be marked; to provide such an apparatus which is movable to an operative position adjacent the slab and movable to an inoperative position away from the slab; to provide such an apparatus which includes a novel stamp striking mechanism; to provide such an apparatus which includes means

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for individually striking a plurality of stamps so that the stamps will mark the slab uniformly regardless of whether or not the stamps are of the same length and have been worn the same amount; to provide such an apparatus which includes a novel stamp retaining means; and to provide such an apparatus which is economical to manufacture and readily operable with a minimum of effort on the part of the operator to accurately and legibly mark the body with identifying indicia.

These and other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevational view of a preferred embodiment of the present invention with parts in section and portions removed to show the internal structure of the mechanism;

Figure 2 is a rear elevational view of the machine of Figure 1;

Figure 3 is a front elevational view of the machine of Figure 1; and,

Figures 4 and 5 are plan and front views of the member in which the stamps are slidably supported.

Referring to the drawings, a slab stamping mechanism S is slidably mounted on the member M which is in turn pivotally mounted on the supporting base B. Power-actuated means C is connected to the member M and to the mechanism S to move the mechanism toward and away from an operative position adjacent the slab A. A pair of rollers R are provided for engaging the side of the slab A so that when the mechanism S is moved toward the slab A by the power-actuated means C, the rollers R engage the slab and properly align the stamping mechanism about the pivotal axis between the member M and the base B. The hammers H are moved to a cocked position ready for stamp striking by means of a cylinder D and are held in the cocked position by the latching mechanism L. A plurality of control valves V are selectively operative to release the latching mechanism L to permit a predetermined number of the hammers H to swing down and strike the slab marking stamps G.

The slab marking mechanism S is pivotally supported so that it can readily swing about its pivotal axis and into proper alignment with the slab A. A plate 10, on the underside of the member M, is adapted to form half of a thrust bearing, the member 11 of base B forming the other half of the thrust bearing. A bolt 12 extends through

members M, 10 and 11 to fasten the elements together. A small thrust bearing 13 is positioned between the head of the bolt 12 and the member M to reduce the friction therebetween. Ball bearings 14 are provided between the members 10 and 11, substantially as shown in Figure 1, so that the mechanism S is supported for pivotal movement about a vertical pivot axis which coincides with the longitudinal axis of the bolt 12.

The stamping mechanism S is supported on two slides 15 fastened to the frame 16 and is slidable along ways 17 on member M. The mechanism S is retained in position on the ways 17 by two L-shaped guides 18 fastened to the member M by means of bolts 19.

The pneumatic cylinder C is fastened to the plate M by means of bolts 20 and a clevis 24 on the outer end of piston rod 21 is connected to the stamping mechanism S by pin 22. The head and rod ends of cylinder C are connected through tubes 23 to a four-way valve 26 which is in turn connected through a pipe 27 to a source of gas, such as, air under pressure. The valve 26 is so constructed and arranged that movement of the valve handle 28 downward admits air under pressure to the head end of the cylinder C and exhausts the rod end of the cylinder C to the atmosphere so that the rod 21 and the slab stamping mechanism S move toward the right end toward the slab A until the rollers R are resiliently urged against the side of the slab, as shown in Figure 1. Movement of the valve handle 28 upwardly admits air under pressure to the rod end of the cylinder C and exhausts air from the head end to the atmosphere so that the slab stamping mechanism S moves toward the left end away from the slab A to an inoperative position where the apparatus will not be damaged by bodies moving along the roll table or other supporting means, not shown.

