

March 20, 1945.

J. H. KELLER ET AL

2,372,089

DECORATING MACHINE

Filed Jan. 12, 1942

4 Sheets-Sheet 1

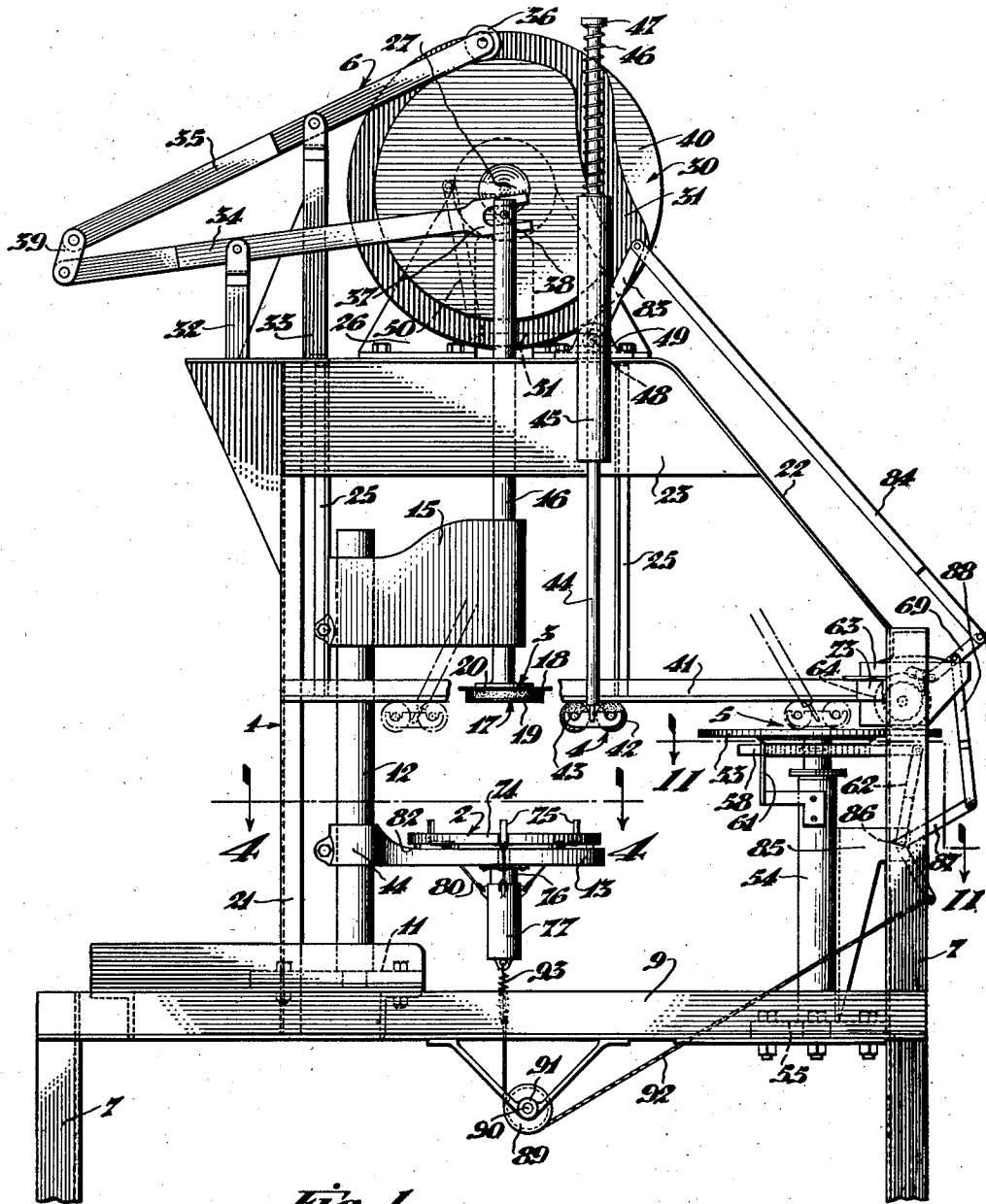


Fig. 1

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4 Sheets-Sheet 2

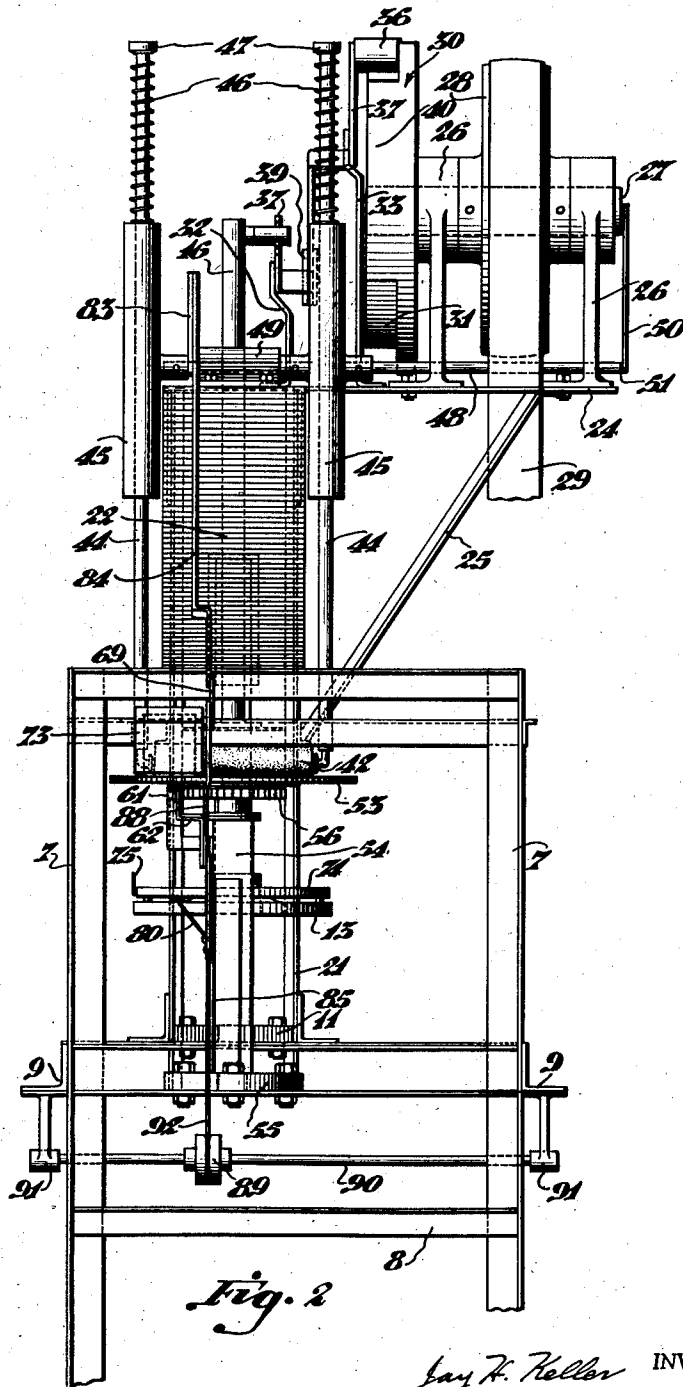


Fig. 2

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4 Sheets-Sheet 3

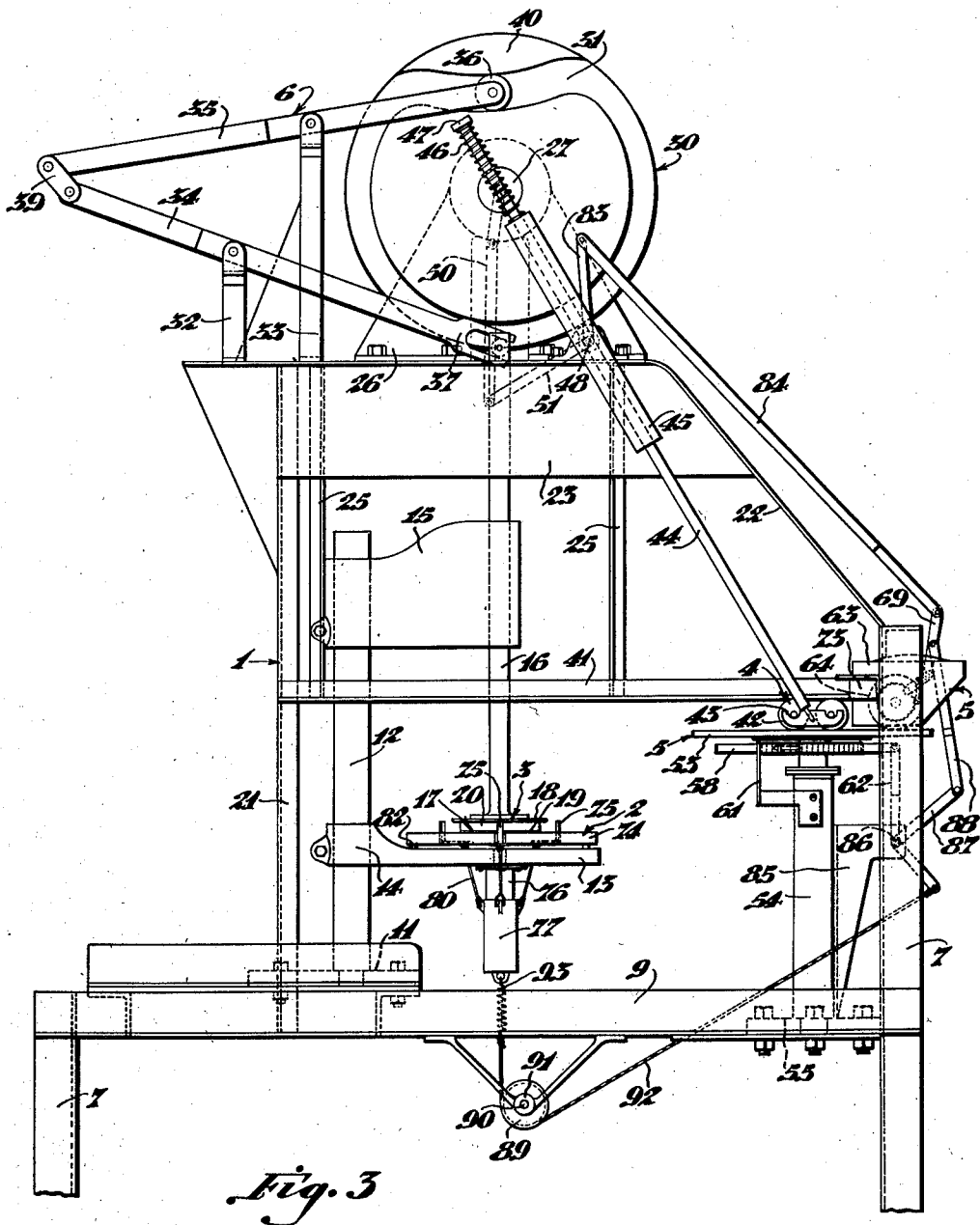


Fig. 3

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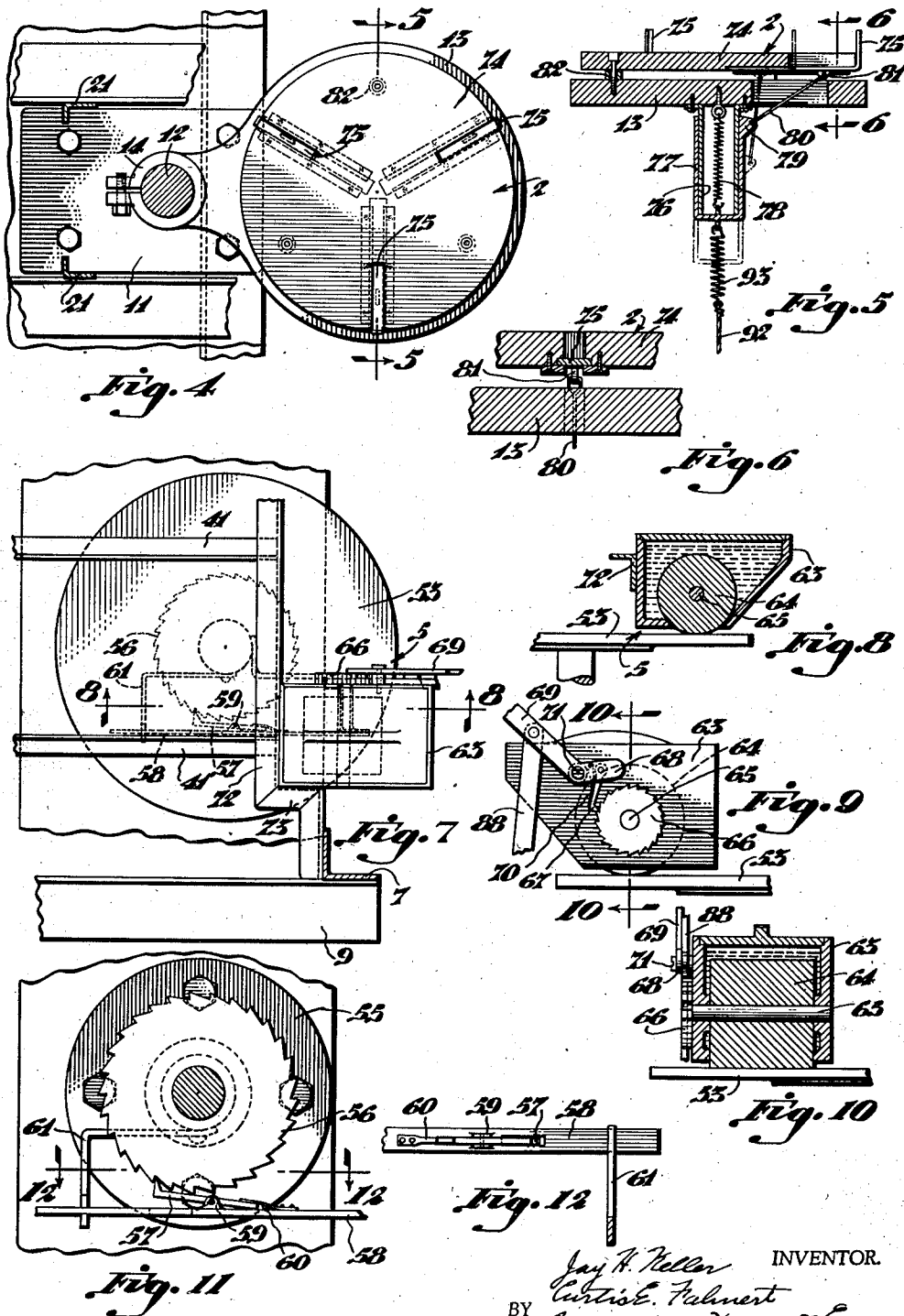
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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DECORATING MACHINE

