Oct. 9, 1951 J. A. BOWER 2,570,756

STAMPING MACHINE

Filed March 30, 1948 3 Sheets-Sheet 1

Fig. 1.

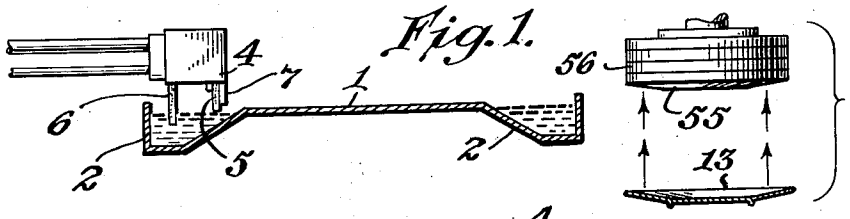


Fig. 2.

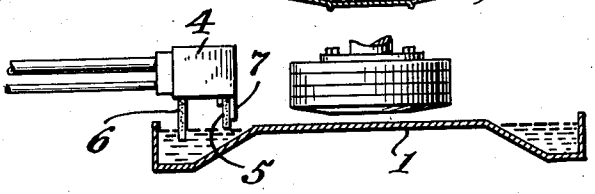


Fig. 3.

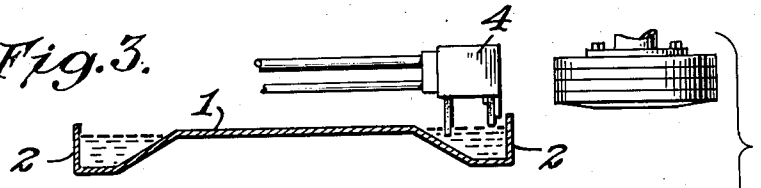


Fig. 4.

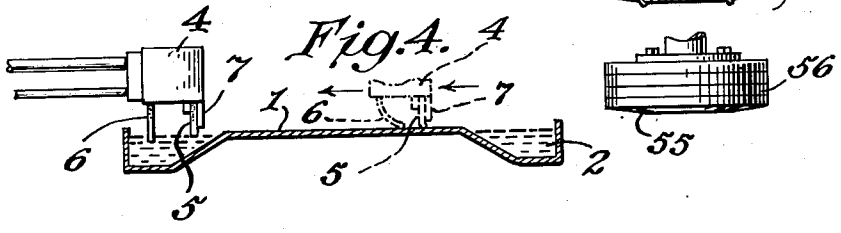
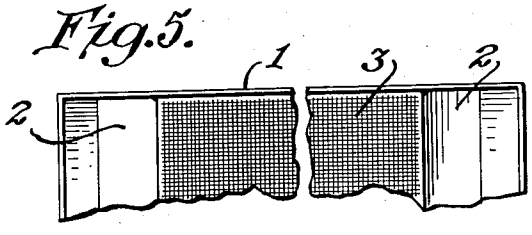


Fig. 5.



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Oct. 9, 1951 J. A. BOWER 2,570,756

