July 15, 1952 M. MANN 2,603,148

IMPRINTING MACHINE FOR CHINA

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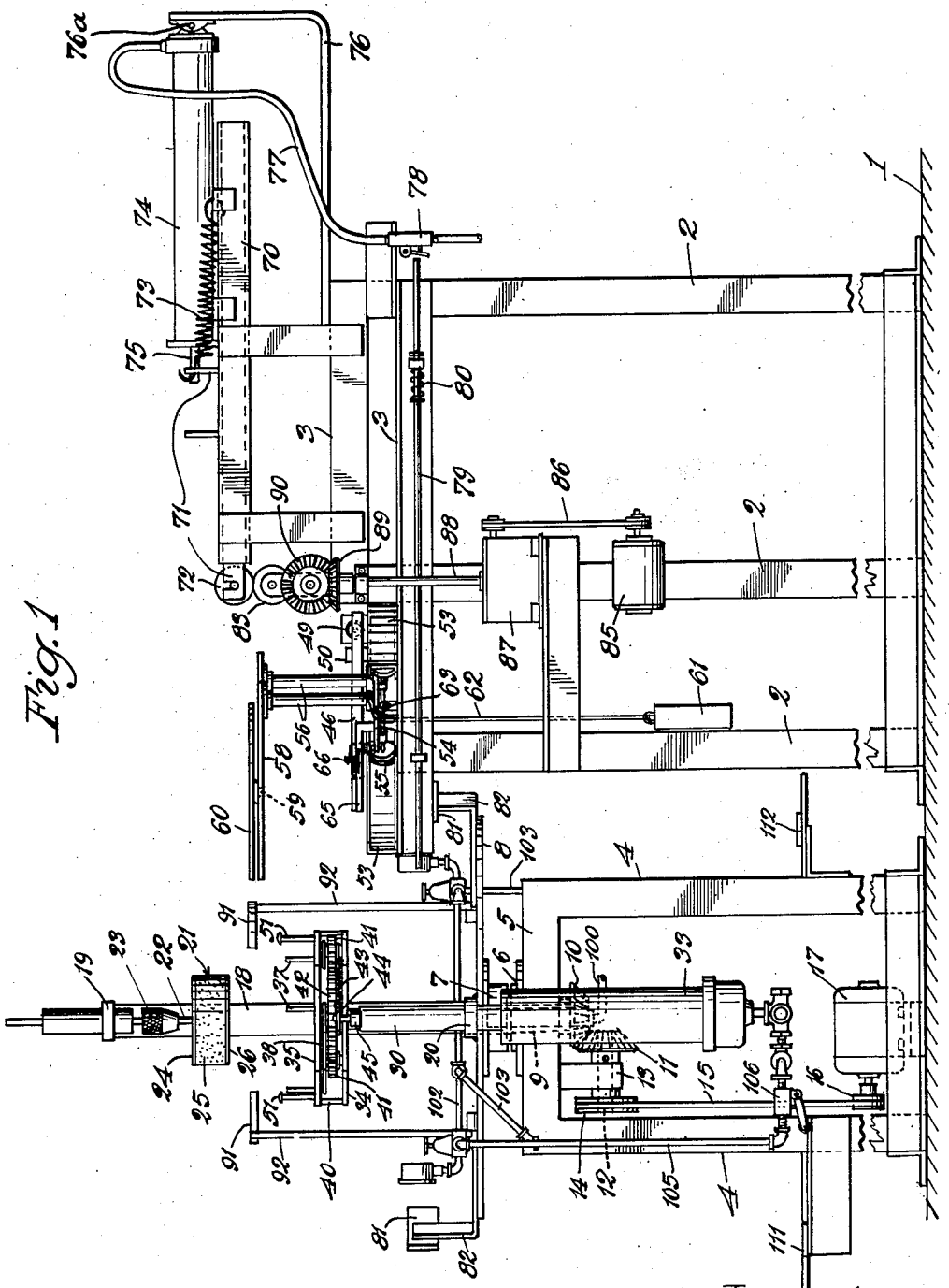


Fig. 1

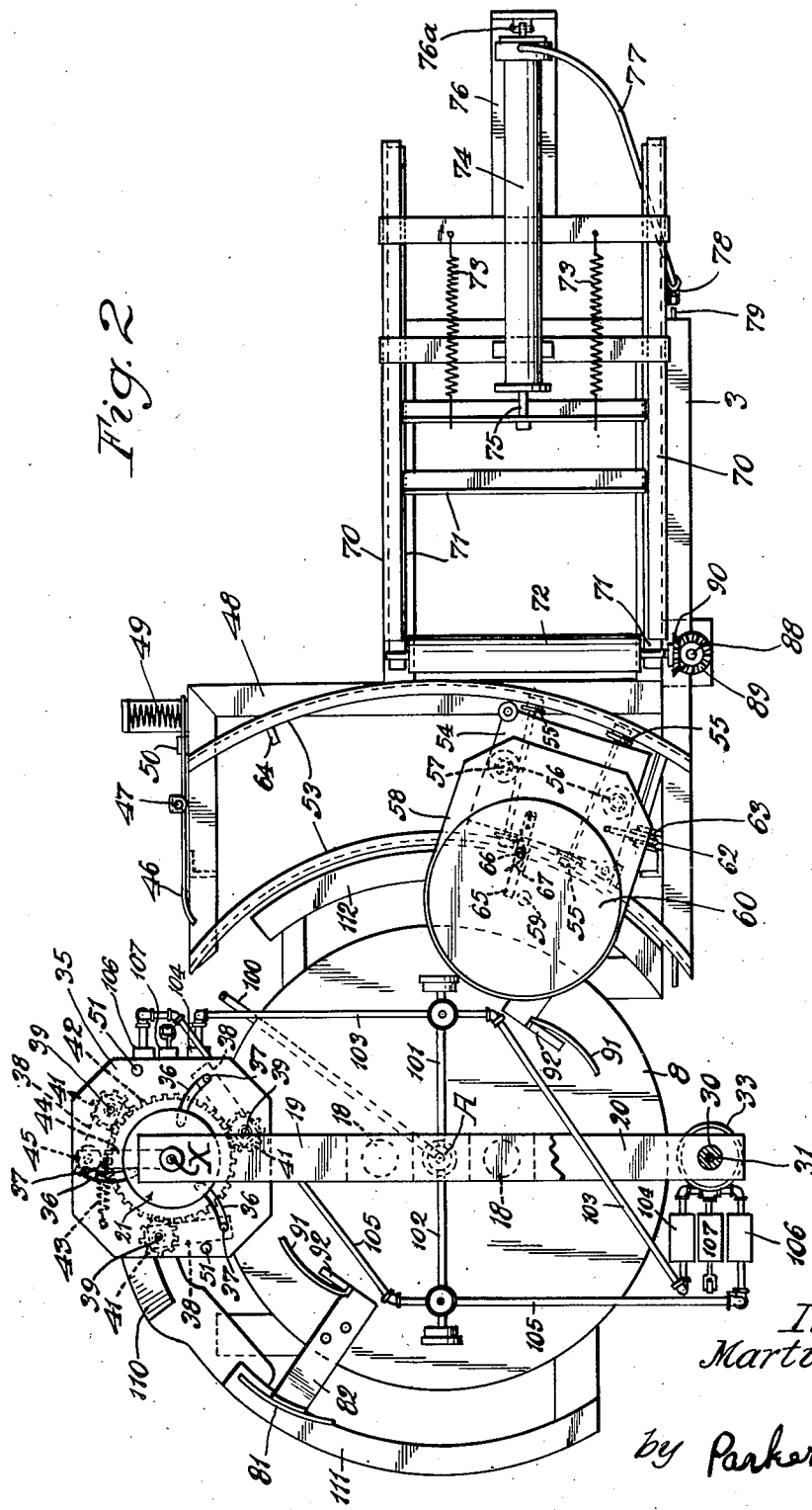
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Fig. 2