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Application January 12, 1942, Serial No. 426,414

5 Claims. (Cl. 101-41)

This invention relates to apparatus for applying decorations and designs to articles of manufacture by means of a stamp. The invention is directed particularly to the decoration of ceramic, enamel, glass and chinaware articles, such as plates, saucers, bowls and the like, but is also useful for decorating other kinds of ware in other fields of manufacture.

It has been the principal objective of the present invention to provide a machine for practicing the so-called stamp method of decorating automatically and rapidly. The stamp decorating technique in general is well understood in the ceramic arts and it consists principally in fashioning the design or motif which is to be used, in relief, upon a piece of rubber or the like. A tacky film of ink containing the desired coloring pigment such as bright gold or suitable coloring oxide is applied to the design surface of the stamp and the stamp is then pressed against the surface to be decorated. Due to the tackiness of the ink, some of it adheres to the surface of the ware and is thus detached from the stamp when the stamp is lifted. In the decoration of ceramic, glass, enamel, or china articles the ware is subsequently fired to fuse the color. The same general method may be utilized in ornamenting leather, wood and other objects by using suitable ink or pigment compositions.

Briefly, the machine of the present invention consists in general of a surface upon which the ware is supported, a plunger to drive the stamp in a reciprocating movement toward and from the ware, means for applying a film of ink to the surface of the stamp between successive stamping operations, and means for driving the stamp and for driving the inking apparatus in timed relationship.