STAMPING MACHINE

Filed March 30, 1948 3 Sheets-Sheet 2

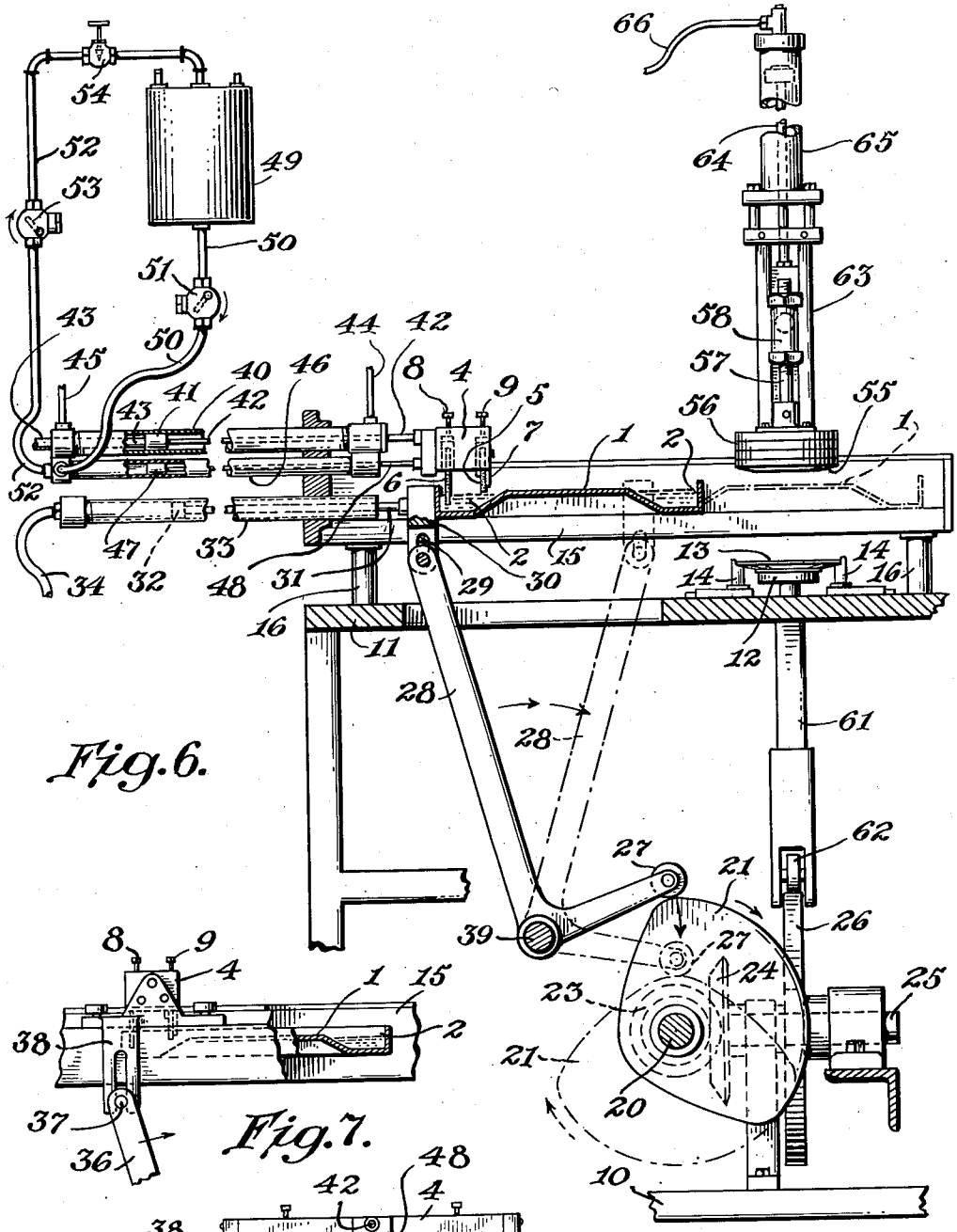


Fig. 6.

Fig. 7.

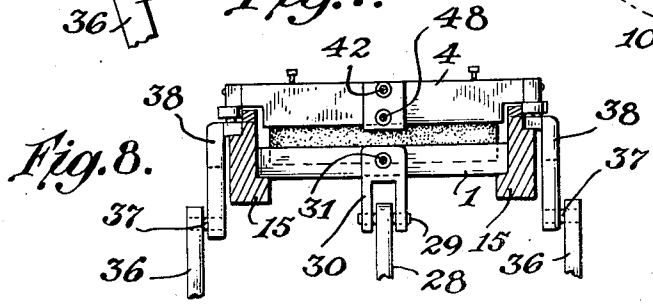


Fig. 8.