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Fig. 3

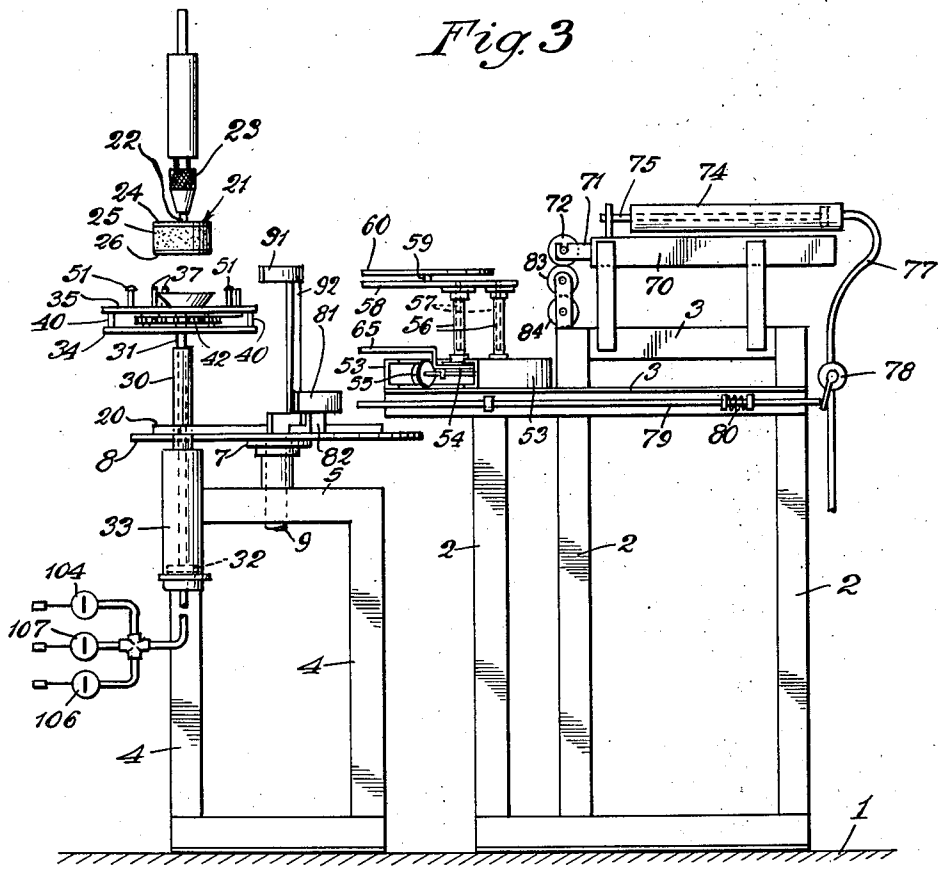
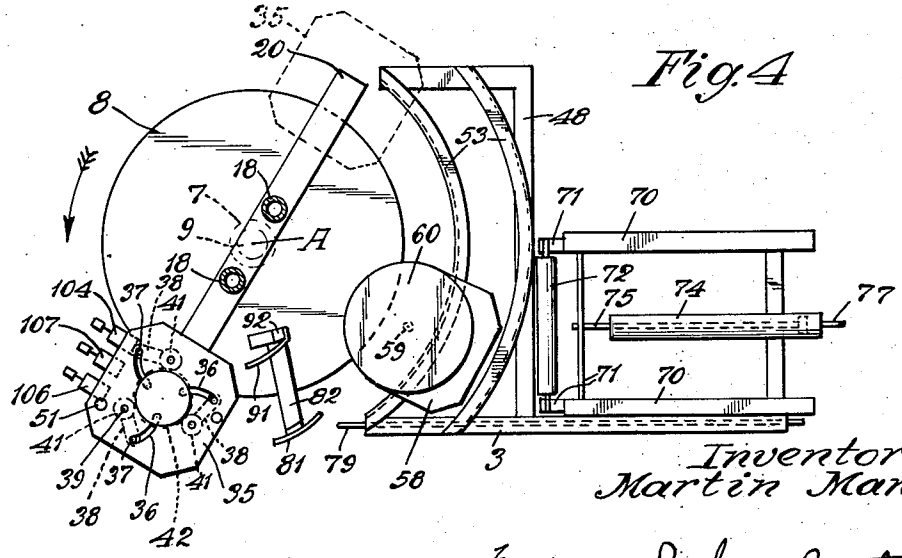


