June 25, 1968 R. LORENZ ET AL 3,389,655

VIBRATING SCRAPER FOR INKING INTAGLIO PRINTING MOLDS WITH DRY POWDER

Filed March 6, 1967 2 Sheets-Sheet 1

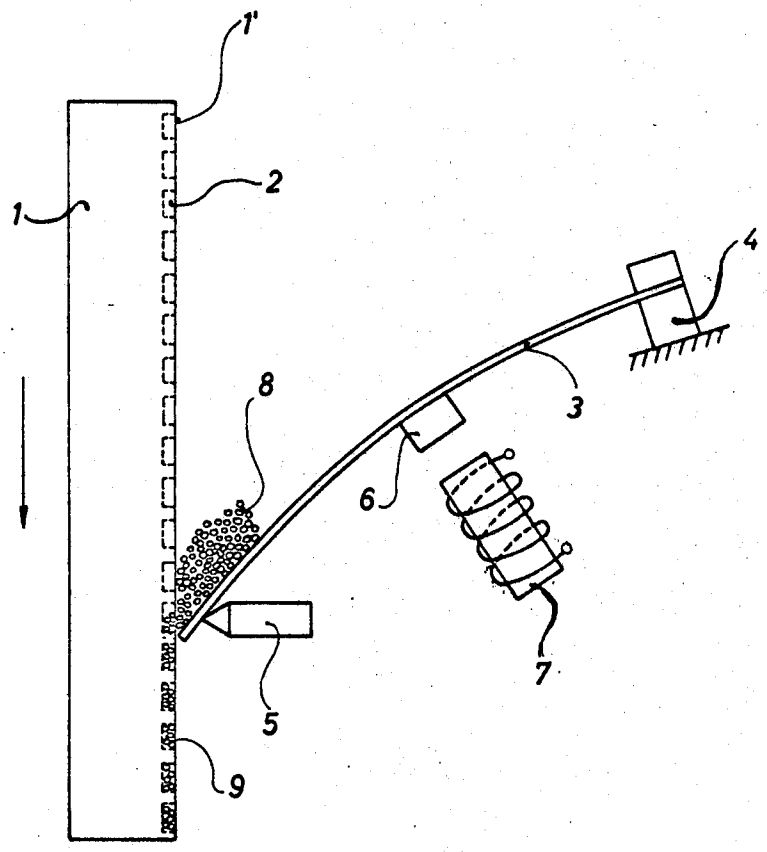


Fig.1

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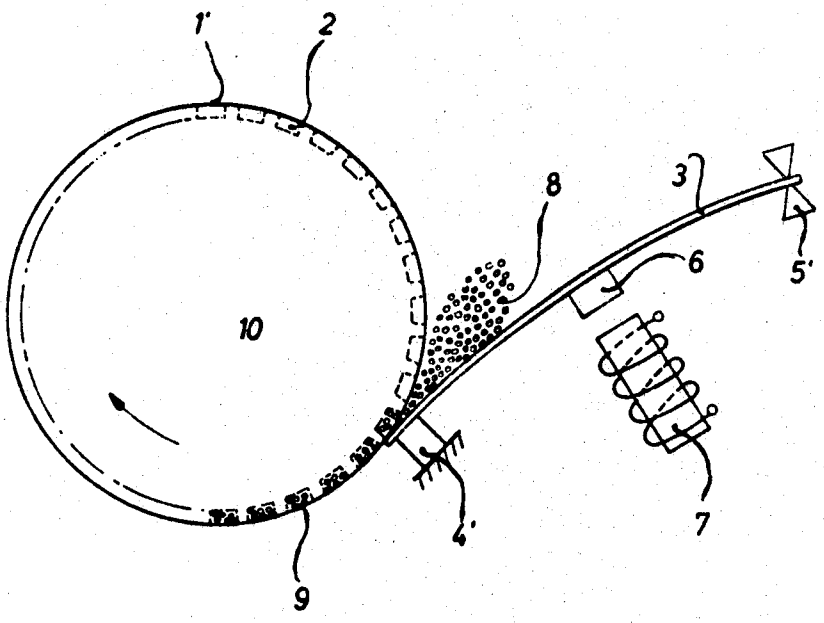


Fig.2

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VIBRATING SCRAPER FOR INKING INTAGLIO PRINTING MOLDS WITH DRY POWDER

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1 Claim. (Cl. 101—157)

ABSTRACT OF THE DISCLOSURE

This disclosure relates to a device for dry powder inking a printing mold. A mechanically or electromechanically vibrated plate is aligned with the face of the mold to define a wedge shaped cavity for containing the powder. As the mold passes the edge of the plate the vibrations force the powder into the ink receiving recesses of the mold.

In various processes of printing and inking technology, for example, in applying surface layers, intermediate carriers are frequently employed for transferring the material concerned, the transferring surfaces of which carriers are provided with depressions for the temporary accommodation of the material to be transferred. These depressions are preferably, but not exclusively made by etching. They either have the form of dots and dashes, if it is desired to transfer the material to selected areas only, or they are all uniform and correspond to the apertures of a ruled screen, if material has to be transferred uniformly to extensive surfaces. By the predetermined depth of said depressions the quantity of material to be transferred can be accurately proportioned. Known examples of these usually cylindrical intermediate carries are intaglio-printing cylinders or feed rollers for applying layers to strips of paper. In the case of liquid paints or layer material inking of these rollers does not involve difficulties. The roller is partly dipped into a bath of ink and after it is withdrawn, all material lying on the elevated surface parts between the depressions is wiped off by a doctor blade. In many technical problems it is desirable to transfer dry powdery or dust-like inks or paints by means of such a device. Examples thereof are the inking devices and developing devices in electro-static printing apparatus. The powders to be transferred may have granular sizes lying between about 20μ and less than 1μ. Therefore, these powders are not free fluids, even in the dry state; their gradient is, in all cases, 90°. The rheological behavior of such a mass of powder is not defined. In order to charge an intaglio-printing mold with such powder it is usually necessary to rub it into the depressions, which takes a long time.

