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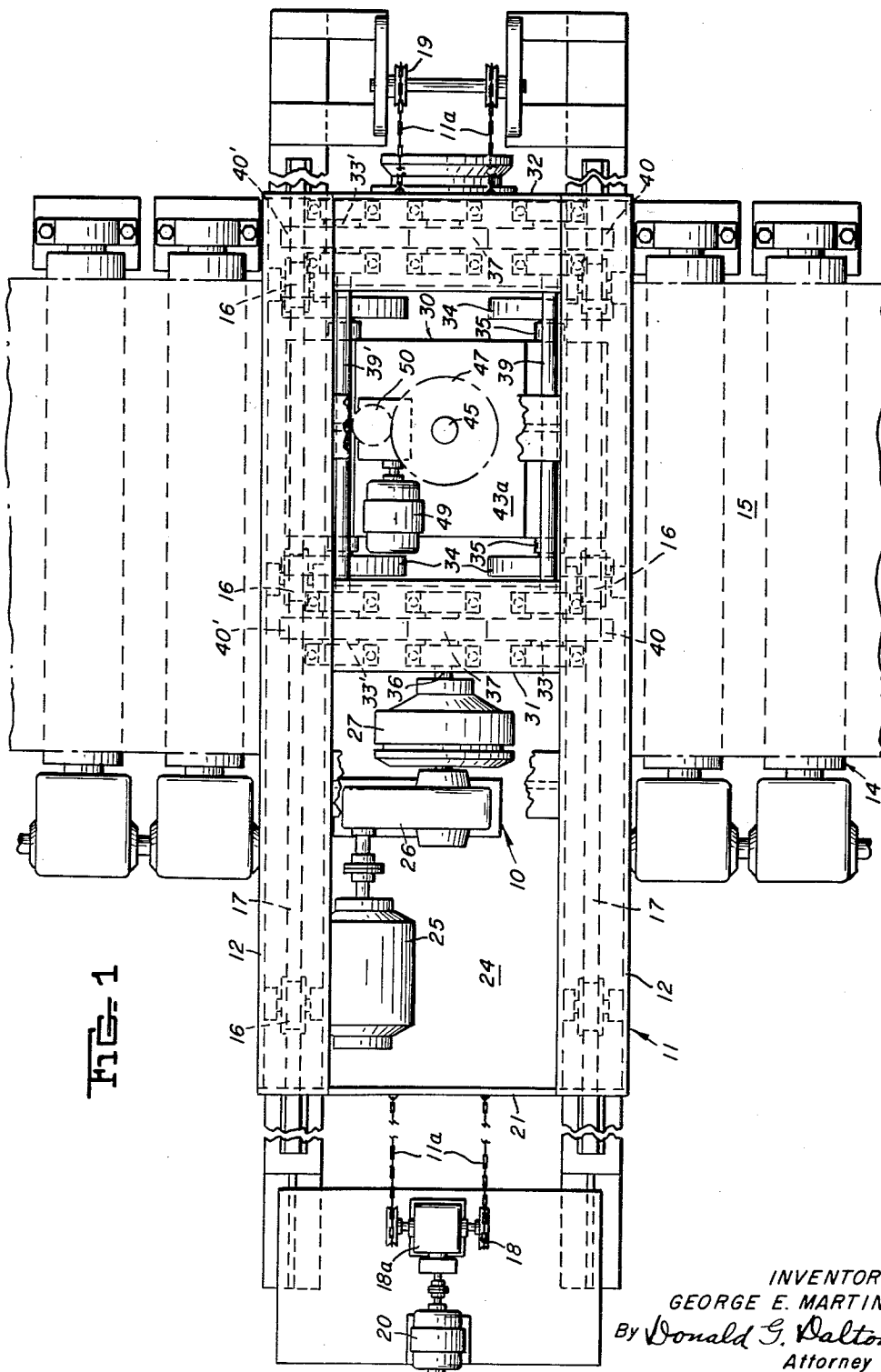
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DIE-SINKING PRESS FOR MARKING PLATES WHILE IN MOTION

