March 18, 1952 A. SCHALLER 2,590,044

FRANGIBLE PLATE SECURING MEANS FOR BED AND CYLINDER PRINTING MACHINES

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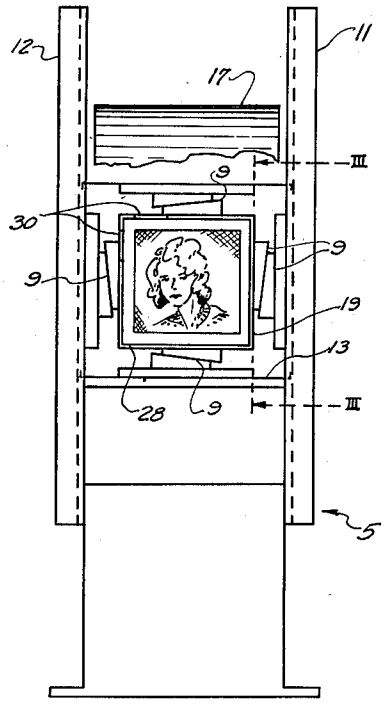


Fig. 1

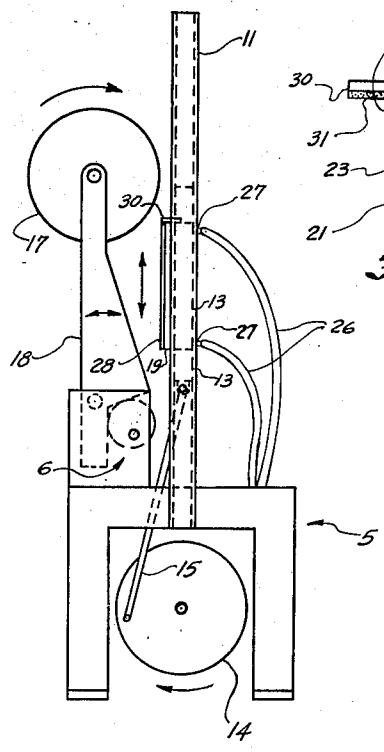


Fig. 2

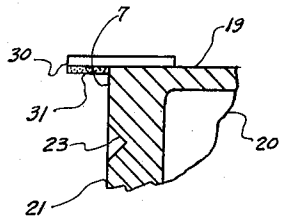


Fig. 7

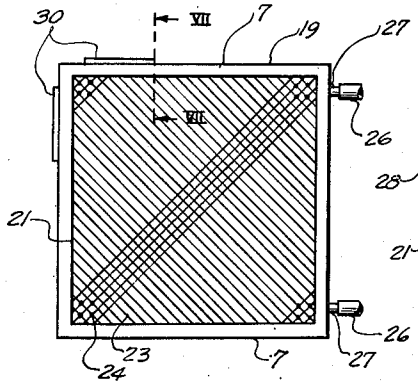


Fig. 4

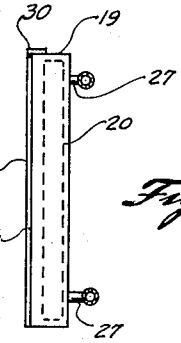


Fig. 3

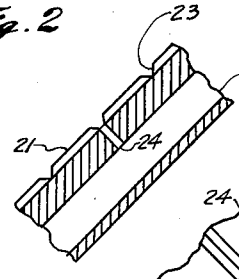


Fig. 6

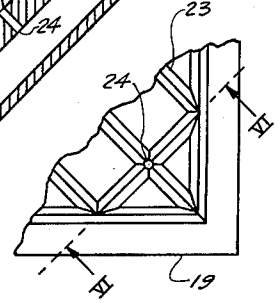


Fig. 5

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FRANGIBLE PLATE SECURING MEANS FOR BED AND CYLINDER PRINTING MACHINES

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1 Claim. (Cl. 101—250)

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This invention relates generally to letter press printing apparatus, that is, apparatus utilized for printing pictures and the like by firmly pressing a sheet of suitable material, such as paper, against an inked image plate. Usually this method of printing is carried out through the use of a machine having a rigid image plate mounting part or block and a sheet feeding and pressing device or roll, the roll and image plate mounting block being relatively movable with respect to each other and coacting to press a sheet of paper, or the like, firmly against the inked image plate during the relative movement of these parts.