Fig. 4



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Fig. 5

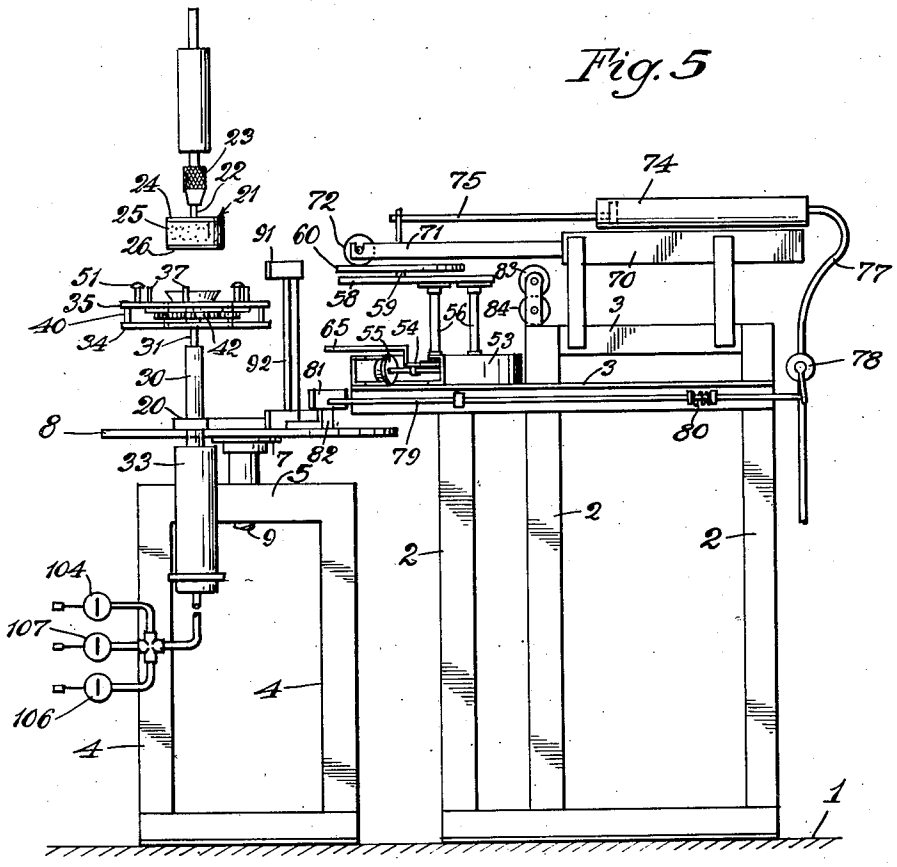
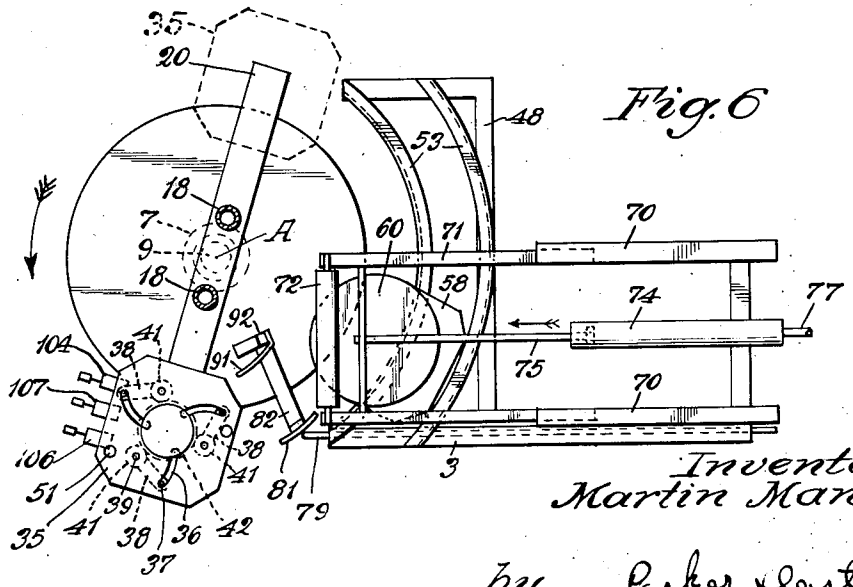


Fig. 6



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Fig. 7

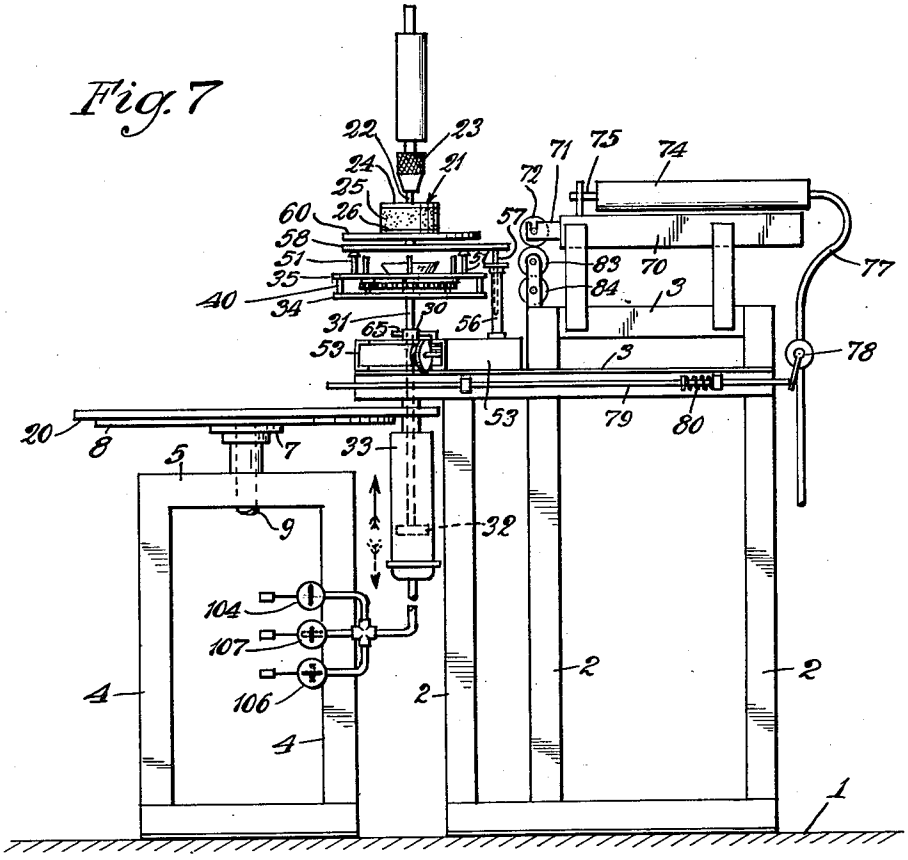
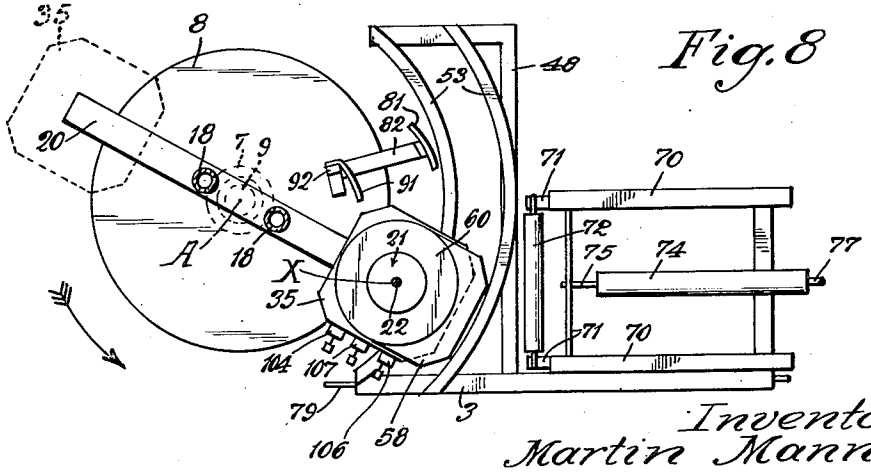