Filed June 28, 1961

4 Sheets-Sheet 1



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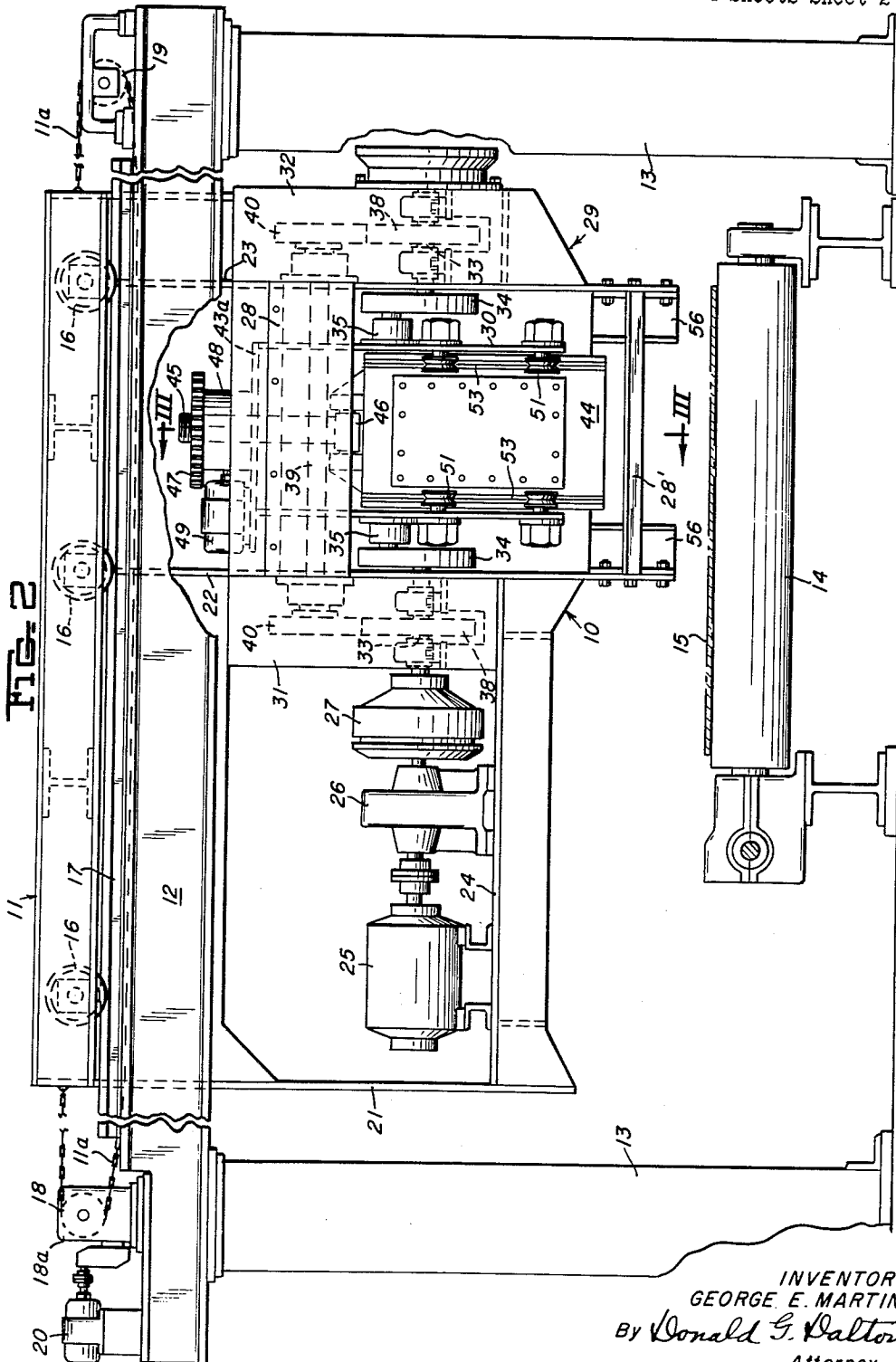
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DIE-SINKING PRESS FOR MARKING PLATES WHILE IN MOTION