More particularly, the present invention is directed toward and has as an object the provision of an improved image plate mounting block suitable for use in such a machine in combination with a relatively inexpensive image plate.

In general, most of the inexpensive image plates are usually made of glass, or some other relatively rigid, brittle, plastic material suitable for the purpose. The use of such plates in the type of machines above mentioned has not been entirely satisfactory, due to excessive plate breakage generally attributable to the inability of the operator to correctly position and rigidly secure such a plate on the forms of machine mountings heretofore available. Therefore, another object of the present invention is to provide a contact printing machine with an improved image plate mounting block, enabling the operator to correctly position and secure a brittle image plate thereon with a minimum of time, effort, and skill.

A construction capable of affording one or both of the aforementioned objects necessitates the use of a plate mounting block which will enable even an inexperienced operator to quickly and correctly position an image plate thereon, and which includes a suitable means for automatically holding the image plate pressed firmly against a face of the block with a substantially uniform application of force at all points. However, it has been found that in machines suitable for this type of printing, the movement of the block and plate relative to the press roll, or equivalent device, together with the inherently present torque and vibration invariably results in image plate creep, that is, a movement of the image plate relative to the block irrespective of the degree of force acting to press the plate against the block. The direction of this inherent creep is determined by the direction of the resultant of the forces acting on the image plate due to the relative movement, torque, and vibration hereinbefore mentioned. And once the direction of this resultant force, and therefore the direction of the inherent creep, is ascertained for a particular machine, it has been found that it always remains substantially the same. Consequently, another object of the present invention is to provide a contact printing machine with an image plate mounting block which entirely eliminates the effect of inherent creep, without in any manner interfering with the ease with which an image plate can be removed therefrom or correctly positioned thereon.

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Moreover, the plain block engaging face of a relatively inexpensive image plate is not usually an absolutely plane surface, and if such a plate is pressed against what might be termed a generally planographic face of such a block with some force, even though uniformly applied to such face, a slight amount of creep results in flexing of some portions of the plate relative to other portions thereof, which in turn sets up unequal stresses of sufficient magnitude to cause breakage of the plate when it is subjected to the vibration of the machine or to the additional force exerted thereagainst by the press roll. Therefore, another object of the present invention is to provide a contact printing machine with an image plate mounting block which entirely eliminates the effect of creep, and which holds an image plate pressed firmly against the face of the block with a non-destructive degree of force uniformly applied to the effective block opposed surface of the image plate.

The construction, application, and operation of apparatus for accomplishing one or more of the aforementioned objects will become readily apparent as the disclosure progresses and particularly points out additional objects and advantages with those features considered of special importance. Accordingly the present invention may be considered as comprising combinations of elements and parts constructed and correlated as hereinafter more fully set forth in the detailed description, and as pointed out in the appended claim, reference being had to the accompanying drawing illustrating but one embodiment of the invention, and in which:

Fig. 1 represents a front view of a contact printing machine with a portion of the press roll broken away to better show the image plate and its relative position in the machine;

Fig. 2 represents a side view of the contact printing machine shown in Fig. 1;

Fig. 3 represents a side view of the vacuum mounting block with the image plate in place

thereon, this view being taken generally along line III—III of Fig. 1;

Fig. 4 represents a front view of the mounting block shown in Fig. 3 with the image plate removed;

Fig. 5 represents an enlarged view of a corner portion of the mounting block;

Fig. 6 represents a sectional view of a portion of the mounting block taken generally along line VI—VI of Fig. 5; and

Fig. 7 represents a view in enlarged fragmentary section of the mounting block taken generally along line VII—VII of Fig. 4.

