May 20, 1930. F. M. ALLEN 1,759,476

WORK SUPPORTING MEMBER FOR PRINTING MACHINES

Original Filed Sept. 10, 1927

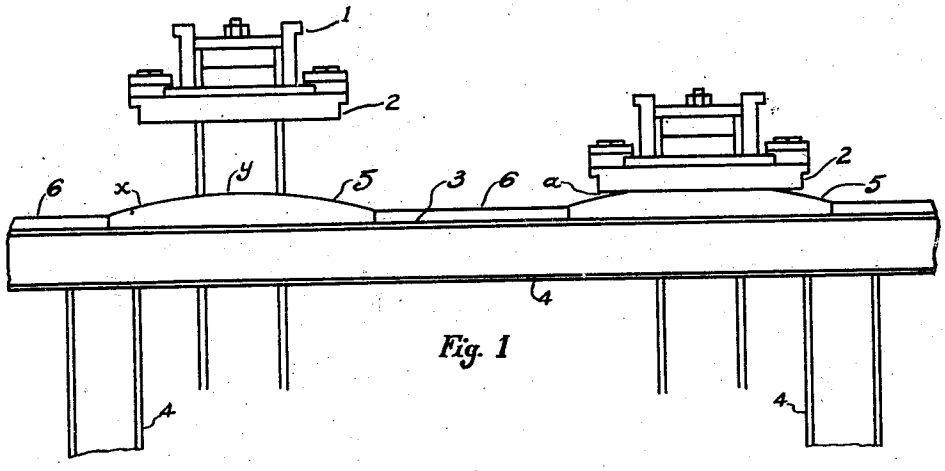


Fig. 1

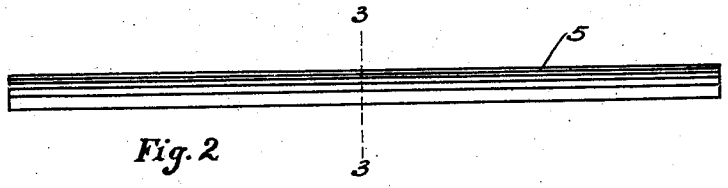


Fig. 2

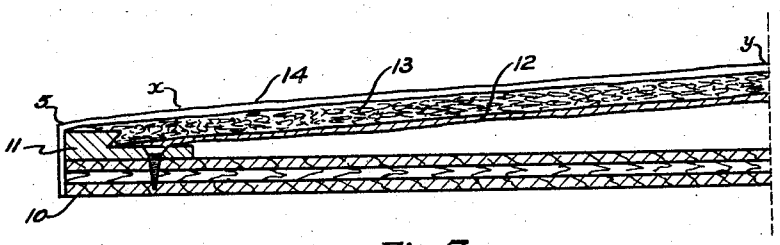


Fig. 3

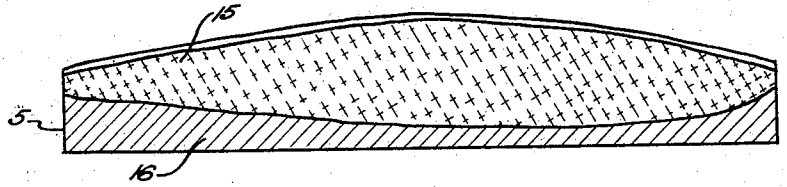


Fig. 4

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UNITED STATES PATENT OFFICE

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WORK-SUPPORTING MEMBER FOR PRINTING MACHINES

Refiled for abandoned application Serial No. 218,636, filed September 10, 1927. This application filed March 21, 1930. Serial No. 437,647.

This invention relates to printing machines, and more particularly to printing machines of the bed-and-platen type as described and claimed in the Waldron Patent No. 1,145,821.

Printing machines of the type referred to, comprise, in general, a set of platens carrying printing blocks, which are adapted to be reciprocated by suitable mechanism to impress a design upon a base material as it is conveyed step by step through the machine over the bed and work-supporting members. In the present-day machines, the work-supporting members consist of flat pads each having a wood backing and a top of wool felt of uniform thickness, covered with oilcloth or similar material. The pads are suitably cradled in the framework of the print machine beneath the set of platens, the felt faces being adapted to provide flat, compressible work-supporting surfaces, against which the print blocks may abut without injury to their printing surfaces. Intermediate the work-supporting members or pads, and in a plane therewith, are wood or steel plates, forming with said pads a continuous flat bed over which the work is conveyed. As the flat print block is brought into association with the work supported by the flat felt pad for the purpose of depositing paint thereon, or for flattening or "mashing" the paint previously deposited, a strong cohesive relation is set up between the print block and the work, whereby the raising of the print block from the printed surface is opposed with great resistance. This effect is particularly noticeable when a relatively heavy layer of paint is being deposited, as, for example, when decorating hard-surfaced floor coverings with a film of paint of sufficient thickness to form a wearing surface. In consequence, the work is slightly raised from the work-supporting member by the suction of the block, until the opposing forces break the bond and the work is suddenly torn from the block. Frequently this results in spattering the paint and in many instances the paint is raised in pits and points so that the work has an uneven and rough appearance. With relatively slow reciprocation of the platens and blocks, this defect, while apparent, is not serious, but as the speed of operation is increased, the defect becomes most serious and functions as one of the chief factors in limiting the printing capacity of the machine.

The chief object of my invention is to provide a novel work-supporting member for print machines of the bed-and-platen type, which is of simple and durable construction and which is adapted to substantially eliminate the defect outlined above and to permit an increased speed of operation.