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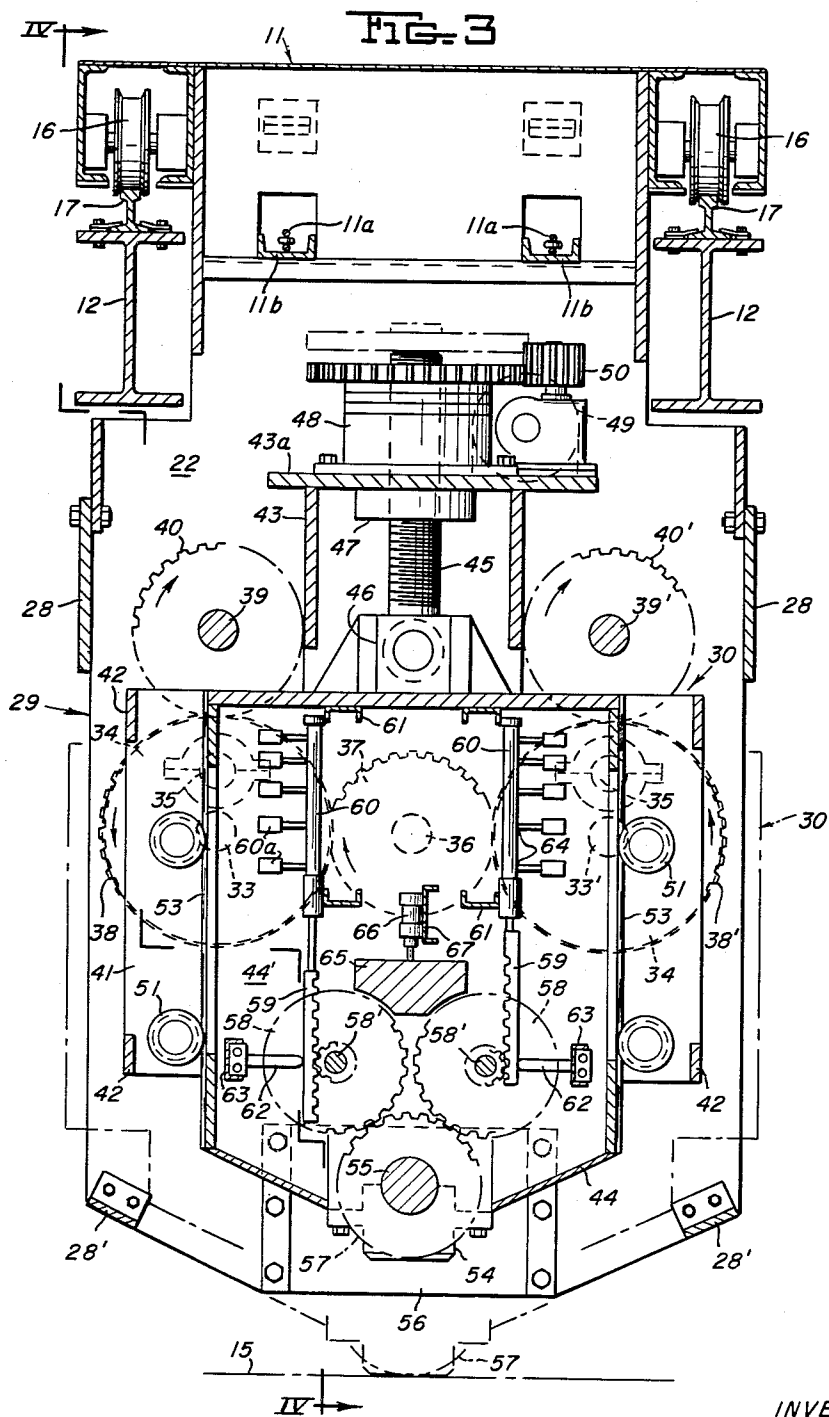
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DIE-SINKING PRESS FOR MARKING PLATES WHILE IN MOTION