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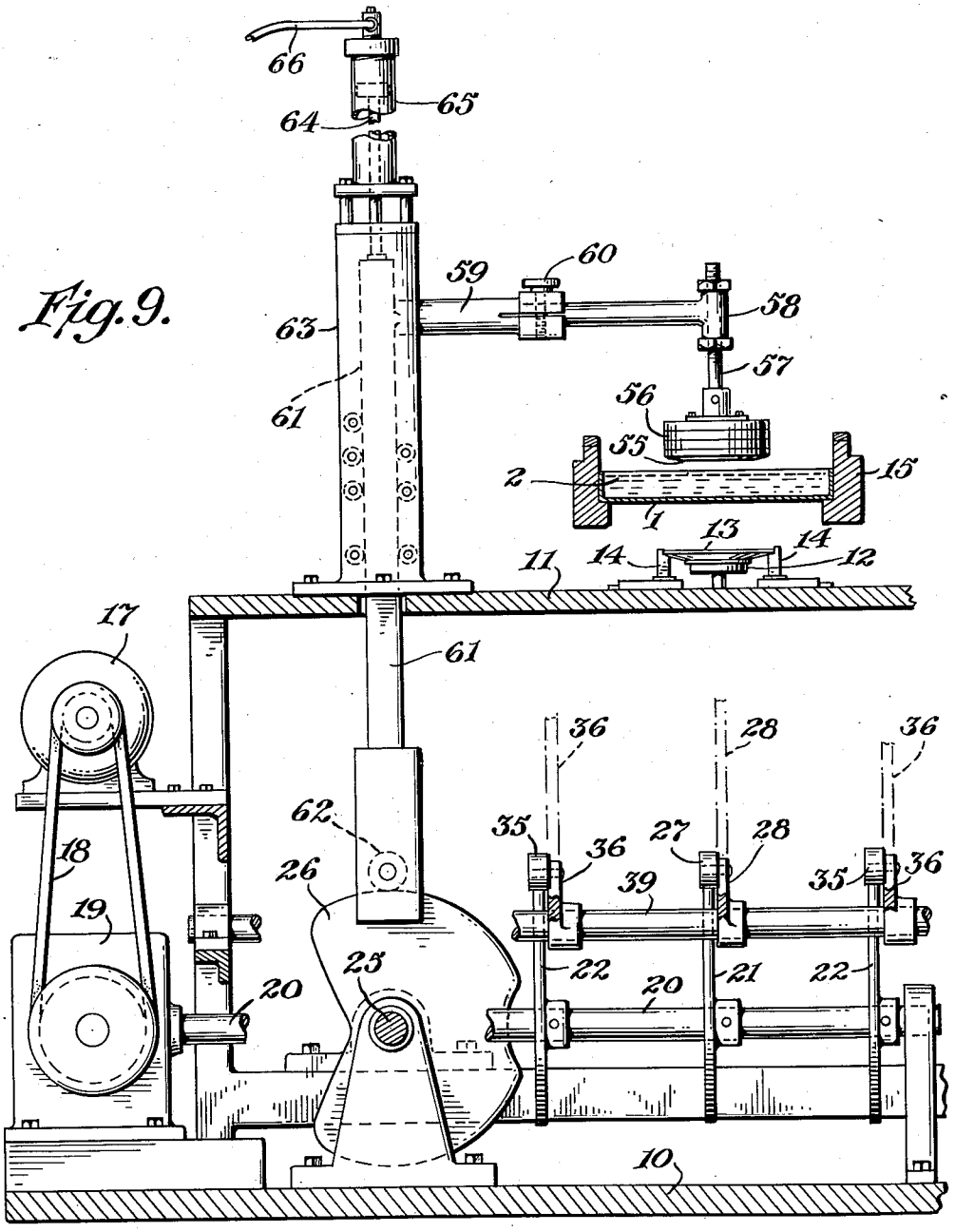
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Oct. 9, 1951 J. A. BOWER 2,570,756

STAMPING MACHINE

Filed March 30, 1948 3 Sheets-Sheet 3

Fig. 9.