Fig. 8



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Fig. 9

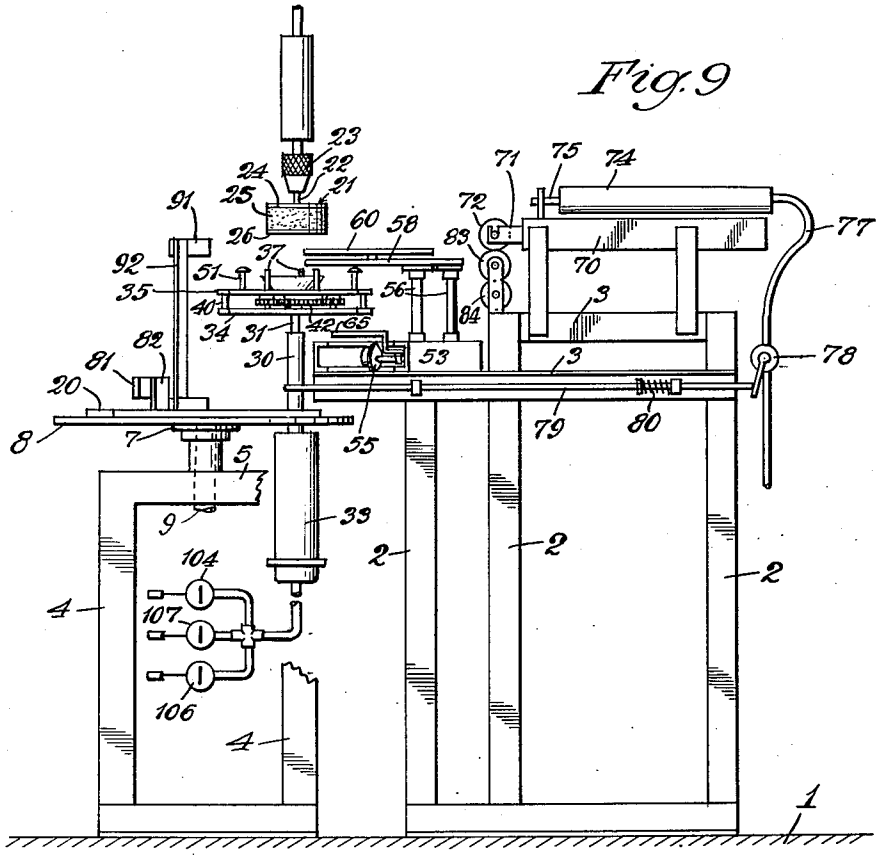
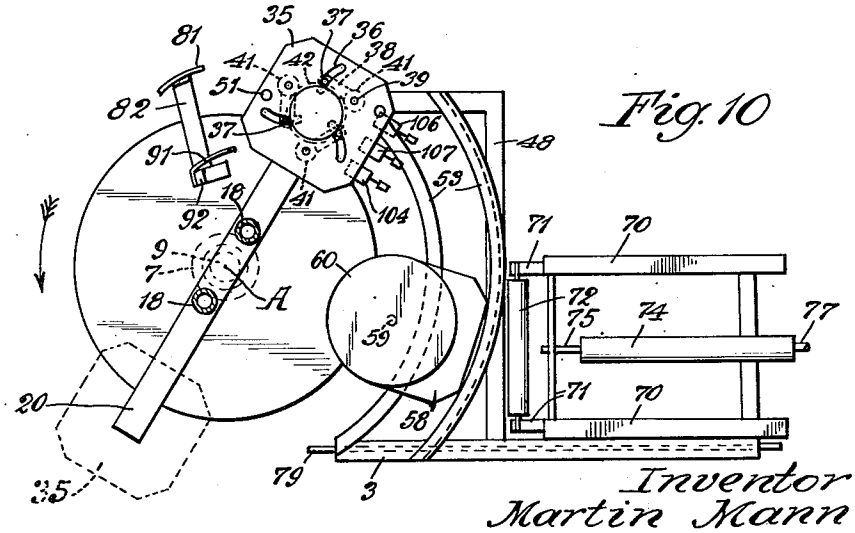