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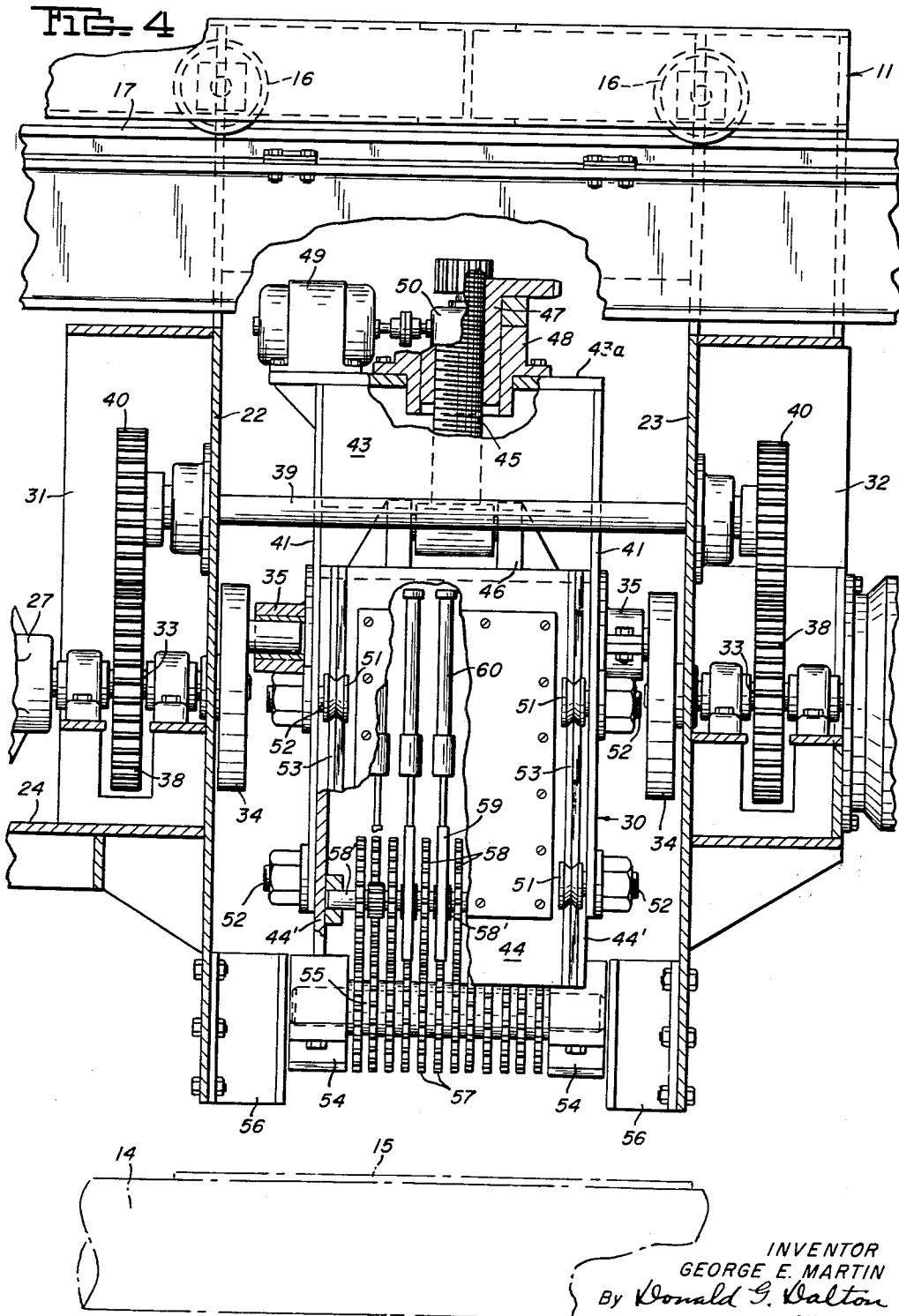
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DIE-SINKING PRESS FOR MARKING PLATES WHILE IN MOTION

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FIG. 4



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DIE-SINKING PRESS FOR MARKING PLATES WHILE IN MOTION

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8 Claims. (Cl. 101—4)

This invention relates to apparatus for making die impressions in a metal product while moving along a horizontal conveyor.

In the manufacture of metal products, e.g., steel plate, it is desirable to mark the product when finished, for identification. For permanent and positive identification as to manufacture, heat, analysis, etc., customers require die stamping of the plates. Hand stamping is slow and tedious. It also requires that the plate be held stationary. The latter is also true of a rectilinearly reciprocating die. It is accordingly the object of my invention to provide apparatus for die-marking a steel product such as a plate or the like while it is still at a substantial temperature, e.g., 1800° F. A further object is to provide a die-sinking press having die wheels adapted to engage a plate traveling along a roller table, and power means under remote control for adjusting said wheels.