The slab stamping mechanism contains a plurality of stamps G. The stamps G are slidably mounted in slots 30 of a stamp holder 31 fastened to the frame 16 by means of bolts 32. A stamp supporting plate 33 is fastened to the bottom of member 31 to support the stamps G in the slots 30. Each of the substantially rectangular shaped stamps G includes an elongated slot 34 cut in its upper surface. Two stamp retaining members 35 and 36 are mounted in guide slots 39 in the stamp holder 31. The lower edge of each of the stamp retaining members 35 and 36 extends into the slots 34 in the corresponding stamps G so that the stamps have a limited sliding movement relative to the stamp holder 31. The stamp retaining member 35 is fastened to the stamp holder 31 by means of a bolt 37 as the corresponding stamps are normally not often changed, as will be more fully hereinafter described. A manually operable bell crank 38 is pivotally mounted on top of the member 31 and one arm extends through a hold 39 in the stamp retaining member 36. By manually moving the bell crank 38, the member 36 can be raised which releases the group of stamps normally retained by this member and permits any one of this group of stamps to be readily changed. Normally, one or more of the stamps in this last mentioned group will have to be changed relatively often for the reasons more fully hereinafter set forth.

For each one of the stamps G there is a separate, corresponding, stamp striking hammer H so that each stamp will mark the slab about the same, even though the stamps are worn different amounts and regardless of whether the stamps are the same length. All of the hammers H are swingably mounted on a rod 40 supported by the frame 16. The slab stamping mechanism S includes means for simultaneously raising all of the hammers H to a cocked position as shown in broken lines in Figure 1. This last mentioned means includes a hammer raising cylinder D mounted in brackets 41 on the frame 16. A pair of slides 42 are slidably mounted on ways 43 and are connected to the outer end of piston rod 44 of cylinder D. A rod 45 is mounted in the slides 42 and has rotatably mounted thereon a sleeve 46. The rod 45 and sleeve 46 are so positioned as to engage the upper ends of the hammers H when rod 45 is moved toward the right. The head and rod ends of cylinder D are connected through tubes 47 to a four-way valve 48. The valve 48 is connected through pipe 27 to a source of air under pressure and is so constructed and arranged that when the handle 49 is moved downward, air is admitted under pressure to the head end of cylinder D and the rod end of the cylinder is in communication with the atmosphere so that the piston rod 44, slides 42 and the hammer moving sleeve 46 are moved toward the right to swing the hammer into the position shown in broken lines in Figure 1. When the valve handle 49 is moved upwardly, the direction of flow of air in the head and rod ends of cylinder D is reversed so that the piston rod 44 is retracted to the position shown in solid lines in Figure 1.

A latching mechanism L is provided to releasably retain the hammers H in the raised position upon movement of the hammers to such a position by the cylinder D. The latching mechanism L comprises a plurality of similar latch members 50 slidably mounted in the bar 51. There is a latch member 50 for each hammer H and the rear end of each latch member 50 extends through a bracket 52. Movement of the latch member 50 in one direction is limited by the adjustable nut 53. A spring 54 is provided for each latch member 50 and extends between the bracket 52 and the nut 53. The spring 54 urges the latch member toward the right, hammer-engaging position. The forward edge of the latch member 50 slopes so that when the hammers H are raised by operation of the cylinder D, the lower ends of the hammer H readily snap past the inner ends of the latch members 50 so that the hammers are automatically retained in the raised position.

A rod 56 is pivotally supported by the bracket 52 and has fastened thereto six arms 57. Each of the arms 57 is connected at its upper end to the outer end of a corresponding latch member 50. A lever 58 is mounted on and fastened to the rod 56 and has its upper end connected to a corresponding latch member 50. The lower end of lever 58 is connected to the outer end of a piston rod 59 of cylinder 60. The rod end of cylinder 60 is connected by a tube 61 to a two-way valve 62 of the group of valves V. The valve 62 is connected through the pipe 27 to a source of air under pressure and when the valve handle is lowered, air under pressure is admitted to the rod end of cylinder 60 which moves the lever 58 and causes the rod 56 to turn and thereby withdraw the latching members 50 which are connected to the six arms 57 and the lever 58. This permits the seven hammers H corresponding to the seven stamps retained by the retaining member 36 to simultaneously swing down and strike all of this group of stamps and mark the slab A. When the valve handle of valve 62 is raised, air is exhausted

to the atmosphere and the springs 54 return the corresponding latch members 50 to the hammer-engaging position.