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STAMPING MACHINE

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Application March 30, 1948, Serial No. 17,989

8 Claims. (Cl. 101—335)

1

The invention relates to the stamping of ceramic ware, particularly the stamping of plates, with desired decorations, such as gold bands for example.

One of the objects of the invention is to provide a machine of this character which will apply bands or other decorative designs, of gold or other material, to plates, dishes and the like, in such manner that the decoration will be perfectly smooth and uniform.

Another object of the invention is to provide means by which the squeegee will be moved at an absolutely uniform velocity during the stroke of applying the material to the platen; while other movements of the squeegee and platen may be uniformly accelerated and decelerated.

Another object of the invention is to assure uniform application of the material to the platen, by the provision of a squeegee head carrying an applicator followed by a squeegee.

Still another object of the invention is to provide a machine of this character of simple construction which will operate efficiently and at high speed.

Various other objects and advantages will be apparent to those skilled in the art from the following detailed description when taken in connection with the accompanying drawings, in which:

Figure 1 is a diagrammatic illustration showing the platen and squeegee head in withdrawn position, after the decorating material, such as gold, has been applied to the platen, and after the previous plate has been decorated and the stamp elevated;

Figure 2 is a diagrammatic illustration showing the position of the parts after the platen and squeegee head have been moved bodily forward together, to bring the inked platen beneath the stamp, whereupon the stamp is quickly moved down into contact with the platen and then lifted;

Figure 3 is a diagrammatic illustration showing the position of the parts after the platen has been quickly moved to withdrawn position; the squeegee head remaining in advanced position, and the stamp descending to stamp a plate;

Figure 4 is a diagrammatic illustration of the parts after the squeegee head has been moved, in its material-applying stroke, to its withdrawn position, so that the parts have now completed a cycle and have returned to the same position as shown in Figure 1; and showing in dotted lines the positions assumed by the applicator and squeegee during this relatively slow inking

2

stroke; the stamp having moved back to its elevated position;

Figure 5 is a fragmentary plan view of one form of platen.

Figure 6 is a central longitudinal sectional view of the preferred form of apparatus; the parts being in the position illustrated diagrammatically in Figure 1;

Figure 7 is a detail side view, with parts broken away, illustrating the operating connection for the squeegee head;

Figure 8 is a detail cross sectional view illustrating the operating connections for the platen and squeegee head; and

Figure 9 is a vertical sectional view of the machine, with parts omitted and illustrating the driving means for the stamp, squeegee head and platen.

As will be understood from the diagrammatic illustrations of Figures 1 to 4, the platen and squeegee head are moved bodily forward together, after the platen has been inked, to bring the platen into position beneath the stamp. The stamp is then moved down into contact with the platen and then lifted, and upon lifting of the stamp the platen is quickly moved back to its withdrawn position, with the squeegee head remaining in its advanced position, and the stamp descends to decorate the plate or other article. And the squeegee head moves across the platen in its relatively slow inking stroke at uniform speed, to thereby complete a cycle.

With this general description of the operation of the machine, the preferred form of apparatus will now be described.

Numeral 1 refers to the preferred form of platen, which has a well 2 at each end for carrying the material for decorating the ware, such as gold. And the platen surface may be engraved with closely spaced cross lines 3, forming minute pockets.

The squeegee head is indicated by numeral 4, and this head carries a squeegee 5 and an applicator 6, both of which are made of rubber. The squeegee is provided with a metal backing 7 on one side which extends downwardly close to the lower end of the squeegee. By this construction the squeegee is free on one side so that it will readily flex in one direction, but cannot flex to any extent in the other direction because of the metal backing, and hence will exert considerable pressure on the platen. Both the applicator and the squeegee are preferably vertically adjustable, as by screws 8 and 9 as shown in Figure 6.