In a preferred embodiment, my invention comprises a car supported for travel transversely above the path of the plate to be die-stamped. A cage is mounted on eccentrics journaled in a frame depending from the car. A housing movable vertically in the cage has die wheels journaled in the bottom thereof and power means for adjusting them to desired position. The cage, by virtue of its mounting on the eccentrics, travels through a circular path without altering its angular position. As the housing traverses the lower portion of its path, the die wheels engage a plate on the roller table under the weight of the housing and the parts carried thereby, thus imprinting the desired identifying indicia therein.

A complete understanding of the invention may be obtained from the following detailed description and explanation which refer to the accompanying drawings illustrating the present preferred embodiment. In the drawings:

FIGURE 1 is a plan view;

FIGURE 2 is an elevation showing the roller table and plate thereon in transverse section;

FIGURE 3 is a partial section taken along the plane of line III—III of FIGURE 2; and

FIGURE 4 is a section taken along the plane of line IV—IV of FIGURE 3.

Referring now in detail to the drawings and, for the present, particularly to FIGURES 1 and 2, the apparatus of my invention, indicated generally at 10, is suspended from a car 11 traveling on beams 12. The beams are supported by posts 13 and extend across a roller table 14 on which a plate 15 is conveyed. Car 11 has wheels 16 traveling on rails 17 secured to the beams and is actuated therealong by drive chains 11a attached thereto and trained through channels 11b and over sprockets 18 and 19 at opposite ends of the beams. A reversible motor 20 drives sprocket 18 through a gear reducer 18a to position the car as desired.

Plates 21, 22 and 23 depend vertically from the frame of car 11 in spaced relation along the length thereof. A base 24 extending between plates 21 and 22 supports a motor 25, a gear reducer 26 and a pneumatic clutch 27. Plates 22 and 23, together with connecting top and bottom transoms 28 and 28' constitute a frame 29 enclosing a cage 30 mounted therein for rotary movement as will now be explained. Gear boxes 31 and 32 extending laterally from plates 22 and 23, respectively, have pairs

of coaxial shafts 33 and 33' journaled therein, one pair on each side of the common axis of reducer 26 and clutch 27 (see FIGURE 1). Each shaft 33, 33' has a disc 34 thereon. Crank pins on the discs extend into bearings 35 on opposite sides of cage 30. The two pairs of crank pins support the cage rigidly in space and, on rotation of the eccentrics, impart to the cage continuous motion in a circular path.

A shaft 36 forming part of clutch 27 is journaled in gear box 31 and has a pinion 37 thereon meshing with gears 38 and 38' on shafts 33 and 33' on the drive side of frame 29. Cross shafts 39 and 39' journaled in frame 29 have gears 40 and 40' thereon meshing with gears 38 and 38'. Through identical gearing on the far side of frame 29, shafts 39 and 39' drive the shafts 33 and 33' on that side. Thus all four discs 34 are driven in the same direction at the same speed.

Cage 30 is a box-like structure which comprises spaced side plates 41 connected by a transom comprising cross bars 42 and 43 and a top plate 43a. The cage is open at the bottom. A die-wheel housing 44, also a box-like structure having side plates 44', connected by cross bars and top and bottom plates, is suspended within cage 30 by means of a T-head screw 45 pivoted to bearings 46 on top of the housing. The screw has threaded thereon a sleeve 47 rotatable and slidable in a thrust bearing 48 on top plate 43a. A motor 49 mounted on the top plate drives the sleeve through a reduction gear 50. Housing 44 is free for movement upwardly in cage 30. Such movement is guided by wheels 51 journaled on stub shafts 52 secured to plates 41. Wheels 51 travel on V-rails 53 on the housing. The lowermost position of the housing 44 in cage 30 is determined by the adjustment of screw 45. When the sleeve 47 is driven to run the screw entirely out of it, housing 44 may be dropped from the cage through the open bottom thereof.