In the accompanying drawings, forming a part of this specification:

Figure 1 illustrates a portion of a conventional bed-and-platen print machine, embodying the novel work-supporting members constructed in accordance with the principles of my invention;

Figure 2 is a longitudinal elevation of said work-supporting members;

Figure 3 is an enlarged sectional elevation taken on the line 3—3 of Figure 2;

Figure 4 is a sectional elevation of a modified form of work-supporting member likewise embodying the principles of my invention.

Referring to the drawings:

1 designates the platens of a bed-and-platen type print machine, carrying the flat print blocks 2. Beneath the platens and forming a continuous surface over which the work to be printed is conveyed step by step through the machine, is the bed 3 supported by the framework 4. The bed consists of pads or work-supporting members 5 positioned beneath each platen and intermediate members or plates 6 of metal or wood. Preferably, the pads or work-supporting members 5 are removably cradled in the frame 4, whereby they may be easily replaced in case of wear or damage.

According to the principles of my invention, the pad or work-supporting member 5 is of resilient construction having a work-supporting surface which is normally convexed and which is adapted to be flexed under the pressure exerted by the print block during the printing operation to form a substantially flat work-supporting surface. In Fig-

ures 2 and 3, I have shown a preferred form of construction of work-supporting member or pad. Such pad comprises a backing member 10 of laminated wood slightly greater in surface area than the surface area of its corresponding print block. Along each upper longitudinal edge of the member 10 and attached thereto are grooved metal strips 11 adapted to support and retain a normally convexed spring steel plate 12. The relation of the plate 12 to the retaining members 11 is such as to permit free flexing movements of the former, while preventing any substantial lateral movement thereof. Over the plate 12 is a thick layer of felt 13 adapted to provide a relatively soft surface against which the print block may abut without injury to the printing surface thereof. Preferably, the felt is covered with a good grade of oilcloth 13 providing a surface of low friction, over which the work may pass.

The amount of convexivity of the pad 5 and the spring plate 12 may be somewhat varied according to conditions, but I have found that when the width of the pad is about 20″, the best results are obtained if the center point y is approximately $\frac{3}{16}$″ to $\frac{5}{16}$″ above the edge points x, when the pad is in normal position and free from all pressure. As regards the resilience of the pad and plate member 12, the force required to flex the pad flat or into a plane with the surface of the print block, should, in all events, be comparable with the normal downward pressure exerted by the blocks and platens during the printing operation. I have found it most desirable that the force required should be considerably less than such printing pressure, in order to insure a complete flexing of the pad to conform with the surface of the print block. Preferably, the plate 12 is so tempered as to exert a substantially uniform upward pressure over its entire surface when flexed to a flat work-supporting surface, so that a uniform impression of the print block is obtained.

In Figure 4, I have shown a modified form of resilient convex work-supporting member, consisting of a sponge rubber block 15, suitably cradled in the supporting member 16. The sponge rubber block is preferably moulded in such double convex form as to exert a uniform upward pressure when the work-supporting surface is compressed by the print block to the plane thereof. Other suitable compressible elastic material may be substituted for the sponge rubber if desired.

In the operation of a bed-and-platen type printing machine embodying my invention, the platens and blocks are reciprocated in the usual manner. As the print block descends upon the work supported by the convex resilient pad, there is line-contact engagement of such block and work at the center y of the pad in contrast with the overall plane-contact engagement as in the present-day machines. As the print block is forced into further engagement by extended line-contact under the pressure exerted by the platen, the work-supporting member is flexed to conform with the surface of the flat block, thereby causing a complete and uniform contact of the print block with the work. As the print block, having reached the end of its downward stroke, commences its upward movement, the work still firmly held between the block and the center of the resilient pad, is separated from the block at the edges a smoothly and easily by the line-contact disengagement, as shown in Figure 1. The pad continuing to flex to its normal convex position as the block recedes, the line-contact disengagement of the work and print block continues until the two are entirely separated. This feature of line-contact disengagement, similar to the "peeling" action in rotary printing machines, entirely avoids the sudden plane-cleavage of the bond between the print block and the work. Furthermore, such operation substantially eliminates all spattering occurring from the sudden separation of the print block and work, and avoids the formation of pits and points of paint. Of chief importance, however, is the fact that by employing work-supporting members having the characteristics of my invention, I am able to obtain a considerably increased speed of reciprocation of the print blocks, which results in increased capacity of the print machine, and at the same time produces prints which have a uniform and even finish.

It will be obvious to those skilled in the art that numerous modifications may be made in the manner of carrying out my invention, and I do not wish to limit its scope, except as defined in the appended claims.

This application is a re-file of application, Serial No. 218,636, filed September 10th, 1927.

Claims:

1. In a bed-and-platen print machine, in combination, a printing member having a flat printing surface and a resilient work-supporting member, including a normally convexed spring plate, adapted to be flexed to a substantially flat work supporting surface during the printing operation.

2. In a bed-and-platen print machine, in combination, a flat block printing member and a resilient work-supporting member, said work-supporting member having a normally convexed work-supporting surface adapted to be flexed to a substantially flat work-supporting surface during the printing operation.

3. In a bed-and-platen print machine, in combination, a flat block printing member and a resilient work-supporting member, said work-supporting member being adapted to cause line-contact engagement and disen-

gagement of the printing member and the work.

4. In a bed and platen print machine, in combination, a resilient normally convex work supporting member, adapted to flex under printing pressure to provide a flat work supporting surface, and a printing member having a flat printing surface and adapted to reciprocate toward and from the work supporting member, and to flex the latter into the plane of the former.

5. In a bed-and-platen print machine, in combination, a printing member having a flat printing surface, and a resilient work supporting member adapted to provide a flat work-supporting surface during a portion of the print period and to cause line contact disengagement of the printing member and the work.

In testimony whereof, I affix my signature.

FRANK M. ALLEN.