The frame of the machine need not be de-

scribed in any detail, but it may include a base 10 supporting a table 11 on which is mounted a holder 12 for supporting a plate 13 or other article to be decorated, and a series of fingers 14 for accurately centering the article to be decorated; the fingers preferably being radially adjustable. The framework in which the platen and squeegee head reciprocate is referred to generally by numeral 15, and may be supported from the table by legs 16.

Numeral 17 indicates a motor for driving the machine. This motor, through a belt 18 and reduction gear box 19, continuously rotates a shaft 20. This shaft carries a cam 21 for operating the platen, and two cams 22 for operating the squeegee head. This shaft also carries a bevel gear 23 meshing with a bevel gear 24 on a stub shaft 25. This stub shaft carries a cam 26 for operating the stamp.

The cam 21, which operates the platen 1, cooperates with a roller 27 carried by one arm of a bell-crank lever 28; the other arm of the lever having a pin and slot connection 29 with a bracket 30 connected to the platen.

Also connected with the platen is a piston rod 31 having a piston 32 riding in a cylinder 33. This cylinder is open at its forward end, and its closed rear end is connected by a line 34 with a source of constant air pressure; the pressure being sufficient to maintain the roller 27 in contact with the cam 21.

The squeegee head is operated by the two cams 22, 22 in conjunction with cylinders to be later described. These cams, which are mounted on the continuously rotating shaft 20, are shown in Figure 9 but not in Figure 6. Cooperating with the cams 22, 22, are rollers 35, 35, carried by one arm of the bell crank levers 36, 36; the other arm of the bell crank levers being connected by pin and slot connections 37, 37, to brackets 38, 38, carried by the squeegee head 4. The bell crank levers 36, 36, as well as the bell crank lever 28 for operating the platen, are mounted to oscillate about a shaft 39.

Numeral 40 refers to an air cylinder having a piston 41. Connected with this piston are two piston rods 42 and 43, and the piston rod 42 is connected with the squeegee head 4. The piston rod 43 rides free and it will be noted that rod 43 is of greater diameter than rod 42, so that greater pressure is exerted on the forward or right hand side of the piston (Fig. 6) than on its rearward or left hand side. Air pressure lines 44 and 45 connect with the front and rear ends respectively of the cylinder. And, of course, appropriate valve and timing mechanism (not shown) are provided to alternately admit and exhaust the pressure from opposite ends of the cylinder through these lines.

When pressure is admitted to the rear end of the cylinder, which is the end having the piston rod of greater diameter, it is sufficient to rapidly move the squeegee head forwardly to its advanced position; the rollers 35 being in contact with the cams 22.

The opposite or return movement of the squeegee head is its inking stroke, and in this stroke the head will travel at a relatively slower speed, and it is highly desirable that the speed be uniform throughout its stroke, that the speed be finely adjustable, and that the motion of the head should be entirely free of vibration. Such results are not obtainable if the squeegee is cam-driven during this stroke. Therefore I have provided means for eliminating the cam control during the inking stroke of the squeegee head, as will now be described.

When air is admitted to the forward end of the cylinder 40 the pressure will be sufficient to lift the rollers slightly from the cams 36, which will eliminate the cam control during this inking stroke and accordingly eliminate any vibration which might result from cam control, and to obtain a uniform speed, finely adjustable, I provide an oil or other liquid cylinder 46 having a piston 47 and piston rod 48 connected to the squeegee head.

Numeral 49 indicates an oil reservoir with a line 50 leading therefrom to the rear end of the oil cylinder 46; the front end of the cylinder being open. And in this line 50 there is a check valve 51 which will permit oil to flow freely from the bottom of the reservoir to the rear end of the cylinder, but will prevent oil from flowing back to the reservoir through this line. Another line 52 leads from the rear end of the cylinder to the top of the reservoir, and a check valve 53 permits oil to flow from the cylinder to the top of the reservoir but not in the opposite direction. And this line is also provided with a needle valve 54 to control the volume flow. Thus it will be apparent that in the forward or non-inking stroke of the squeegee head the oil cylinder has no control whatever, for oil is merely drawn freely into the rear end of the oil cylinder through the line 50, by the vacuum created by the forward movement of the piston 47. But when air is admitted to the forward end of the cylinder 40, for the inking stroke of the squeegee head, the oil will be forced out of the rear end of the cylinder 46 by the piston 47 and must flow through the line 52 to the top of the reservoir. And of course it must flow through the needle valve 54. Thus there is imparted to the squeegee head a uniform motion, and the velocity can be finely regulated by adjusting the needle valve. As previously mentioned, the movement of the head is free of the cams for the rollers have been lifted from contact with the cams.