The invention provides a simple device for a rapid application of dry powder to an intaglio-printing mold. According to the invention this device is characterized in that a sheet caused to perform rapid bending vibrations forms a wedge-like gap adapted to receive the powder with the profiled, flat or cylindrical printing surface adapted to move towards the point of the wedge.

The vibratory energy imparted to the powder continuously disturbs the stable structure of the powdery mass, which is otherwise formed so that the possibility of flow under the action of gravitational forces is restored. With rates of movement of the mold up to 1 m./sec. a vibration frequency about 100 c./s. has proved to be effective.

The invention will be described in greater detail with reference to several preferred embodiments thereof illustrated in the accompanying drawing, in which:

FIG. 1 illustrates diagrammatically a flat surfaced intaglio-printing mold having ink transferred thereto in accordance with the instant invention and

FIG. 2 illustrates diagrammatically a cylindrical intaglio-printing drum having ink transferred thereto.

As is shown in FIG. 1 the mold **1** to be inked, having empty depression **2** on its surface **1'**, is moved perpendicularly in downward direction. The guide members and the transmission means are not shown, since they are of the conventional type. A vibrating planar member in the form of a sheet **3** is arranged at an angle of about 30° to the mold. The thin plate of sheet iron is fastened at two places; one of them has to be such that the sheet is rigidly secured, whereas the other connection has to allow a movement of the sheet in its plane. In FIG. 1 the upper fastening place **4** is the rigid connection, whereas the lower fastening place **5** has the form of a unilateral counter-bearing.

The bearing point is located only at a small distance from the lower end of the sheet **3**, which is in contact with the surface **1'** of the moving mold **1**. Even without being energized, the sheet **3** is held in a slightly curved state by the position of the upper connection **4**. At the centre, on the lower side, the sheet is provided with the device producing the vibrations. The vibrations may be produced by known mechanical means or, as in this case, by electro-magnetic means. For this purpose a closing piece for the magnetic flux **6** is provided. At a distance slightly greater than the maximum desirable vibration amplitude a bipolar U- or E-shaped magnet **7** is energized by an A.C. coil. The advantage of magnetic excitation resides in the case of control of the vibration amplitude.

With the fastening of the vibration sheet shown the lower end performs, when energized, reciprocatory rubbing movements on the mold. The form of the grate on the moving mold surface **1'** has to ensure that the vibrating sheet is always engaged by a few of the elevated wall sections surrounding the depressions **2** which define the grate. The vibrations of the sheet continuously move the dry powder **8** in the wedge between the sheet and the mold and it is continuously supplied to the narrowest portion of the wedge-like gap, so that the depressions **9** are filled by the catching effect of the moving mold. If necessary, a wiper (a scraper) (not shown) may be arranged after the filling device, so that occasional powder on the elevations is removed. With a suitable adjustment of the vibrating sheet this wiper is not necessary for most filling substances. Without an energization of the vibrating sheet the powder accumulates in the wedge between the two surfaces to a stable mass, which leaves a narrow air gap for the moving mold, so that the depressions are not filled.

The form of fastening of the vibrating sheet described above is not the only method. Good results in inking intaglio-printing molds by dry powders are obtained, when the places of the rigid connection and of the resilient connection of FIG. 1 are interchanged.

Such an arrangement is shown in FIG. 2. The mold with the depressions **2** and the surface **1'** has the form of a rotating cylinder **10**. The vibrating sheet **3** is again curved slightly at an angle of about 30° to the tangential plane of the cylinder **10** so that its lower end touches the cylinder slightly below the level of the axis. The cylinder rotates in the direction of the arrow. The lower connection **4'** fairly close to the lower end of the vibrating sheet **3** forms a rigid hold and the lower end of the vibrating sheets slides like a scraper along the rotating cylinder. The upper connection **5'** forms a resilient bearing. The device for producing the vibrations, formed by the parts **6** and **7**, is similar to that shown in FIG. 1. The dry pow-

der **8** is also accommodated in the wedge-like space between the cylinder and the vibrating plate and when the cylinder rotates the depressions **9** leave the device in the filled state, when the vibrating sheet **3** is energized. At the free periphery of the mold cylinder **10** there may be supposed members and materials (not shown) to which the material from the depressions has to be transferred.

What is claimed is:

1. A device for inking a profiled printing surface comprising: a thin elongated member disposed at an acute angle with said profiled printing surface, a rigid support attached to an end of said member, an additional support adjacent the other end of said member, one of said supports locating one of said ends adjacent said profiled printing surface, a powdered ink disposed in the acute angled wedge-shaped area defined by the intersection between said member and said profiled printing surface, and means inducing said member to vibrate in a direction substantially normal to the elongate surfaces of said member, said vibration causing said end of said member adjacent said profiled printing surface to perform a reciprocatory rubbing movement against said profiled printing surface thereby forcing said powdered ink onto said profiled printing surface.

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