Fig. 10



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Fig. 11

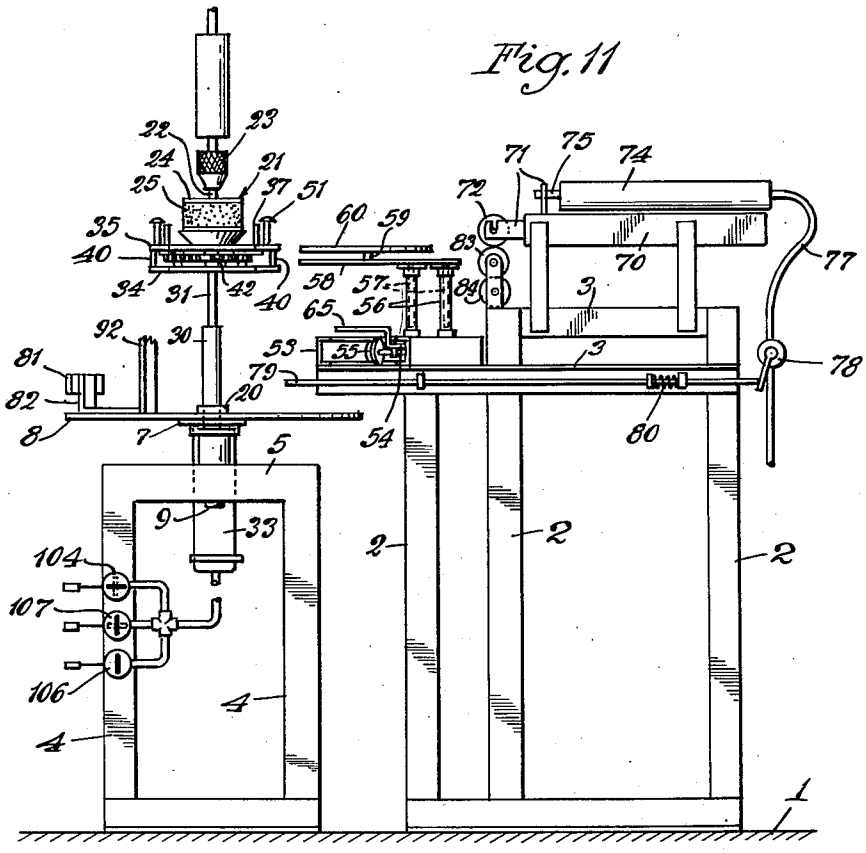
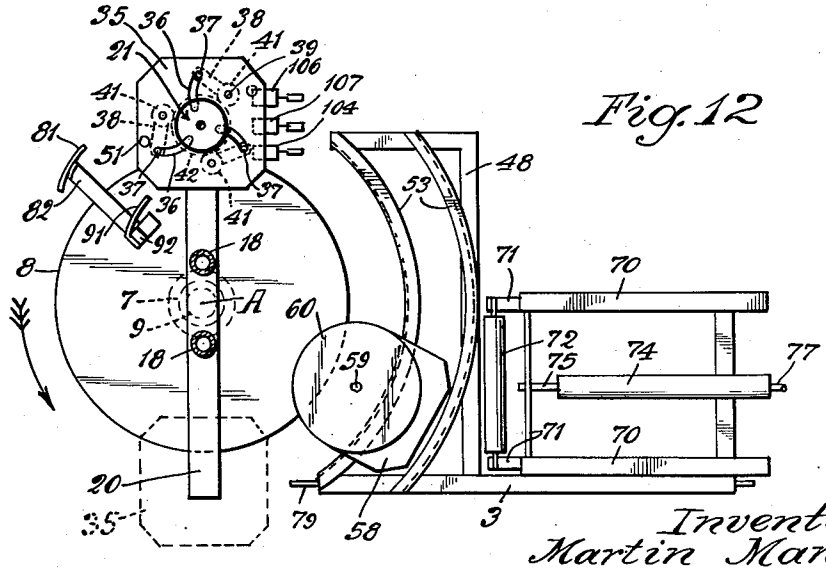


Fig. 12



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Patented July 15, 1952 2,603,148

UNITED STATES PATENT OFFICE

2,603,148

IMPRINTING MACHINE FOR CHINA

Martin Mann, Chicago, Ill., assignor to Stetson China Company, Chicago, Ill., a corporation of Illinois

Application July 31, 1946, Serial No. 687,505

14 Claims. (Cl. 101—41)

1

My invention relates to an improvement in stamping or impressing devices, and has for one purpose to provide an improved means of and method for applying ink, pigments and the like to china and pottery.

Another purpose is to provide an improved method of and means for handling china, pottery and the like, while applying designs or surface treatment thereto.

Another purpose is to provide improved inking or pigment supplying means for such a device.

Another purpose is to provide improved driving and operating means for such a device.

Other purposes will appear from time to time in the course of the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings wherein:

Figure 1 is a side elevation;

Figure 2 is a plan view with parts broken away and parts in section;

Figure 3 is a schematic side elevation, illustrating the initiation of the cycle of operation;

Figure 4 is a schematic plan view, illustrating the parts in the position in which they are shown in Figure 3;

Figure 5 is a schematic side elevation similar to Figure 3, illustrating the step of applying ink to the ink imparting member;

Figure 6 is a schematic plan view, illustrating the same stage;

Figure 7 is a schematic side elevation, illustrating the stamp in the ink receiving stage;

Figure 8 is a corresponding schematic plan view;

Figure 9 is a schematic side elevation, illustrating the position of the parts just prior to the printing of the work, with the work in the course of being centered;

Figure 10 is a corresponding schematic plan view;

Figure 11 is a schematic side elevation, illustrating the printing operation;

Figure 12 is a corresponding schematic plan view.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring to the drawings, 1 generally indicates any suitable support surface upon which are mounted a plurality of upright frame members or supports 2, which support a fixed top structure generally indicated as 3, the details of which will later be described. 4 indicates other supports carrying a top structure 5 supporting a turn-table base 6 upon which is rotatably mounted the turn-table element 7, carrying a circular rotatable table 8. Turn-table 7 is driven by any suitable sleeve 9 carrying a bevel gear 10 at its lower end. In mesh with the gear 10 is the bevel gear 11 on the driven shaft 12 rotatable in any

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suitable bracket 13. The shaft 12, and thus the table 8, are rotated through a pulley 14 by a belt 15 which passes about the drive pulley 16 of any suitable motor 17. Any suitable gear reduction may be employed, if necessary, but it will be understood that, by any suitable means, I impart rotation, at a predetermined rate, to the table 8. Mounted on and rotatable with the table 8 are a pair of preferably diametrically opposed supports 18, which support a top cross frame structure 19. 20 indicates an underlying bottom cross frame member connected to the surface of the table 8, and underlying the member 19. Supported from the top cross frame member 19 is a stamp 21. The stamp may include a stem 22 removably received in any suitable chuck 23. The nature of the stamp may be widely varied, but I find it convenient to employ a relatively rigid back plate 24 to which is secured a mass 25 of flexible, distortable material, such as sponge rubber, which may carry any suitable printing member or surface 26. It will be understood that the stamp 21 rotates in unison with the table 8, and does not normally move in relation to said table. Mounted on the table 8 are a pair of diametrically opposed guiding cylinders or sleeves 30 in which are slidably movable piston extensions 31. Each said piston extension or rod is connected to a piston member 32 in a cylinder 33 which is mounted on and extends downwardly from the table 8. It will thus be understood that as the piston 32 rises and falls in the cylinder 33, the corresponding rod 31 rises and falls in the guide sleeve 30. It will be understood that one of these structures is vertically aligned beneath each of the stamps 21. At the upper end of each such rod 31 is a work support assembly which includes a bottom plate or member 34 and an upwardly spaced top plate 35. The top plate is provided with a plurality of actuating slots 36 through which upwardly pass any suitable centering pins 37, mounted on lever arms 38, which are pivoted as at 39, between the plates 34 and 35. It will be understood that any suitable spacing means for the two plates may be employed, such as spacer pins or extensions 40. Mounted for rotation in unison with each lever arm 38 is a pinion 41 driven by the gear 42. The gear is normally held in or returned to initial position by any suitable tension spring 43, one end of which is anchored on the arm 44, which rotates with the gear 42, the other end being anchored to the plate 34. The gear 42 is rotated by the engagement of the roller 45 at the end of the arm 44, which roller engages the cam 46, pivoted as at 47 on any suitable fixed structure 48, and provided with a spring release 49 adapted normally to hold it in the position of Figure 2. It will be understood that the spring 49 returns the arm 46 to position against any suitable limiting stop 50. It will be understood

that when, in response to counterclockwise rotation of the table 8, one of the rollers 45 engages the cam 46, the result is a rotation of the gear 42 which causes the pins 37 to travel inwardly toward the center of rotation X of the gear 42. Assuming that the operator has placed the work, such as a dish or plate, on the work support 35, the result is a centering of the work, in relation to the center X, by the inward movement of the pins 37.