Housing 44 has bearing blocks 54 set in the lower edges of plates 44' and a die-wheel shaft 55 is clamped in these blocks. Spacers 56 at the bottom of plates 22 and 23 confine the blocks and shaft laterally. Die wheels 57 are rotatable on shaft 55. Each wheel is angularly adjustable by a gear 58 meshing with teeth formed thereon and each gear is adjustable by a rack 59 engaging a pinion integral with the gear. As shown in FIGURE 3, the gears 58 and their racks and pinions are arranged in two groups, one on each side of shaft 55. The gears are journaled on shafts 58'. The racks and pinions of adjacent die wheels are located one in each group. Each rack is actuated by a multiple-position fluid-pressure cylinder and piston 60 (Westinghouse Air Brake Co.) mounted on cross bars 61 extending between side plates 44'. Slide bearing fingers 62 mounted on similar cross bars 63 hold the racks in engagement with their pinions.

Each cylinder 60 has a plurality of ports 64 and, by admitting air to various combinations thereof by operating suitable valves 64a, their pistons may be caused to take a selected position in the cylinder. Thus wheels 57 may be adjusted to desired positions through the racks 59 and gears 58. A wedge 65 between groups of gears 58, operable by a pneumatic cylinder and piston 66, engages the gears to frictionally hold them in adjusted position. Cylinder 66 is mounted on a cross bar 67.

As shown in chain lines in FIGURE 3, when cage 30 passes through the lower portion of its path, the peripheries of die wheels 57 bottom on plate 15 and housing 44 is arrested in its descent so it rises slightly in the cage as the latter continues to move downward and then horizontally along with the advancing plate. Sleeve 47 rises correspondingly in bearing 48. Thus the wheels sink their dies in the plate under the impact of the descending housing and all the parts carried thereby. This effects a clearly readable marking of the plate.

It will be apparent that my invention is characterized by numerous advantages. In the first place, the speed of the cage in its circular path can be made substantially equal to that of the plate to be marked. The die-wheels thus move with the plate during the interval in which they are in contact therewith. The die wheels may easily be adjusted by control valves 60a in the air supply lines (not shown) to cylinders 60 and, when once adjusted, the wheels may be locked by wedge 65. Housing 44 may be adjusted vertically in cage 30 by driving sleeve 47, to accommodate plates of various thicknesses. The kinetic energy of housing 44 as it descends, suffices to sink the dies on wheels 57 without further pressure. Car 10 mounting the apparatus for movement across table 14 permits the die marks to be placed in the desired position relative to the center line of the plate and also the withdrawal of the whole apparatus to an out-of-the-way position at one side of the table. Housing 44, furthermore, may be dropped bodily from cage 30 when the car is in the latter position.

Although I have disclosed herein the preferred embodiment of my invention, I intend to cover as well any change or modification therein which may be made without departing from the spirit and scope of the invention.

I claim:

1. Apparatus for marking product as it moves along a predetermined path comprising a frame including spaced parallel side plates disposed vertically above said path, spaced opposed crank means journaled adjacent said plates respectively, and normal thereto, a box-like cage mounted on said means between said plates and adapted to be transported by said means about a circular path, a box-like housing reciprocable vertically in said cage, marking wheels journaled in said housing and adjustable means suspending the housing in said cage.

2. Apparatus as defined in claim 1, characterized by said suspending means including a thrust bearing whereby said housing may be arrested while said cage is descending.

3. Apparatus as defined in claim 2, characterized by said suspending means including a screw threaded through said bearing and connected to said housing.

4. Apparatus as defined in claim 1, characterized by gear boxes carried on said plates, respectively, said crank means being journaled in said boxes.

5. Apparatus as defined in claim 1, characterized by roller means and ways on said cage and housing, guiding movement of the latter relative to the former.

6. Apparatus as defined in claim 1, characterized by a car adapted to travel transversely above said path, said frame depending from said car.

7. Apparatus as defined in claim 1, characterized by said cage being open at the bottom whereby said housing may be dropped therefrom.

8. Apparatus as defined in claim 1, characterized by said adjustable means including a transom extending across the top of said cage, a vertical thrust bearing on said transom, an internally threaded sleeve rotatable and axially slidable in said bearing, and a screw threaded into said sleeve, said housing hanging from said screw.

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