However, an important objective of the invention has been to provide apparatus in which these operations can be conducted at a high rate of production. It is obvious, of course, that the hourly output of any machine can be increased by driving it at a faster rate, but in the decoration of fragile articles the fatigue of the operator is related directly to breakage losses and satisfactory results cannot be obtained if the operator has to perform his or her functions so quickly that the pace is impossible to sustain throughout the working day. Moreover, in such instances prolonged training periods are necessary to train the unskilled operator in catching the rhythm of the machine.

To avoid these difficulties the machines of the present invention have a chuck which is capable

of locating or aligning the ware with respect to the stamp and means are provided for operating the chuck automatically relative to stamping movements in such manner as to provide the greatest latitude of time for feeding and unloading purposes during the intervals that the stamp is being inked. More specifically, the present invention contemplates an apparatus in which the chuck is operated to hold the ware only during the actual stamping operation and for momentary periods preceding and succeeding stamping so as to enable the operator to utilize the remaining time of a cycle of operation, during which the stamp is being inked, for loading and unloading purposes. Supplementing this provision the drive mechanism for the stamp plunger drives the plunger through a complete stamping and return stroke during only a portion of a cycle of revolution. Through these arrangements the fast pace and the strain to which the operator otherwise would be subjected are relieved and a high rate of production is maintained with little fatigue to the operator.

Other objects and further advantages and features of the invention are shown in the drawings in which a preferred embodiment of the invention is illustrated and in the following detailed description of the drawings.

In the drawings:

Figure 1 is a side elevation of a typical machine constructed in accordance with the invention.

Figure 2 is a front elevation of the machine.

Figure 3 is a view similar to Figure 1 showing another stage in the operation of the device.

Figure 4 is a sectional plan view taken on the line 4-4 of Figure 1.

Figure 5 is a sectional elevation taken on the line 5-5 of Figure 4.

Figure 6 is a fragmentary sectional view taken on the line 6-6 of Figure 5.

Figure 7 is a plan view showing a portion of the inking table.

Figure 8 is a sectional elevation taken on the line 8-8 of Figure 7.

Figure 9 is an elevation of the end of the apparatus for applying ink to the inking table.

Figure 10 is a sectional view taken on the line 10-10 of Figure 9.

Figure 11 is a sectional plan view showing means for rotating the inking table.

Figure 12 is a sectional elevation taken on the line 12-12 of Figure 11.

As shown in the drawings, the apparatus includes a frame indicated generally at 1, a table

2 having a clutch thereon, the stamp and plunger 3, the mechanism 4 for inking the stamp 3, the ink feeding apparatus 5, and the plunger driving apparatus 6.

The frame is made up of corner posts 7 and braces 8 appropriately fastened together with side members 9 providing a table to which a pedestal 11 is fastened. A column 12 extends upwardly from the pedestal and a table 13 projects laterally from a split collar 14 which is slidably journaled on the column so as to be adjustably supported thereby.

An arm 15 extends from the upper part of the column out over the table 13 and it is provided with a bore for slidably journaled the plunger shaft 16. The lower portion of the plunger shaft carries the stamp 17. The stamp unit is preferably detachably mounted on the plunger shaft and, as shown in the drawings, comprises a base piece 18 which engages the shaft, the stamp face member 19 which carries the design or decoration motif and a layer of resilient material 20 which absorbs shocks incidental to the impression of the stamp upon the ware.

Posts 21 extend upwardly from the side rails 9 adjacent the column 12 at the back part of the machine to provide support for a super structure 22, with a bracing panel 23 supporting the front end of the super structure from the front end of the frame. A table 24 is mounted on the super structure in offset relationship to the plunger 16, with braces 25 extending diagonally from the lower frame to the outer edges of the table at front and rear to rigidify the mounting.

A pair of pillow blocks 26 rest on the table in spaced relationship and these rotatively journal a drive shaft 27. Pulley 28, driven through belt 29, is pinned to the drive shaft 27 intermediate the pillow blocks and a cam 30 is pinned to the drive shaft at an end thereof projecting beyond the pillow block adjacent the upper portion of the plunger 16. Cam 30 is of regular contour except for the chordal "driving" portion 31 thereof.