Referring particularly to Figs. 1 and 2, a contact printing machine designated generally by numeral 5 has upwardly extending parallel channel-shaped members 11 and 12 which serve as guides for a reciprocably mounted frame 13 given a reciprocating motion, as indicated in Fig. 2, by means of a driven wheel 14 and a pitman link 15 operatively connecting the wheel 14 with the frame 13. A press roll 17 is rotatably supported in adjacent side opposed relation to frame 13 by means of a pivotally mounted support 18 adapted to be actuated toward and away from frame 13 through the action of a suitable cam or other mechanism forming part of the machine and designated 6. The specific construction of the contact printing machine herein illustrated and briefly described above forms no part of the present invention, and since machines of this type are well known in the art, the form illustrated being commonly termed Miehle Vertical, it is believed that a more detailed description of this machine is unnecessary for a complete understanding of the invention.

An image plate mounting block 19 is fixedly removably secured to a reciprocable frame 13 for movement therewith by any suitable means, such as by wedge-shaped quoins 9, this mounting block comprising a rigid hollow structure forming a vacuum chamber 20 and presenting a plane surfaced marginal image plate engaging edge 7 and a rigid image plate engaging face or surface 21 provided with grooves 23 formed therein as shown in Fig. 4. As a result, portions of the image plate engaging surface of the block, that is, a portion extending diagonally from one corner to another, as well as each of the two remaining corner portions, are provided with intersecting grooves. Spaced openings 24 extend through corner portions of the image plate engaging surface or face 21 (sometimes termed a planographic surface) and terminate at the intersection of some of these grooves, thereby placing the bottoms of the grooves in communication with vacuum chamber 20. Block 19 is provided with vacuum chamber outlet connections 27 having flexible hoses 26 connected thereto, and with a pump or other suitable device (not shown) for withdrawing air from chamber 20 when the machine is in operation.

The edges of the block 19 forming the upper left hand corner thereof are provided with stops 30 which may be secured to the block in any suitable manner and extend a slight distance above the marginal edge of the image plate engaging surface, that is to a distance somewhat less than the thickness of the image plate. Referring to Fig. 7, it will be seen that the image plate engaging portions of stops 30 are covered with a slightly resilient material 31, such as sponge rubber or leather (the latter being found preferable). This resilient material is adapted to engage the edge of the image plate and functions to prevent

a destructive chipping or breaking of such edges, attributable at least in part to the vibration inherently present in a contact printing machine.

Since glass plates have slight irregular margins the leather or other cushion material in reality provides a plurality of contact points against which the plates bear.

In operation, air withdrawn from vacuum chamber 20 through the flexible hoses 26, and an image plate 28 is placed over the face portion 21 of block 19 with marginal edge portions of the plate engaging the plain block surfaces 7 and with a pair of adjoining corner-forming edges of the plate in contact with the resiliently covered stops 30. The openings 24 serve to withdraw air from the groove-formed spaces beneath the image plate, thereby subjecting the block opposed face of such plate to a partial vacuum or negative pressure, which, in turn, results in the image plate being firmly pressed and held against the block with a uniformly distributed application of force. If desired, block surfaces 7 may be coated with any suitable substance, for example, grease, to better pneumatically seal the engaged marginal edge portions of the plate and block. Frame 13 is vertically reciprocated within guides 11 and 12 through the action of pitman link 15, and as frame 13 starts upward, support 18 and thereby press roll 17, is moved away from the frame through the action of the mechanism 6. Consequently, press roll 17 remains out of engagement with image plate 28 during the upward movement of frame 13. However, as frame 13 begins its downward movement support 18 and press roll 17 are moved toward frame 13, and as the image plate 28 (which has been inked prior to or during its upward movement) moves past press roll 17, any paper or other suitable print receiving material on roll 17 is pressed firmly against image plate 28, thereby impressing a print of such image on the sheet of print receiving material carried by the roll. The movement of frame 13 and image plate 28 relative to press roll 17 effects a rotation of the latter sufficient to eject the sheet of print receiving material from the lower portion of the press roll as frame 13 continues its downward movement.