The outer end of each of the remaining latch members 50 is connected to the upper end of a corresponding lever 64 pivotally mounted on rod 56. The levers 64 are not connected to rod 56. The lower end of each lever 64 is connected to a piston rod of a corresponding cylinder 65 and the rod end of each cylinder 65 is connected by a tube 66 to a corresponding one of the two-way valves 67 of the group of valves V. Each of the five two-way valves 67 is connected to a source of air under pressure through the pipe 27 so that opening any one of the valves 67 causes the corresponding cylinder 65 to move the latch member 50 to which it is connected and release the corresponding hammer H to permit the hammer to swing down and strike the corresponding stamp which is one of the group of stamps retained by the stamp retaining member 35.

The group of stamps retained by the stamp retaining member 36 includes those stamps indicating the heat number, and if desirable, the ingot number. As shown in Figure 3, the stamp having the numeral "13" thereon, is for stamping the ingot number and the remaining stamps are for stamping the heat number. The valve 62 is provided for simultaneously releasing all of the hammers which strike this group of stamps as each slab is marked by all of the stamps.

Where the ingot number is used, the ingot number stamp will have to be changed for each ingot. At least one of the other stamps in this group must be changed for each heat. The stamps can be readily changed by manually raising the stamp releasing member 38 by means of the bell crank 39, removing one or more stamps and sliding the new stamps into the vacant slots 30.

The group of stamps retained by the stamp retaining member 35 indicates that portion of the ingot which forms the slab and normally only one of these stamps will be used for marking any particular slab so that a plurality of valves 67 are provided for selectively releasing the proper, single hammer H. Each slab is marked with one of these stamps and normally, it is only necessary to change a stamp when it becomes damaged.

The apparatus includes means for stopping the swing of any hammer past the normal stamp striking position. A rod 70 extends across the mechanism and is so positioned that the hammers H do not normally engage the rod 70 when striking the stamps G. For various reasons, it may be desirable at times to remove one or more of the stamps G, for example, if it is not desirable to stamp the slab with the ingot number, the stamp having the numeral "13" could be readily removed as hereinbefore described. The rod 70 prevents the hammer H from striking the stamp supporting member 31 and damaging it and the hammers. The rod 70 also prevents damage to the mechanism when, for any reason, the hammers are released without slab A being in a position to be stamped. Under such conditions, the stamps slide forward in the slots 30 and the hammers H strike the rod 70 before the ends of the slots 34 have moved into engagement with the corresponding retaining members 35 and 36.

This apparatus may be readily mounted on any suitable supporting base adjacent a roll table, a run-out table or any other supporting means for the body to be stamped. Before the apparatus is operated, the pipe 27 is connected to a suitable

source of air under pressure, not shown. After a slab has been moved into a position to be stamped, the operator moves the valve handle 28 of valve 26 downwardly to admit air under pressure to the head end of cylinder C and move the stamping mechanism S horizontally toward the slab A until the rollers R engage the surface of the slab. The cylinder C urges the rollers against the slab so that even though the slab is not properly aligned with the stamping mechanism, the stamping mechanism will pivot about the vertical axis of bolt 12 until both rollers R engage the slab and the stamping mechanism is in proper alignment therewith. Movement of the valve handle 28 to the horizontal or neutral position closes all air lines so that the stamping mechanism is resiliently held against the side of the slab A.

If the hammers H have not been previously raised, the operator actuates the handle 49 of valve 48 to cause the cylinder D to raise the hammers to the cocked position where they are engaged by the members 50. The valve handle 49 is then raised to withdraw the piston rod 44. The operator then actuates valve 62 to release all of the hammers for the stamps retained by member 36 to mark the slab with the heat number and the ingot number. Immediately thereafter, the operator selectively actuates one of the valves 67 to mark the slab with the proper stamp retained by the retaining member 35 which shows the portion of the ingot from which the slab was formed.

After the slab has been marked, the operator raises handle 28 of valve 26 to withdraw the stamping mechanism away from the slab supporting means and may at this time, actuate the valve handle 49 of valve 48 so as to cause the cylinder D to raise the hammers H. With the apparatus in the withdrawn position, it is not readily damaged by slabs moving along the roll table or being positioned on the slab supporting means.