Projecting upwardly from the top plate 35 are additional pins 51, the purpose of which will later appear.

It will be understood that, in inking or impressing the work, the work support, after the work is centered, is elevated sufficiently to cause the engagement of the work with the stamp 21. However, prior to the final stamping or finishing elevation, the stamp 21 has to receive its charge of ink or pigment. This is done by aligning the stamp above an ink imparting member and raising the ink imparting member against the stamp.

As a convenient inking means I employ a carriage which moves concentrically with the table 8, through a limited arc, during the ink imparting process. With reference to this structure I illustrate, on the fixed support 48, any suitable arcuate tracks 53 which are concentric with the center of rotation A which may be conveniently made concentric with the center of rotation of the table 8, although this relationship is not in all circumstances necessary. Mounted for movement along the tracks 53 is any suitable carriage 54 carrying track engaging wheels or rollers 55. Upstanding from the carriage 54 are any suitable supports 56 which are shown as hollow centering tubes in which are telescopically received rods 57 in the upper ends of which is secured the inking table 58 upon which is pivoted, as at 59, the inking disc 60. The inking structure is normally held in the position in which it is shown in Figure 2 by any suitable counterweight 61, connected thereto by the flexible cable 62 which extends over the roller 63. Thus, unless the inking assembly is positively moved from the position in which it is shown in Figure 2, it retains that position. And, when it is released, it returns to that position. Its movement away from the rest position may be limited by any suitable stop, such as the stop 64. The carriage 54 carries a lever 65, pivoted as at 66, and adapted to be engaged by either of the guide cylinders 30, as the table 8 is rotated. A spring 67 is employed, of sufficient strength to maintain the lever 65 in actuating position. Thus, by the engagement with the cylinder 30, the inking assembly is moved along the tracks 53, until the stop 64 prevents further movement. At that time the spring 67 permits the lever 65 to rotate to the release position, and then snaps it back to operative position. The counterweight 61 then returns the inking assembly to the original rest position of Figure 2, ready for the next contact with one of the cylinders 30.

In order to ink the plate 60 I provide the following construction: 70—70 illustrate a pair of parallel tracks along which is movable any suitable cross-head or carriage 71. Mounted on the carriage 71 is an inking roller 72. The carriage is normally held in the withdrawn position in which it is shown in Figure 2 by any suitable tension springs 73. It may be advanced toward the inking mechanism by any suitable structure. I illustrate a pneumatic or hydraulic cylinder 74 from which extends any suitable piston rod 75 which is secured to the cross-head structure 71. It will be noted, as in Figure 1, that the cylinder 74 may be pivotally supported as at 76a on any suitable bracket 76. 77 is any suitable pneumatic or hydraulic supply tube for the cylinder 74. 78 indicates a normally closed valve assembly therefor. The valve 78 may be operated by any suitable operating rod 79, suitably guided and supported on the structure 3 and provided with a spring 80 adapted to return it to the position in which it is shown in Figure 1, after it has actuated the valve assembly 78. The valve rod 79 may be actuated by any suitable cam 81, mounted on any suitable fixed bracket 82 on the table 8. As will be seen from Figure 1, the ink applying roller 72 may be inked by the roller 83 which receives ink from a lower roller 84 shown, for example, in Figure 3. Ink may be applied to the rollers manually or by any suitable mechanical feeding means not herein shown. However, the rollers 83 and 84 are driven by any suitable motor 85, belt 86, gear reduction 87 and shaft 88. The shaft 88 carries a bevel gear 89 in mesh with the driven bevel gear 90. Whereas, I have described means for applying ink to the roller 72, it will be understood that any other suitable means of ink supply may be employed. It will be understood that the disc 60 is rotatable, and is rotated by the cams 91 which may be mounted on any suitable brackets or supports 92, which rotate with the table 8.

It will be understood that, in the pressure system herein employed, I may employ either hydraulic or pneumatic pressure. It will further be understood that I may employ either the same pressure source or different pressure sources for the cylinders 33 and 74. The cycle of operation is as follows: the operator manually positions the work on the upper plate 35. In response to the continuing rotation of the table 8 the roller 72 is thrust forward by the action of the piston and cylinder assembly 74, and applies ink to the upper surface of the disc 60. Thereafter, the springs 73 return the parts to the original position. It will be understood that the advance is caused by the engagement of the rod 79 with the cam 81, which causes the rod 79 to actuate the valve assembly 78.

The continuing rotation of the table 8 causes the sleeve 30 to engage the lever arm 65, and to carry the inking assembly along the rails 53. At that stage the stamp 21 is aligned above the inking plate 60.

While the stamp and inking plate are moving in unison, the work support is raised and thrusts the inking plate upwardly against the stamp surface 26, thus inking the stamp. The pins 51 at that stage engage the bottom of the member 58, causing the inking operation. At this stage low pressure is applied to the cylinder 33, as will later be pointed out in greater detail.

Thereafter the work support is lowered and the continuing rotation of the table 8 continues, while the stop 64 terminates the forward movement of the inking assembly, and the inking assembly is returned to initial position by the counter-weight 61.

Thereafter the roller 45 engages the member 46, and the pins 37 center the work, at the center X, below the stamp 21.

Thereafter, higher pressure is supplied to the cylinder 33, and the work support is raised to the fully elevated position, shown, for example, in Figure 11, and the work is given its final impression.

Thereafter the work support recedes to its lower position. The work may adhere to the stamp or it may remain on the work support, depending on the details of the stamp and on whether or not positive freeing means are employed. In either event, the work is removed by the operator, and a new piece is positioned on the top of the member 35.

As to the details of the hydraulic or pneumatic system: Referring to the hydraulic system, I illustrate a main air intake or supply duct 100. 101 is a high pressure take-off and 102 is a low pressure take-off. It will be understood that the details of the means for taking off or supplying high and low pressure do not of themselves form part of the present invention and are not herein fully indicated. In communication with the high side 101 is a high pressure supply duct 103 extending to the valve 104. In connection with the low side 102 is the low pressure supply duct 105 extending to the valve 106. 107 is any suitable exhaust valve. Thus the cylinder 33 may receive fluid at high pressure, when the valve 104 is actuated or may receive low pressure when the valve 106 is actuated, depending upon whether the desired excursion is the inking excursion or the printing excursion, as above described. Each of the valves 104, 106 and 107 is provided with any suitable camming arm, shown diagrammatically, for example, in Figure 3, each of which may be engaged by any appropriate cam 110, 111 or 112. It will be understood that the system is in duplicate, as shown in Figure 2, to supply the two cylinders 33.

