United States Patent [19]

Funahashi

[11] **3,885,495**

[45] **May 27, 1975**

[54] **STAMPING DEVICE**

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[22] Filed: **Feb. 19, 1974**

[21] Appl. No.: **443,764**

Related U.S. Application Data

[63] Continuation of Ser. No. 283,543, Aug. 24, 1972, abandoned.

[52] **U.S. Cl.** **101/327**; 101/335; 101/380

[51] **Int. Cl.**..... **B41f 31/00**

[58] **Field of Search** 101/368, 369, 405, 406, 101/371, 372, 327, 333, 125, 103, 202, 379, 335, 380

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[57] **ABSTRACT**

A stamping device characterized by an inner frame substantially closed at its bottom end and providing a positive support for an ink storage block and a stamping block disposed thereunder to prevent any appreciable warpage or deformation of those two blocks when the lower surface of the stamping block is pressed against the object on which an impression is to be produced. The inner frame is further provided at the bottom end or wall thereof with an aperture or apertures, and a plurality of grooves communicating with the aperture or apertures. These apertures and grooves serve as passages for an enhanced supply of ink and also as passages for the air flowing down through the inner frame into the ink storage block to thereby push down the ink into the stamping block as the volume of the ink contained in the stamping block decreases. The device is especially useful when used with a continuous stamping machine for a variety of applications.

2 Claims, 4 Drawing Figures

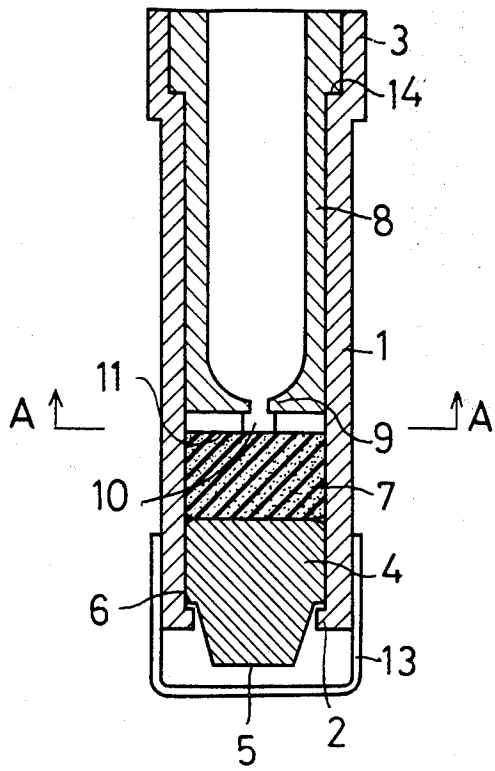


Fig-1

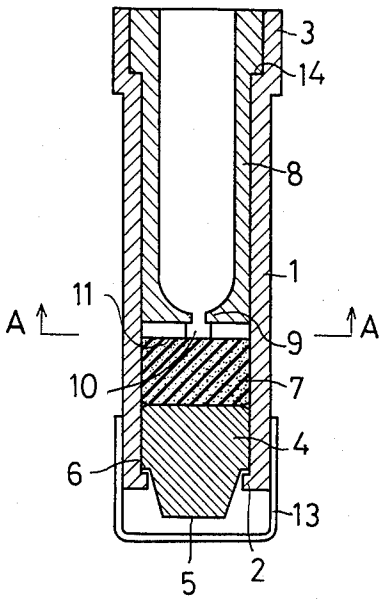


Fig-2

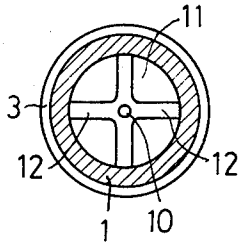


Fig-3

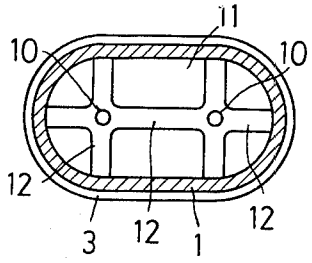
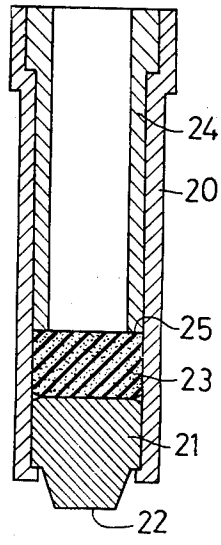


Fig-4



STAMPING DEVICE

This is a continuation application of copending application Ser. No. 283,543, filed Aug. 24, 1972, and now abandoned.

SUMMARY OF THE INVENTION

This invention relates to a stamping device of improved construction adapted for continuous, repeated use.