Numeral 55 refers to an ordinary rubber stamp shaped to decorate plates, dishes and the like, and the stamp is preferably provided with the usual sponge rubber backing 56. As best shown in Figure 9, this stamp may be carried by a rod 57 mounted for vertical adjustment in a bracket 58. Numeral 59 indicates a hollow sleeve in which one end of the bracket 58 is telescopically mounted, and the end of the sleeve is preferably split and provided with clamping screws 60, so that the bracket can be adjusted about its axis and also in and out of the sleeve. Thus the stamp can be adjusted in any direction.

The sleeve 59 is carried by a vertically reciprocable rod or shaft 61 carrying at its lower end a roller 62 riding on the previously mentioned continuously rotating cam 26. The rod 61 is suitably guided for vertical reciprocation in a frame 63 on the table 11, and connected to the upper end of this rod is a piston rod 64 of a cylinder 65. The cam is of course designed to give two strokes to the rod 61 and the stamp operated thereby, the first downward stroke being for the purpose of bringing the stamp into contact with the platen to pick up the gold or other decorating material, and the second downward stroke being for the purpose of bringing the stamp into contact with the plate or other article to apply the decoration. To assist in keeping the roller 62 in contact with the cam, air pressure is admitted to the upper end of the cylinder 65, through a line 66, for the

downward strokes and released for the upward strokes. Suitable timing and valve mechanism (not shown) is provided for this purpose.

In operation, the cam shaft **20** is continuously rotating in the direction indicated by the arrows in Figure 6. Assuming the parts are in the positions shown in Figures 1 and 6, with the platen already inked, the cams **21** and **22** are designed to quickly move the squeegee head and platen forward together, to bring the platen beneath the stamp, so that the parts are in the position shown in Figure 2. Then the cam **26** and pressure in the upper end of cylinder **65** quickly lower the stamp into contact with the platen and the stamp is then lifted by the cam.

As soon as the stamp is lifted, cam **21** is designed to move the platen quickly outward to its withdrawn position, and cams **22** are designed to hold the squeegee head stationary in its advanced position during the outward movement of the platen, so that the parts are now in the position shown in Figure 3. And when the platen is thus moved outwardly, cam **26** and pressure in the upper end of cylinder **65** lower the stamp to apply the decoration to the plate or other article. And, of course, as soon as the plate is decorated the cam **26** lifts the stamp out of the way for the next cycle of operation. The decorated article is removed from the holder **12** and replaced by another article to be decorated.

The outward movement of the platen is rapid and is not an inking operation; though of course some of the gold or other decorating material will be swept across the platen. The squeegee **5** will not exert any particular pressure during this movement of the platen, for it will tend to swing away from its metal backing member **7**.

Now the platen is to be inked, and cam **21** is designed to hold the platen in its withdrawn position while the cams **22** move the squeegee head across the platen, that is, from the position shown in Figure 3 to the position shown in Figure 4.

This movement is relatively slow, and it is of the greatest importance that the platen be coated in preferably a smooth and uniform manner, in order that the articles may be properly decorated. In this movement of course the applicator **6** is in advance of the squeegee **5**, and as the applicator advances it spreads the gold, which it has taken from the pocket, over the surface of the platen, the surface of which may be engraved with closely spaced cross lines, as shown in Figure 5.

