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CONVEYER BELT PRINTING MACHINE
WITH MULTIPLE IMPRESSION
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Fig. 1

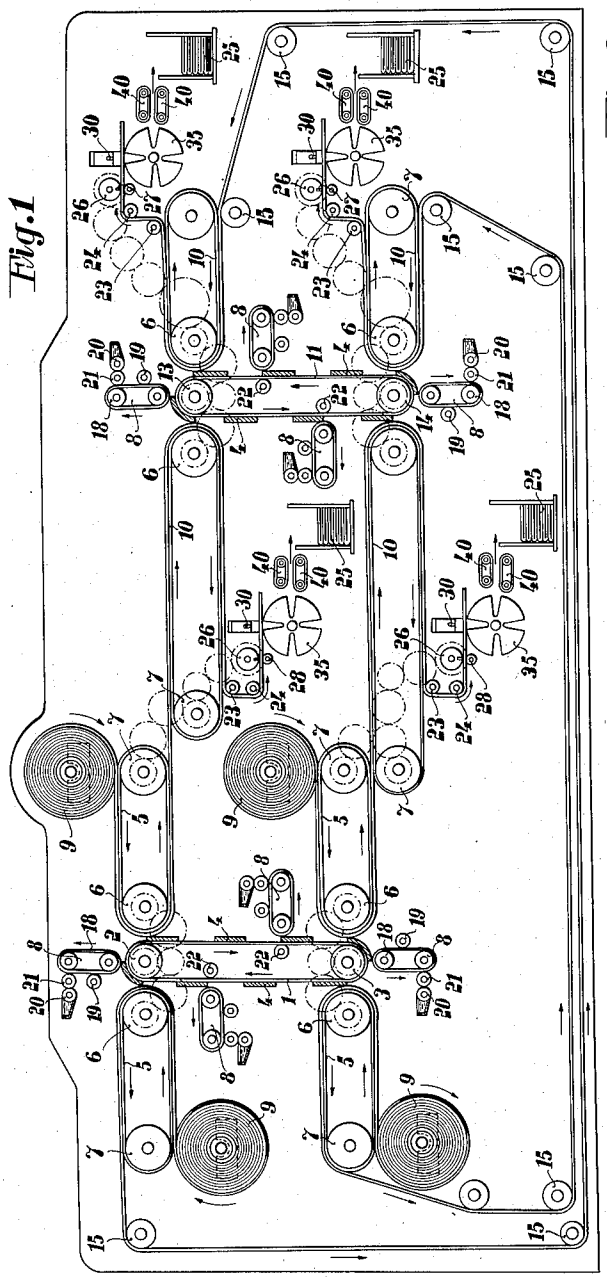


Fig. 3

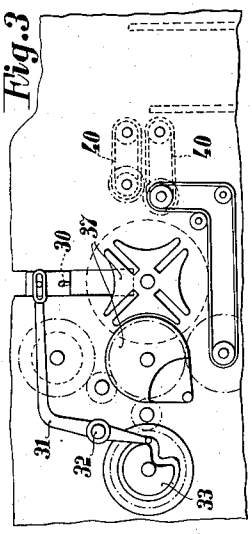
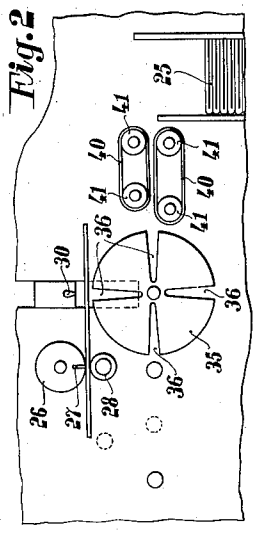


Fig. 2



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CONVEYER BELT PRINTING MACHINE WITH MULTIPLE IMPRESSION

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The invention relates to a printing machine for letter press printing operating with conveyor belts as carriers of the printing blocks, and has the object of providing a machine of this kind with which the printing can be effected on several paper bands simultaneously, viz. in printing on upper side (first form) and in printing on back side (second form) on each of them.

Conveyor belt printing machines as suggested hitherto are capable of effecting printing on a single band only but do not permit printing on back. Printing on several paper bands with printing on back has been carried out with rotary printing machines, but requires a complicated structure and great space.

In order that the invention be better understood and readily carried into effect, an embodiment of a printing machine for printing on upper side and printing on back side is diagrammatically represented by way of example, but not of limitation, in the accompanying drawing, in which:

Fig. 1 in a diagrammatic view of the printing machine;

Fig. 2 in an enlarged detail sectional view of the cutting- and folding device; and

Fig. 3 is an elevational view of the cutting- and folding device showing the driving gear for this device.