The typical stamping device known in the art of the type similar to this invention is constructed substantially as shown in FIG. 4 of the accompanying drawings, and includes an ink storage block **23** interposed between a stamping block **21** and an inner frame **24**, all of these three components being enclosed in an outer frame **20**. As shown in the drawing, the ink storage block **23** is held in contact with the inner frame **24** only in a limited area along the lower end **25** of the peripheral wall of the inner frame **24**. As a consequence of such construction, the ink storage block **23** has a serious tendency to extrude upwardly into the bottom opening of the inner frame **24** by a combination of the force exerted downward by the lower end of the inner frame **24** and the force applied onto the lower face **22** of the stamping block **21** during repeated use of the device. This inevitably causes the stamping block **21** to become deformed in a similar manner, resulting in the production of a deformed, unclear impression.

This invention eliminates the above-mentioned drawbacks of the stamping device known in the art, and provides an improved stamping device of rigid construction having an ink storage block and a stamping block supported in such a manner that neither the ink storage block nor the stamping block is liable to undergo any appreciable warpage due to the pressure applied onto the bottom surface of the stamping block during the continuous and repetitive use of the device for producing impressions.

It is another object of this invention to provide a stamping device characterized by a uniformly even permeation of ink from the ink storage block into the stamping block which ensures the production of uniformly clear impressions devoid of any noticable thinness, line breakage, obscurity or variations in color density during a continuous stamping operation conducted with a rapid rate.

It is still another object of this invention to provide a stamping device which is very easy to install on a stamping machine, and which is also replenished with ink whenever necessary during the stamping operation.

It is a further object of this invention to provide a stamping device having an aeration hole and a plurality of radially extending grooves formed in the bottom of the inner frame through which air flows down into and permeates the ink storage block to ensure effective replenishment of the stamping block with ink.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a vertical cross-sectional view of a form of the stamping device according to this invention;

FIG. 2 is a cross-sectional view taken along the plane A — A of FIG. 1;

FIG. 3 is a transverse cross-sectional view, similar to FIG. 2, of another form of the stamping device according to this invention; and,

FIG. 4 is a vertical cross-sectional view of a typical form of the stamping device known in the art.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 2 of the drawing, a form of the stamping device according to this invention includes a generally cylindrical outer frame **1** which is open at both ends thereof, and which is preferably made of an ABS (acrylonitrile-butadiene-styrene) resin or any other material that is not readily corroded or otherwise damaged by ink. The outer frame **1** is formed at the lowermost end thereof with an inwardly projecting annular flange **2**. The frame **1** includes a relatively short portion **3** of increased diameter formed at the upper end thereof, whereby both the inner and outer surfaces of the peripheral wall of the frame **1** are stepped to provide upwardly and downwardly facing annular shoulders, respectively. The downwardly facing or outer shoulder provides means for connecting the device in a stamping machine.

A stamping block **4** is generally enclosed in the lower end portion of the outer frame **1**, and has a generally tapered or frusto-conical lower portion extending through the lower end opening of the outer frame **1**. The larger end of the frusto-conical portion of the stamping block **4** is slightly smaller in diameter than the remaining or upper portion of the block **4**, thereby forming an annular shoulder **6** facing the upper surface of the flange **2** of the outer frame **1**. When the device is pressed down against a sheet of paper, the shoulder **6** abuts against the flange **2**, and is locked in the outer frame **1**. The smaller or lower end of the frusto-conical portion of the stamping block **4** provides a surface **5** on which letters, numerals and/or any other symbols are engraved. The stamping block **4** may be made of rubber or any other suitable material of the porous nature. An ink storage block **7** is positioned above the stamping block **4** in such a manner that the lower surface of the block **7** is substantially in full contact with the upper surface of the block **4**. The ink storage block **7** may be made of felt, a polyvinylformal sponge or any other suitable material that has a large capacity for absorbing and retaining ink, and yet permits free flow of the ink for subsequent transfer into the stamping block **4** as required.

A generally cylindrical inner frame **8** is fitted in the outer frame **1**, and longitudinally extends between the upper end of the outer frame **1** and the upper surface of the ink storage block **7**. The inner frame may be made of any suitable material, such as an ABS resin, that is not easily corroded or otherwise damaged by ink. The inner frame **8** is fully open at the upper end thereof, and has a relatively small aperture **10** formed in the center of the lower end thereof. The aperture **10** serves a passage for both the ink which has been supplied into the inner frame through the upper end opening thereof, and the air which flows down through the inner frame **8**. The bottom wall **9** of the inner frame **8** is generally flat on the underside **11** thereof, and has a gradually decreasing thickness toward its inner or central edge or aperture **10**, thereby forming a rounded inside corner in the region where the bottom wall **9** of the inner frame **8** joins the side wall. It will be seen that such configuration of the lower end portion of the inner frame **8** ensures a smooth flow of the ink which has been supplied to replenish the ink storage block **7**, down the inner surface of the inner frame **8** into the aperture **10**. A plurality of radially extending grooves **12**

(four in FIG. 2) are formed in the underside 11 of the bottom wall 9 of the inner frame 8 so as to communicate with the aperture 10. The inner frame 8 is secured in position in such a manner that a shoulder 14 at the upper end of the inner frame 8 rests on the inner shoulded of the outer frame 1 where it is bonded or otherwise secured thereto, while the bottom wall 9 rests on the ink storage block 7. A cap 13 covers the lower end of the outer frame 1.