Posts 32 and 33 project upwardly from the table in offset and staggered relationship relatively to one another to pivotally carry arms 34 and 35 respectively. Arm 35 is provided with a roller 36 arranged to follow the contour of cam 30, and arm 34, at its corresponding end, is provided with a fork 37 for driving a pin 38 projecting transversely from the plunger 16. At their other ends the arms 34 and 35 are pivotally interconnected through the link 39.

The driving portion 31 of cam 30 is hooded as at 40 so that the follower roller 36 is driven downwardly when riding through this portion of the cam contour.

It will be seen that because of the circular contour of the major portion of the cam periphery plunger 16 is normally at rest and the parts are so arranged that this rest position takes place when the plunger is in receded position. When the follower roller 36 contacts the driving portion 31 of the cam contour, which corresponds to approximately one-fourth of its periphery, the follower moves toward the center of the cam, thus causing the rear portion of arm 35 to be lifted. As the rear portion of arm 34 moves up, the forward portion of arm 34 is driven downwardly thus causing the plunger to approach the table 13 for a stamping operation. As the rotation of the cam 30 continues the follower 36 relatively is lifted thereby retracting plunger 16 to its normal receded position where it remains through-

out the remaining portion of the cycle of revolution of the cam.

It is to be noted that the points at which the arms 34 and 35 are pivoted at the posts 32 and 33 are inversely arranged so that a multiplying action is obtained whereby the relatively slight depression in the cam contour effects a substantial, and fast, reciprocating movement of the plunger 16. This enables the actual stamping operation to be performed in a minimum portion of the time cycle.

At the forward end of the machine the inking table 5 is located. A pair of guide rails 41, extending between the rear super structure posts 21 and the front posts of the frame above the table, form a track for guiding inking rollers 42 from the inking table to the surface of stamp 17. The lower faces of the rails 41 are in the plane in which the face of stamp 17 resides when it is in retracted position, so that in passing along the rails the rollers 42 come into contact with the face of the stamp 17 and transfer ink to it. The surface of table 5, on the other hand, is so located that when the rollers 42 move toward the forward end of the machine the lower portions of the roller peripheries engage the ink located on the table. It is to be noted that the inking operation is conducted at a level substantially above the table 13 so as to leave the work table in a most accessible position, free and unobstructed by the inking mechanism.

Stub shafts project from the ends of rollers 42 and are journaled in cradles 43. The cradle members in turn are pivotally suspended from swing arms 44, one at each side of the machine. Each arm 44 projects upwardly through a drive sleeve 45 by means of which the arms are moved to drive the rollers 42 back and forth along the guide rails. The upper end of each arm 44 projects beyond the sleeve by which it is driven and carries a compression spring 46. These springs surround the arms and reside intermediate the upper portions of the sleeves and caps 47 on the arms, thereby tending to lift the arms and hold the rollers in engagement with the guide rails 41.

Drive sleeves 45 are fastened to a rock shaft 48 at opposite sides of a pillow block 49 through which the shaft rotatively is journaled. For rocking the shaft 48 an eccentric stub is provided at the end of the shaft 27 opposite the cam 30 and a connecting rod 50 is journaled on the stub with its opposite end pivotally journaled on a link 51. The opposite end of link 51 is fastened to shaft 48. As the connecting rod oscillates through an arc upon rotation of the drive shaft 27, shaft 48 is rocked whereby the arms 44 are swung back and forth to drive the rollers 42 between the stamp 3 and the inking table.

The inking table is constituted by a plate 53 which is rotatably carried on a post 54, the latter in turn being supported from a pedestal 55 located between side rails 9 of the frame of the machine. A ratchet 56 is arranged beneath the table so as to be concentric therewith and a pawl member 57 extends from an oscillating arm 58 for engagement with the ratchet teeth. The pawl is pivoted on a block 59 extending from the arm 58 and a spring 60 also fastened to the arm 58 engages the one end of the pawl so as to urge the opposite end into engagement with the ratchet teeth. One end of the arm 58 is slidably supported in a bracket 61 which projects upwardly from the column 54. The other end is engaged by a drive link 62, which is operated

as described at a later point in the specification.