Printing can be made on four paper bands simultaneously, and while the machine illustrated is a very suitable form or embodiment of the invention, modifications thereof will suggest themselves to those skilled in the art, and I wish to be understood that the scope of my invention is defined in the claims at the end of this specification, and is not limited to the embodiment shown.

In the embodiment shown there are provided two carriers for the printing blocks (forms) 4, which carriers consist of endless steel bands 1 and 11, respectively, running vertically over driving and guide rollers, 2, 3 and 13, 14, respectively. On these bands the elastic and flexible printing blocks 4 are attached. These blocks adapt themselves to hug the curvature of the rollers 2, 3 and 13, 14, respectively while passing over them and assume again a flat condition when running along with the band on its straight stretches between the rollers.

On each side of the driving- and guide rollers 2, 3 and 13, 14, respectively, there are four endless belts or bands 5 and 10 running over transport rollers 6, 7. These belts 5 and 10 serve for the adjustment and transport of the paper as will be described later. These transport rollers 6 are journalled parallel and in one plane with their

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associated guide rollers 2, 3 and 13, 14, respectively, and effect the printing by pressing the paper band against the printing blocks 4.

Between adjacent transport rollers 6 there is provided at least one inking device 8, so that each carrier of printing blocks has at least four associated inking devices which ink in the printing blocks 4 on their way to the corresponding transport roller 6. Each inking device may comprise an endless steel band 18 co-acting with a distributing roller 19. Supply of ink to the band 18 is effected by a supplying roller 20 and a transmitting roller 21. Two of the four inking devices co-operating with the printing blocks 4 of the bands 1 and 11, respectively, are arranged opposite to the driving- and guide rollers 2, 3 and 13, 14, respectively. The other two inking devices are arranged adjacent to the straight stretches of the bands 1 and 11, respectively, and opposite to rollers 22 arranged inside the said bands.

The paper bands are drawn off from four blank paper rolls 9 and are passed first over the adjustment and paper transport belts 5 to the printing blocks 4 of the printing block carrier 1 which effect the printing on the upper side. From the adjustment and paper transport belts 5 arranged between the printing block carries 1 and 11 the paper bands run over the adjustment- and paper transport belts 10 towards the printing blocks 4 of the printing block carrier 11.

The paper bands drawn-off from blank paper rolls 9 arranged outside the carriers of the printing blocks are then, after the printing on the upper side has been effected, passed over the deflector rollers 15 and the adjustment- and paper transport belts 10 to the carrier 11 of printing blocks in order to effect the printing on the back side.

The paper, which is then printed on both sides, is passed subsequently to the cutting-and folding devices by deflecting rollers 23, 24, and is deposited in piles 25.

Each cutting device comprises a roll 26 provided with a knife 27, and co-acting with a counter-roll 28. The web of paper is fed between the rolls 26 and 28, cutting the paper into sheets which are folded by the folding device.

Each folding device comprises a folder 30, a folding drum 35 and a pair of belts 40 running over transport rollers 41. The folder 30 is moved in a vertical direction by a reciprocating lever 31, pivotally mounted at 32 and controlled by a cam 33. In the folding drum 35 there are radially arranged four slots 36 cooperating with the folder 30 to fold the sheets of paper at the movements

of said folder towards the center of the folding drum. After return of the folder 30 in its raised position the drum 35 and the folded paper pushed in the upright slot is turned about 90° in the clockwise direction. This is effected by a Maltese cross 37. Thus the folded paper comes in a horizontal position close to the draw-in mouth of the transporting belts 40, by which it is moved to right and is deposited in the pile 25.

In order to attain constant perfect synchronisation of the carriers 1 and 11 of the printing blocks with the adjustment- and paper transport belts 5 and 10, which is essential for the prevention if displacements of the impressions, the circumferential velocity of the two groups of conveyer belts is brought into accurate agreement by means of synchronising components. In the embodiment shown the synchronising means comprise toothed wheel-works. However, various other gears, such as bevel gears or chain gears may be used for the synchronising the circumferential velocity of the different means for conveying the paper bands.

The main advantages of the printing machine according to the invention consist in a space-saving structure, the savings in material, weight and costs, and in the easy accessibility of the inking- and folding-devices.