The movement of image plate 28 relative to press roll 17, as above described, together with the torque and vibration inherently present in a contact printing machine, produces image plate creep, as hereinbefore pointed out. And it has been found that although the rate of creep may vary generally as a function of vibration and of the applied force acting to hold the image plate pressed firmly against the block, it has also been found that some degree of image plate creep will actually take place irrespective of the degree of force applied thereto. As previously indicated, the direction of creep may vary in different machines, but once it has been ascertained for a given machine it will remain substantially the same. And although it may be possible to mathematically calculate the direction of creep for any given machine, the direction of such creep may be readily ascertained simply by mounting image plate 28 on the block 19 and operating the machine for a short interval of time sufficient to determine the general direction plate 28 moves relative to the block. From such an observation stops 30 can then be readily secured to adjoining edge portions of block 19 in a position effective to entirely eliminate the aforementioned creep. And in this connection it should be obvious that the aforementioned procedure permits

the creep preventing stops to be readily accurately located by persons having only a slight degree of skill. In the particular machine hereinabove illustrated and described, the direction of creep was found to be generally in the direction of a diagonal extending across the face of the block from the lower right hand corner toward the upper left hand corner thereof. And while such a location of the stops may be satisfactory for most Miehle Vertical machines, it must be borne in mind that the direction of creep is likely to vary in different machines and should be accurately determined and the stops applied to the mounting block in accordance with the procedure hereinabove outlined.

As previously indicated, the present invention is directed toward and contemplates a construction which permits an image plate to be readily mounted and retained on the generally plane surface portions of a mounting block or other machine part in correctly positioned relation thereon, which permits ready removal of such a plate and the substitution of another plate therefor disposed in exactly the same position on the mounting block as the first mentioned plate, which entirely eliminates the destructive breaking or chipping of the stop engaged edge portions of brittle image plates, and which permits the practical commercial use of relatively thin, inexpensive image plates. In this connection it should be noted that the invention also contemplates a construction permitting the use of a generally plane and but slightly flexible image plate, irrespective of whether the plate is formed of a material subject to breakage by a non-uniform distribution of the applied force acting to hold the plate pressed against the face of a mounting block or other suitable surface, and affording a uniformly distributed applied force insufficient to effect an image distorting flexing of the plate attributable to opposed noncoplanar surface portions of the plate and block.

The invention is of particular advantage in making color prints by successively superimposing different colored images on the same sheet of print material, but it is also of general application and of particular advantage in carrying other printing operations in that it permits the machine to be readily set up for a run of prints with a minimum of time, effort, and skill. It should therefore be understood that the structure herein shown and described illustrates but one practical application of the present invention and

that, depending on whether it is desired to attain only some or all of the advantages hereinabove pointed out, numerous modifications of the structure hereinabove referred to may be made by persons skilled in the art without departing from the spirit of the present invention and without exceeding the scope of the appended claim.

What is claimed is:

In a contact printing machine having a reciprocating carriage mechanism cooperating with an impression roller carrying a sheet of material to receive an impression from an inked image plate on said carriage, an image plate mounting block secured to the carriage, said block comprising a rigid face portion with spaced openings therein, a vacuum chamber operatively connected with said face portion by means of said openings, an image plate of frangible material adapted to be positioned in abutting relation to said face portion, means for maintaining a vacuum within said chamber and between said image plate and said face portion to hold said plate thereto, stop members secured to said mounting block and having portions extending above the plane of the plate supporting face of the block but terminating below the image carrying face of said plate and adapted to engage the edges of the image plate, and cushioning material interposed between the plate engaging portions of the stop members and said plate, said stop members being positioned on said block to engage the image plate at points to inhibit the inherent tendency of the plate to creep relative to the block under the influence of repeated impression contacts between the plate and said roller.

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