An ink feed box 63 for containing a supply of the coloring material to be used, say a bright gold ink, is located above the inking table 53 but in offset relationship thereto and houses an ink feed roller 64 for applying and maintaining a uniform film of the ink upon the inking table. The feed roller 64 is journaled in the box so that a portion of it extends slightly below the lower face of the box to engage plate 52, with the opening in the bottom portion of the box fitting the roller contour snugly so that no ink escapes therefrom except the film portion carried on the surface of the roll.

Shaft 65 on which the feed roller is journaled extends beyond the wall of the box at one side thereof to carry a ratchet 66. This ratchet is driven by a pawl 67 which is pivotally supported upon one arm 68 of a bell crank 69. The pawl is urged toward the ratchet by means of spring 70 and the bell crank 69 is pivotally journaled on the feed box through the stud 71.

The ink feed box is supported from a corner post of the frame by means of a bracket member 72 which is fastened across the guide rails 41. An additional support bracket 73 also is fastened intermediate the side of the feed box opposite the ratchet drive and a corner post of the frame of the apparatus.

To hold the ware a chuck plate 74 is mounted on the table 13. The chuck has the function of aligning the ware with respect to the stamp preceding the stamping operation and also serves to hold the ware against lateral movements during stamping. By virtue of the tackiness of the ink used the chuck has the additional purpose of holding the ware down upon the table so that it is not lifted when the stamp moves away from the work. Slots are cut radially in plate 74 to receive jaws 75 which are slidable in the slots. A stub 76 projects beneath the table 13 on an axis centrally of the plate 74 to carry a sliding sleeve 77. At the inside of the stub a tension spring 78 interconnects the lower portion of the sleeve 77 with the table 13 so that the sleeve normally tends to be drawn toward the table by the tension spring. At the outside of the sleeve 77 bosses 79 are provided, one corresponding to each jaw of the chuck. Stiff link members 80 interconnect the bosses 79 with bosses 81 located at the lower faces of the chuck jaws. Thus, when the sleeve 77 is moved downwardly upon the stub 76 the interconnecting links draw the jaws toward the center of the chuck for a closing operation; when sleeve 77 is released the spring 78 pulls the sleeve upwardly thereby causing the stiff links to drive the chuck jaws to open position.

The chuck plate 74 preferably is spaced slightly from the upper surface of the table 13 by means of spacers 82 so as to provide clearance for the bosses 81 at the bottom faces of the chuck jaws, and the stiff links 80 pass through the table 13 through slots provided therein. It is also desirable that three chuck jaws be utilized to obtain a positive centering action.

In setting up the apparatus the lock nut on the split clamp 14 of the table is unloosened and the table is so adjusted that when the chuck jaws are in a closed position a piece of ware being held by them will be centered with respect to the stamp 17. At this time the table also is adjusted as to height so that when the plunger is in the down position the stamp 17 is impressed prop-

erly upon the surface of the ware being held by the chuck.

The opening and closing operation of the chuck jaws, the driving of the lever 62 through which motion of the inking table is effected and driving of the lever 69 through which rotation of the inking roller is effected are obtained from a rocker arm 83 which is fastened to the rock shaft 48 to oscillate therewith. A connecting rod 84 is pivoted at its one end to the rocker arm 83 and is pivoted at its other end to the arm 69 so that as the rocker arm 83 is oscillated the arm 69 is moved to drive the inking roller through pawl 67.

A bracket 85 is located beneath the inking table to provide a journal for a stub shaft 86. The lever 62 is pinned at its one end to this shaft and, as previously described, is pivotally connected at its other end to the arm 58 through which the inking table is rotated. A bell crank 87 also is pinned to the shaft 86 and a stiff link 88 extends from the lever 69 to one end of the bell crank so as to cause the bell crank to oscillate therewith.

Beneath the table 13 and preferably at the lower face of side rails 9 a pulley 89 is located on a shaft 90 journaled at each end in journal blocks 91. A cable 92 extends from the other end of the bell crank 87 around the pulley and into connection with the sleeve 77. A tension spring 93, somewhat stronger than the spring 78, is positioned in the cable system so as to provide means for tensioning the chuck jaws on the ware.