What I claim as my invention and desire to secure by Letters Patent is:

1. A printing machine for letter press printing comprising, in combination, a first printing mechanism for printing on the upper side and a second printing mechanism for printing on the back side of a web, each comprising elastic and flexible printing blocks, an endless conveyer band arranged as carrier of said printing blocks and adapted to run under tension over driving and guide rollers, at least two adjustment and paper transport means on each side of said conveyer band, each of said means including an impression roller adapted to cooperate with the straight stretches of the conveyer band, a guide roller and an endless belt arranged for running over said rollers and in substantially parallel and horizontal stretches between said rollers, blank paper rolls arranged close to the endless belts of said first printing mechanism and adapted for feeding paper bands to said belts, and deflector rollers for leading at least the outer paper bands from the endless belts of the first printing mechanism to the endless belts of the second printing mechanism.

2. A printing machine for letter press printing as claimed in claim 1, whereof the endless belts of both printing mechanisms lying between the endless conveyers of said mechanisms are arranged in pairs in such a way, that the incoming part of the belts of the second printing mechanism forms the continuation of the outgoing part of the belts of the first printing mechanism.

3. A printing machine for letter press printing comprising in combination, a first printing mechanism for printing on the upper side and a second printing mechanism for printing on the back side of a web, each comprising elastic and flexible printing blocks, an endless conveyer band arranged as carrier of said printing blocks and adapted to run under tension over driving and guide rollers, at least two adjustment and paper transport means on each side of said conveyer band, each of said means including an impression roller adapted to cooperate with the straight stretches of the conveyer band, a guide roller and an endless belt arranged for running over said rollers and in substantially parallel and horizontal stretches between said rollers, blank paper rolls arranged close to the endless belts of said first printing mechanism and adapted for feeding paper bands to said belts, deflector rollers for leading at least the outer paper bands from the endless belts of the first printing mechanism to the endless belts of the second printing mechanism, and synchronizing means arranged for accurately coordinating the circumferential velocities of said carriers of printing blocks and of the said adjustment and paper transport belts.

4. A printing machine for letter press printing comprising in combination, a first printing mechanism for printing on the upper side and a second printing mechanism for printing on the back side of a web, each comprising elastic and flexible printing blocks, an endless conveyer band arranged as carrier of said printing blocks and adapted to run under tension over driving and guide rollers, at least two adjustment and paper transport means on each side of said conveyer band, each of said means including an impression roller adapted to cooperate with the straight stretches of the conveyer band, a guide roller and an endless belt arranged for running over said rollers and in substantially parallel and horizontal stretches between said rollers, blank paper rolls arranged close to the endless belts of said first printing mechanism and adapted for feeding paper bands to said belts, deflector rollers for leading at least the outer paper bands from the endless belts of the first printing mechanism to the endless belts of the second printing mechanism, synchronizing means arranged for accurately coordinating the circumferential velocities of said carriers of printing blocks and of the said adjustment and paper transport belts, and cutting and folding devices, arranged for cutting the paper bands into sheets and folding said sheets.

5. A printing machine for letter press printing comprising in combination, a first printing mechanism for printing on the upper side and a second printing mechanism for printing on the back side of a web, each comprising elastic and flexible printing blocks, an endless conveyer band arranged as carrier of said printing blocks and adapted to run under tension over driving and guide rollers, at least two adjustment and paper transport means on each side of said conveyer band, each of said means including an impression roller adapted to cooperate with the straight stretches of the conveyer band, a guide roller and an endless belt arranged for running over said rollers and in substantially parallel and horizontal stretches between said rollers, blank paper rolls arranged close to the endless belts of said first printing mechanism and adapted for feeding paper bands to said belts, deflector rollers for leading at least the outer paper bands from the endless belts of the first printing mechanisms to the endless belts of the second printing mechanism, synchronizing means arranged for accurately coordinating the circumferential velocities of said carriers of printing blocks and of the said adjustment and paper transport belts and at least an inking-in means arranged between each adjacent impression rollers of consecutive adjustment and paper transport means and adapted to ink-in the printing blocks intermediate said adjacent impression rollers.

6. A printing machine for letter press print-

ing comprising in combination, a first printing mechanism for printing on the upper side and a second printing mechanism for printing on the back side of a web, each comprising elastic and flexible printing blocks, an endless conveyer band arranged as carrier of said printing blocks and adapted to run under tension over driving and guide rollers, at least two adjustment and paper transport means on each side of said conveyer band, each of said means including an impression roller adapted to cooperate with the straight stretches of the conveyer band at the ends of said stretches, a guide roller and an endless belt arranged for running over said rollers and in substantially parallel and horizontal stretches between said rollers, blank paper rolls arranged close to the endless belts of said first printing mechanism and adapted for feeding paper bands to said belts, and deflector rollers for leading at

least the outer paper bands from the endless belts of the first printing mechanism to the endless belts of the second printing mechanism.

FRIEDRICH JOSEF TRÖZMÜLLER.

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