It will be realized that whereas I have described and shown a practical and operative device, nevertheless many changes may be made in size, shape, number and disposition of parts without departing from the spirit of the invention. I therefore wish the description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my specific showing. In particular, it will be understood that my invention may be applied to the application of any suitable pigment, color or substance, including but not limited to ink. It may also be employed to apply relief treatment to the work. The work may include a wide variety of substances, including but not limited to, china and pottery.

The use and operation of the invention mentioned are as follows:

The present invention is illustrated in connection with a rotating table 8, upon which are mounted two diametrically opposed work supports. It will be understood that a single work support may be employed, one of the two herein shown being omitted, or a greater number may be employed, merely requiring changes in size and proportion, and the employment of a greater number of sets of actuating cams.

In considering the cycle as to any single work support, assume that the operator places the work on the work support, as the work support is moving in the direction of the arrow in Figure 4, with the parts in the position in which they are shown in Figure 4. The rotation of the table 8 carries the work support and its overlying stamp 21 in unison toward the inking assembly. The work support and the stamp are spaced apart, as shown in Figure 5. As shown in Figure 6, in response to the continued rotation of the table 8, the cam 81 engages the end of the rod 79, and fluid pressure is admitted to the interior of the cylinder 74, causing the ink imparting roller to supply ink

to the upper surface of the pivoted disc 60. The ink roller 72 is shown at about the outer limit of its inking excursion, in Figure 6. It shortly recedes from its inking excursion, under the urge of the springs 73, to the withdrawn position in which it is shown in Figure 8. In Figure 8, the continuing rotation of the table 8 has carried the work support beneath the member 58, while the stamp 21 overlies the upper surface of the inked disc 60. As shown in Figure 7, which is a side elevation of the structure in the condition in which it is shown in Figure 8, the low pressure connection for the cylinder 33 has been cam actuated, and the work support, with the work on it, has been raised upwardly against the bottom of the member 58. The result is to lift the inking plate 60 upwardly against the stamp 21, the stamp being thereby provided with ink or pigment, in readiness to apply it to the work. It will be understood that the support 58 is free to rise, because of its telescopic supporting connection 56, 57. It is also free to ride along the tracks 53, through a limited arc. The operation of the cam lever for the low pressure connection 104 has admitted sufficient pressure to raise the piston 32 the necessary distance to complete the ink imparting excursion. The cam for the exhaust connection 107 is thereby actuated, the plate 60 is released downwardly, and the stop 64 ends the forward movement of the support 58. The inking assembly is promptly returned to initial position by the counter-weight 61. With the inking assembly withdrawn from between the work support and the stamp, the high pressure connection 106 is actuated by its associated cam, and the maximum upward movement of the work support follows, with the work thrust upwardly, as shown in Figure 11, into contact with the stamp. It will be understood, however, that the centering pins 37 have previously been actuated to work centering position, by engagement of the roller 45 with the yieldingly held camming or actuating member 46. Thus, in sequence, the work is applied to the work support, the work support is carried below and the stamp above the previously inked plate 60, the initial excursion of the work support causes the plate 60 to ink the stamp, the inking mechanism is released, the work is centered on the work support, and the centered work is carried upwardly against the stamp, to receive the ink or pigment.

It will also be understood that the ink imparting plate 60 is rotated about its center 59, whereby the ink is evenly distributed across its upper surface.

The work may be manually applied and removed, or any suitable mechanical means, not herein shown, may be employed for applying or removing the work. It will also be understood that any suitable means may be employed for freeing the work from the stamp and for insuring that the work does not adhere to the stamp. On the other hand, under some circumstances, I prefer to employ a stamp of such material and consistency that the work will adhere to it, the work, in that event, being manually removed from the stamp by the operator.

I claim:

1. In a device for printing china and the like, a rotatable table and means for rotating it, an eccentrically mounted work support mounted for unitary movement with said table about the axis of the table, and for movement in relation to said table, along an upright path in parallelism with the axis of the table, means for centering the

work on the work support, in response to rotation of the table, a stamp, overlying and aligned with the work support and the work centered on said support, said stamp being mounted for unitary movement with said table, about the axis of the table, means for inking the stamp, including an ink receiver adapted to engage the stamp, said receiver being normally out of alignment with the path of the stamp, means for supplying ink to said receiver at a time when it is out of alignment with the path of said stamp, means for intermittently interposing said receiver between said stamp and said work support, means for moving said receiver upwardly toward the stamp when the ink receiver is therebetween, through an excursion of sufficient amplitude to urge the receiver into inking contact with the stamp, and means for moving the work support and the work against said stamp, when the receiver is out of line with the path of movement of the said work support, and for thereby inking the work.

2. In a device for printing china and the like, a table and means for rotating it, a work support eccentrically mounted for rotation with the table, a stamp, aligned with said work support, mounted for rotation with the table, an ink receiver and means for supplying ink thereto, said receiver being interposed between the work support and the stamp in their movement with the table, in the course of the rotation of said table, means for imparting to said ink receiver a limited movement with the table, and means for moving the stamp and the work support toward each other, while the ink receiver is between them and is moving with the table, and for thereby urging the ink receiver into ink applying relationship to the stamp.

3. In a device for printing china and the like, a table and means for rotating it, a work support eccentrically mounted for rotation with the table, a stamp, aligned with said work support, mounted for rotation with the table, an ink receiver and means for supplying ink thereto, said receiver being interposed between the work support and the stamp in their movement with the table, in the course of the rotation of said table, means for imparting to said ink receiver a limited movement in unison with the movement of the table, and means for moving the stamp and the work support toward each other, while the ink receiver is between them and is moving with the table, and for thereby urging the ink receiver into ink applying relationship to the stamp, said inking member being mounted for limited movement in unison with the stamp and work support.

4. In a device for printing china and the like, a table and means for rotating it, a work support eccentrically mounted for rotation with the table, a stamp, aligned with said work support, mounted for rotation with the table, means for imparting to one of said members a limited excursion toward the other, and for thereafter imparting to it a longer excusion toward the other, an ink receiver and means for supplying ink thereto, said receiver being interposed between the work support and the stamp in their movement with the table, in the course of the rotation of said table, during said limited excusion, and supporting means for said ink receiver adapted to permit said receiver to move during said limited excursion, said limited excursion being of such length as to put the ink receiver in ink imparting relationship to said stamp.