In the form of the device as hereinabove described, it will be observed that as the ink which initially is contained in the stamping block 4 decreases in volume during the continuous use of the device, air flows through the aperture 10 and the grooves 12 to the upper surface of the ink storage block 7, and gradually permeates through the block 7 to ensure effective and even transfer of the ink from the ink storage block 7 to the stamping block 4 to properly wet the lower surface 5 of the stamping block 4 to produce clear and uniform impressions continuously. When an additional supply of ink is added through the upper end opening of the inner frame 8 to replenish the device, the ink flows through the aperture 10. A portion of the ink is absorbed in the central portion of the ink storage block 7 immediately below the aperture 10, and a greater part of the ink flows through the grooves 12 to every other part of the block 7. The ink storage block 7 and the stamping block 4 are formed of materials, including a few as hereinbefore mentioned for exemplary purposes, that will allow the ink to quickly permeate the ink storage block 7, and then pass uniformly into the stamping block 4 to maintain the lower surface 5 evenly. Therefore, the present invention is uniquely able to receive and store additional ink at appropriate intervals to maintain the face 5 in a continuously operative condition.

If the stamping block 4 has an imprint of larger size, and is typically rectangular to accommodate larger or more letters, numerals or other symbols, it is useful to include two or more spaced apertures 10 as shown in FIG. 3. When two or more apertures are incorporated, an enhanced network of grooves 12 are formed on the underside 11 of the bottom wall 9 in communication with the apertures 10 to ensure wide distribution of ink over and into the stamping block 4.

The stamping device according to this invention as hereinabove described in its preferred form has several significant features and advantages. For instance, the bottom end of the inner frame 8 is closed except at the centrally located relatively small aperture. The inner frame provides a generally flat surface for supporting the ink storage block 7 which support is significant when the bottom surface 5 of the stamping block 4 is pressed against a surface to transfer an image. This configuration prevents warpage or deformation of the ink storage block 7 and the stamping block 4 that had previously been unavoidable with stamping devices known in the art.

Another important factor is that air flows from the inner frame 8 through the aperture 10 and into the grooves 12 to permeate the ink storage block 7. The air flow exerts a uniform pressure (equal to atmospheric pressure) on the ink in the storage block 7. This air pressure forces the ink into the stamping block 4 as the volume of the ink decreases to maintain the lower surface 5 of the stamping block 4 uniformly wet for the continuous and high speed imprinting.

The bottom inside end of the inner frame 8 has a generally tapered inner surface terminating around the edge of the aperture 10 to ensure a smooth flow of ink into the aperture 10 without a surge when the device is replenished with ink.

The ink storage block 7 distributes the ink uniformly at its face when the ink is introduced through the inner frame 8. In fact, the device can be used continuously if ink is periodically introduced into the inner frame at selected intervals.

The foregoing constitutes a description of the preferred embodiment, the scope of which is determined by the claims which are as follows.

I claim:

1. A stamping device adapted for continuous and high speed operation comprising:

a cylindrical outer frame open at upper and lower ends, and having an inwardly directed flange at its lower end, and an annular shoulder on its upper end on the interior thereof;

a generally mating inner frame received in said outer frame and defining a hollow cavity therein for receiving and holding ink, said inner frame having an open upper end for receiving ink therethrough, and an annular shoulder on its upper outer wall which is complimentarily shaped to said annular shoulder on said outer frame, and a transverse bottom wall provided with an inwardly and downwardly inclined inner surface defining the bottom of said hollow cavity;

aperture means opening through said groove means on the face of said inner surface communicating with said aperture means;

ink storage means formed of porous materials and received adjacent to said aperture means for storing ink;

stamping means formed of porous material and disposed beneath said ink storage means, supported on said flange of said outer frame, and having an exposed face projecting downwardly below the under surface of said flange of said outer frame and adapted to be wetted by ink from said ink storage means; and,

wherein said outer frame includes an outer annular shoulder adjacent to said inner annular shoulder on the exterior thereof, said outer annular shoulder providing means for connecting said device with a stamping machine.

2. The apparatus of claim 1 wherein said stamping means is contacted with said ink storage means and has a frustoconical lower portion projecting downwardly through said lower end of said outer frame and adapted to be wetted by ink from said ink storage block, and a downwardly facing annular shoulder is formed between said upper and lower portions of said stamping block and above said flange of said outer frame and engageable with said flange of said outer frame to hold said stamping block in position.

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