Having described a preferred embodiment of my invention in detail, it is obvious that various modifications may be made therein and that some features may be employed without others, all without departing from the spirit and scope of my invention except as defined in the accompanying claims.

I claim:

1. Apparatus for stamping a surface of bodies such as slabs and the like with indicia, said apparatus comprising a base; a member supported on said base for pivotal movement about an axis parallel to such a surface; a stamping mechanism supported by said member and movable relative to said member in a direction normal to said axis; spaced contact means for contacting a surface of a body to be stamped and for properly aligning said stamping mechanism with said surface about said axis; and means for moving said mechanism relative to said member toward and away from said surface whereby said spaced contact means are moved into and out of contact with said surface of the body.

2. Apparatus for stamping bodies such as slabs and the like comprising a stamping mechanism for stamping the body; means supporting said stamping mechanism for pivotal movement about a vertical axis; and spaced rollers for engaging the surface of the body to be stamped whereby the engagement of said rollers with said surface properly aligns said stamping mechanism about said vertical axis for stamping said body.

3. Apparatus for stamping a substantially vertical surface of a body, such as a steel slab and

the like, said apparatus comprising a supporting base; a member supported on said base for pivotal movement about a vertical axis; a stamping mechanism supported on said member and horizontally movable relative to said member toward and away from an operative position adjacent such a surface of the body to be stamped; spaced contact rollers adapted to contact said surface; and power actuated means connected to said stamping mechanism and to said member and operable for moving said stamping mechanism horizontally away from said operative position and for moving said mechanism horizontally toward the body whereby said rollers are moved into contact with said surface and properly align said mechanism with said surface about said vertical axis.

4. Apparatus for stamping a substantially vertical surface of a body, such as a steel slab and the like, said apparatus comprising a supporting base; a member supported on said base for pivotal movement about a vertical axis; a stamping mechanism supported on said member and horizontally movable relative to said member along ways toward and away from an operative position adjacent such a surface of the body to be stamped; spaced contact rollers connected to the stamping mechanism and adapted to contact said surface; and power actuated means connected to said stamping mechanism and to said member for moving said stamping mechanism horizontally away from the body and said operative position and for moving said mechanism horizontally toward the body and said operative position, said rollers being positioned to contact said surface upon movement of said mechanism to said operative position and thereby properly align said mechanism with said surface about said vertical axis.

5. Apparatus for stamping a vertical surface of bodies such as slabs and the like, said apparatus comprising a stamping mechanism; means including ways supporting the stamping mechanism for pivotal movement about a vertical axis parallel to the surface to be stamped and for horizontal movement along said ways in a direction toward and away from the slab to be stamped; spaced contact means carried by the stamping mechanism on opposite sides of a plane including said vertical axis and extending parallel to the direction of movement along said ways

for contacting the surface to be stamped; power actuated means for horizontally moving said stamping mechanism along said ways away from said slab and for moving said stamping mechanism along said ways toward said slab and for moving said contact means into contact with the slab surface to be stamped whereby said mechanism is properly aligned about said axis and with said slab upon movement of the contact means into contact with the slab surface to be stamped.

6. Apparatus for stamping a surface of bodies such as slabs and the like, said apparatus comprising a stamping mechanism; means including ways supporting the stamping mechanism for pivotal movement about an axis parallel to the surface to be stamped and for horizontal movement along said ways in a direction toward and away from the slab to be stamped in a plane normal to said vertical axis; spaced contact means carried by the stamping mechanism on opposite sides of a plane including said vertical axis and extending parallel to the direction of movement along said ways for contacting the slab surface to be stamped; and resilient means for horizontally moving said stamping mechanism along said ways toward and away from said slab and for resiliently urging the spaced contact means carried by said stamping mechanism into contact with the surface to be stamped whereby said mechanism is properly aligned about said axis and with said slab upon movement of the contact means into contact with the surface to be stamped.

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