5. In a device for printing china and the like, a table and means for rotating it, a work support eccentrically mounted for rotation with the table, a stamp, aligned with said work support, mounted for rotation with the table, means for imparting to one of said members a limited excursion toward the other, and for thereafter imparting to it a longer excursion toward the other, an ink receiver and means for supplying ink thereto, said receiver being interposed between the work support and the stamp in their movement with the table, in the course of the rotation of said table, during said limited excursion, and supporting means for said ink receiver adapted to permit said receiver to move during said limited excursion, said limited excursion being of such length as to put the ink receiver in ink imparting relationship to said stamp, the supporting means for said ink receiver being adapted to permit the ink receiver to move in unison with the table during said ink imparting excursion.

6. In a device for printing china and the like, a table mounted for rotation, a work support, a stamp aligned therewith, means for moving said work support and stamp in unison through a predetermined path, inking means, positioned in said path, said inking means being interposed between the work support and the stamp in the course of their unitary movement with the table, means responsive to the rotation of said table for moving said work support and stamp together, while said inking means is positioned therebetween, and for thereby moving said inking means into ink imparting relation with said stamp, and means for thereafter moving said work support and stamp together upon further rotation of said table, and for thereby subjecting work on said work support to said stamp.

7. In a device for printing china and the like, a table mounted for rotation, a work support, a stamp aligned therewith, means for moving said work support and stamp in unison through a predetermined path, inking means, positioned in said path, said inking means being interposed between the work support and the stamp in the course of their unitary movement with the table, means responsive to the rotation of said table for moving said work support toward said stamp, while said inking means is positioned therebetween, and for thereby moving said inking means into ink imparting relation with said stamp, and means for thereafter moving said work support toward said stamp upon further rotation of said table, when the inking means is out of alignment between the work support and stamp, and for thereby subjecting work on said work support to said stamp.

8. In a device for printing china and the like, a table and means for rotating it, a stamp positioned above said table for movement in unison therewith, the axis of said table being generally upright, a work support on said table, aligned beneath said stamp, and mounted for movement in unison with said table, means, responsive to rotation of said table, for centering work on said work support, means, responsive to rotation of said table, for moving said work support toward and away from said stamp, in a succession of excursions of different amplitude, means for applying ink to said stamp in response to an upward excursion of said work support of minimum amplitude, including an inking element and means for positioning it between the work support and the stamp during the upward excursion of the work support of minimum amplitude, the excursions of maximum amplitude being of sufficient amplitude to move work on said work sup-

port into ink receiving contact with said stamp.

9. The structure of claim 8, characterized by and including the employment of pneumatic means for actuating said work support.

10. The structure of claim 8, characterized by and including the employment of pneumatic means for actuating said work support, said pneumatic means including control means rotatable with said table and actuating cam means adapted to be opposed thereto, in response to rotation of said table.

11. In a device for printing china and the like, a rotatable table and means for rotating it, an eccentrically mounted work support mounted for unitary movement with said table about the axis thereof, and for movement in relation to said table along an upright path in general parallelism with the axis of the table, means for centering work on the work support in response to rotation of the table, a stamp overlying and aligned with the work support and the work centered on the support, said stamp being mounted for unitary movement with said table about the axis of the table, means for inking the stamp including an ink receiver adapted to engage the stamp, said receiver being normally out of alignment with the path of the stamp, means for supplying ink to said receiver at a time when it is out of alignment with the path of said stamp, means for intermittently interposing said receiver between said stamp and said work support, means for moving the work support upwardly into operative engagement with the receiver from beneath to move said receiver upwardly into inking contact with the stamp when the ink receiver is therebetween, and means for thereafter moving the work support and the work against said stamp when the receiver is out of line with the path of movement of said work support for thereby inking the work.

12. In a device for printing china and the like, a rotatable table and means for rotating it, an eccentrically mounted work support mounted for unitary movement with said table about the axis thereof, and for movement in relation to said table along an upright path in parallelism with the axis of the table, means for centering work on the work support in response to rotation of the table, a stamp overlying and aligned with the work support and the work centered on the support, said stamp being mounted for unitary movement with said table about the axis of the table, means for inking the stamp including an ink receiver positioned to pass between the stamp and the work support as the table rotates, said receiver being normally out of alignment with the path of the stamp, means for supplying ink to said receiver at a time when it is out of alignment with the path of said stamp, means for intermittently and releasably connecting the ink receiver and the table for movement together about the axis of the table with said receiver between said stamp and said work support, means for moving the work support upwardly into operative engagement with the receiver from beneath to move said receiver upwardly into inking contact with the stamp when the ink receiver is therebetween, and means for thereafter moving the work support and the work against said stamp when the receiver is out of line with the path of movement of said work support for thereby inking the work.

13. In a device for printing china and the like, a table and means for rotating it, a work support eccentrically mounted for rotation with the table, a stamp aligned with said work support and mounted for rotation with the table, an ink receiver and means for supplying ink thereto, said receiver being interposed between the work support and the stamp in their movement with the table, means for supporting the ink receiver in alignment with and between the work support and the stamp at one point in the path of rotation thereof on the table, means for moving the ink receiver within predetermined limits about the axis of the table in unison with the table while the ink receiver is interposed between the work support and the stamp, means for moving the work support upwardly while the parts are so disposed, the support means for the ink receiver including means for mounting the ink receiver for movement upwardly towards the stamp, and means for moving the work support upwardly beneath the ink receiver supporting means on an excursion of a length to move the ink receiver into inking contact with the stamp, means for thereafter withdrawing the ink receiver from between the work support and stamp, and means for then moving the work support upwardly on an excursion of a length to move the work into printing contact with the stamp.

14. In a device for printing china and the like, a rotatable table and means for rotating it, an eccentrically mounted work support mounted for unitary movement with said table about the axis of the table, and for movement in relation to said table, along an upright path in parallelism with the axis of the table, means for centering the work on the work support in response to rotation of the table, a stamp, overlying and aligned with the work support and the work centered on said support, said stamp being mounted for unitary movement with said table about the axis of the table, means for inking the stamp, including an ink receiver, adapted to engage the stamp, said receiver being normally out of alignment with the path of the stamp, means for supplying ink to said receiver at a time when it is out of alignment with the path of said stamp, means for intermittently interposing said receiver between said stamp and said work support, means for moving said work support upwardly toward the stamp when the ink receiver is therebetween, through an excursion of sufficient amplitude to urge the receiver into inking contact with the stamp and for thereafter moving the work support and the work through an excursion of greater amplitude to bring the work against the inked stamp, after the ink receiver has been moved laterally out of line with the path of movement of the work support for thereby inking the work.

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