The applicator is followed closely by the squeegee during this inking stroke, as shown in dotted lines in Figure 4, and very considerable pressure is exerted by the squeegee in this stroke for it is being firmly held by the metal backing member **7**. In this manner the gold or other decorating material is forced into the minute recesses formed by the cross lines in the face of the platen, and thoroughly wiped.

During this inking stroke it is very important that there be no vibration of the parts such as might be caused by a cam drive, and it is also very important that the travel of the squeegee head be at a uniform speed throughout, rather than accelerated and decelerated, and that it be possible to very finely adjust this uniform speed. This uniform speed, and fine adjustment thereof, without vibration resulting from cam control, are obtained by the air cylinder and oil system, by which the rollers **35** are lifted from the cams **22**, and the control of the oil in the cylinder **46** and

associated parts insures a uniform speed throughout the strike, and this speed can be exactly adjusted by the needle valve **54**, as described in detail hereinbefore.

When the squeegee head reaches the end of its stroke, the platen is inked and one cycle of operation has been completed, with the parts in the position shown in Figure 4, which is the same as Figure 1, and another cycle is started by cams moving the platen and squeegee head forwardly together, to bring the platen again beneath the stamp.

Having fully described the invention, what I claim is:

1. A stamping machine of the character described, including a horizontally reciprocable platen and a horizontally reciprocable squeegee head positioned in operative relation above the platen, a vertically reciprocable stamp positioned above the plane of the platen to cooperate therewith, and operating means connected with the platen and head, said operating means including means for advancing the head and platen together to bring the platen beneath the stamp, means for withdrawing the platen while the head remains stationary, and means for withdrawing the head while the platen remains stationary.

2. A stamping machine of the character described, including a platen, a squeegee head positioned in operative relation above the platen, the platen and head being relatively movable in a horizontal plane, a cam operatively connected with the head for moving the head in one direction, and means connected with the head and independent of the cam for moving the head during its inking stroke.

3. A stamping machine of the character described, including a platen, a squeegee head positioned in operative relation above the platen, the platen and head being relatively movable in a horizontal plane, a cam operatively connected with the head for moving the head on non-inking strokes, an air cylinder connected with the head for moving the head independently of the cam on inking strokes, and an oil system connected with the head and controlling the movement of the head imparted by the said cylinder.

4. A stamping machine of the character described, including a platen, a squeegee head positioned in operative relation above the platen, the platen and head being relatively movable in a horizontal plane, an air cylinder connected with the head for moving the head during inking strokes, and an oil cylinder connected with the head and controlling the movement of the head imparted by said air cylinder.

5. A stamping machine of the character described, including a platen, a squeegee head positioned in operative relation above the platen, means including an air cylinder connected with the head for relatively moving the platen and head in a horizontal plane, an oil system connected with the head and controlling such movement imparted by said air cylinder, and a volume control valve in said oil system to finely regulate the speed of such movement.

6. A stamping machine of the character described, including a platen, a squeegee head positioned in operative relation above the platen, and means for relatively moving the platen and head in a horizontal plane during the inking operation, said means including an air cylinder and an oil cylinder connected with the head, an oil reservoir, a line leading from the reservoir to one end of the oil cylinder, another line leading from the

same end of the oil cylinder back to the reservoir, and check valves in said lines.

7. A stamping machine of the character described, including a platen, a squeegee head associated with the platen, and means for moving the head across the platen in its inking stroke, said means including an air cylinder and an oil cylinder, the piston rods of both cylinders connected with the squeegee head, and the oil cylinder cooperating with the air cylinder to control the movement imparted by the air cylinder.

8. A stamping machine of the character described, including a platen, a squeegee head associated with the platen, a stamp, cams for advancing the platen and head together to bring the platen beneath the stamp and withdrawing the platen from beneath the stamp while the head remains stationary, and means independent of the cam drive for moving the head back across the platen in its inking stroke, said means including an air cylinder and an oil cylinder cooperating with the air cylinder to control the movement imparted by the air cylinder.

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