In the linkage system just described it will be seen that oscillation of the connecting rod 50 causes oscillation of the rock shaft 48 moving the arm 83 backwardly and forwardly, operating the feeding roller through the bell crank 69, operating the inking table through bell crank 87, link 62 and the oscillating pawl arm 57, and operating the chuck through the bell crank 87 and the cable 92.

In respect to the timing of the system it will be seen that the stamp is oscillated to make a full stroke and return only during a portion of the given cycle of operation. The linkage to the chuck is so arranged that the jaws of it are moved to the closed position and hold the work located between them firmly only a moment before the stamp has been moved into engagement with the work. The apparatus also is so arranged that the bell crank 87 is oscillated to release the chuck jaws as soon as the stamp has moved out of engagement with the work surface. Through the action of the cam 30 the plunger is driven rapidly to carry the stamp to its retracted position and the guide sleeves 45 are so arranged upon the rock shaft 48 as to then drive the rollers 42 from the inking table to the stamp, across the face of the stamp and to the return position during the remaining portion of the cycle.

Having described our invention, we claim:

1. A device for applying decorations to articles of manufacture comprising a stamp having design indicia thereon, a device for centering and holding ware in position to be operated upon by said stamp, comprising a ware supporting plate member, a plurality of radially arranged jaws mounted slidably upon said plate and means for moving said jaws radially inwardly in unison, and means for driving said stamp and said centering and holding device in timed relationship such that the jaws thereof are operated to closed position during the period the stamp is in position to engage work held thereby and for momentary

periods preceding and succeeding such work engaging position of the stamp, and the said jaws are in open position during a major portion of a cycle of operation.

2. A machine for applying decorations to articles of manufacture comprising a stamp having design indicia thereon, a rotatable drive member, a centering and chucking device for holding work in position to be engaged by said stamp, means for driving the stamp toward and from said centering and chucking device during a portion only of a cycle of revolution of said drive member and for holding said stamp in idle position during the remaining portion of said cycle of revolution of the drive, said centering and chucking device comprising a plate having a plurality of radially positioned jaws slidable upon said plate and link means for moving said jaws toward the center of said plate in unison, and means driven from said drive member for operating said link means to close said chuck jaws during a minor portion of the cycle of revolution in which said stamp is in work engaging position with respect to said device and for a momentary period preceding and succeeding the work engaging position of said stamp.

3. A machine of the class described comprising a stamp having indicia thereon, a chuck for centering and holding work in position to be engaged by said stamp comprising a plurality of jaws radially positioned with respect to one another and slidable toward a common central axis about which they are arranged, and means for sliding said jaws in unison to open and closed positions, a drive member, a cam device arranged laterally with respect to said chuck driven by said drive member for moving the stamp toward and from said chuck during a portion only of a cycle of revolution of the drive member, means for operating said jaw moving means during a substantially coincidental period whereby the chuck is closed during engagement of the stamp with work held by said chuck and for momentary pe-

riods preceding and succeeding such engagement, said chuck being operated to open position momentarily succeeding disengagement of said stamp with work held by said chuck, whereby said chuck is in open position throughout a major portion of the cycle of revolution.

4. A device for applying decorations to articles of manufacture comprising a rubber stamp bearing design indicia, a drive member, a table, a plurality of jaws arranged radially with respect to one another on said table and being slidable to open and closed position for holding work upon said table in position to be engaged by said stamp, said jaws also being arranged to hold the work downwardly upon the table, means for sliding said jaws to open and closed position in unison, rotatable drive means driven by said drive member for driving the stamp toward and from the table during a portion only of a cycle of revolution of said drive member, and means for operating said jaw moving means in synchronism with said stamp in such manner that the jaws are closed momentarily preceding the period when the stamp reaches the work engaging position and open momentarily succeeding the period when the stamp is driven away from the work position.

5. A machine for applying decorations to articles of manufacture comprising a stamp having design indicia thereon, a table for supporting ware beneath said stamp, means for reciprocating said stamp toward and from said table, a plurality of jaws arranged above said table and movable radially with respect to a common axis for centering and holding work thereon, and means for actuating the jaws in unison, said jaw operating means being actuated in synchronism with said stamp whereby said jaws are moved radially inwardly to center ware and hold it as the stamp approaches and engages the ware and until the stamp leaves the ware.

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