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2,700,931

IMPRESSION CYLINDER FOR PRINTING MACHINES

Filed May 12, 1951

2 Sheets-Sheet 1

Fig. 1.

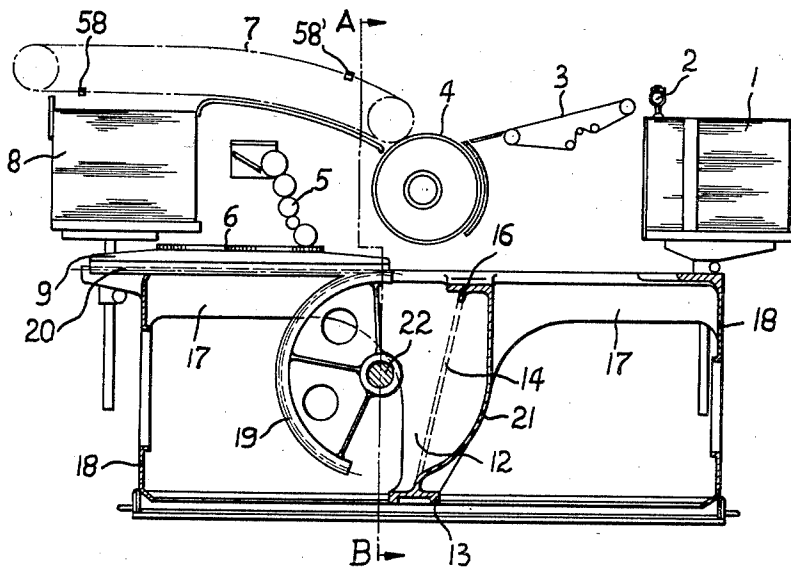


Fig. 2.

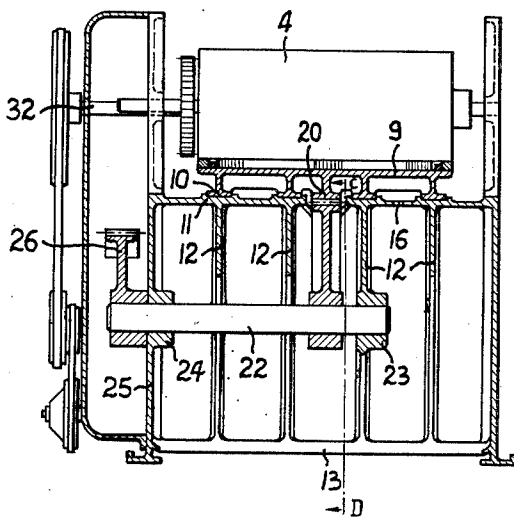
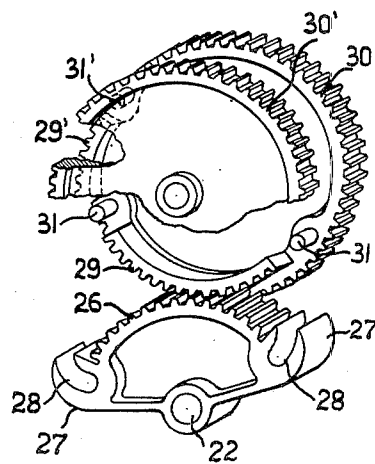


Fig. 3.



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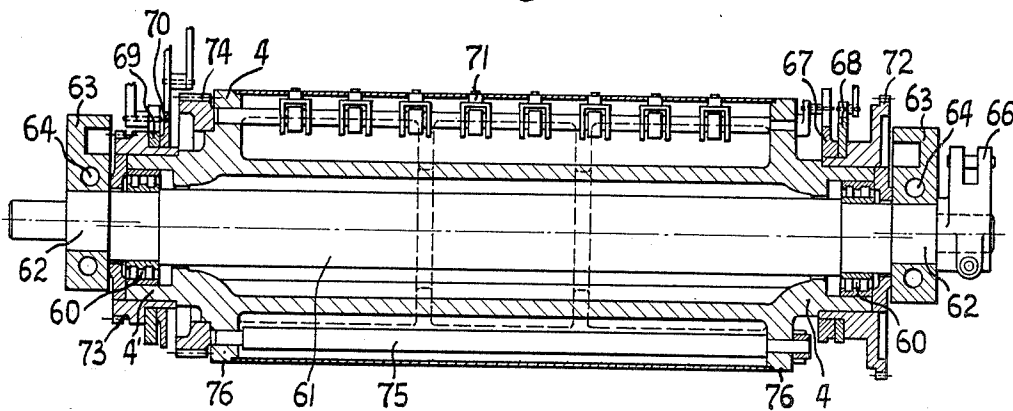
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Fig. 4.



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1

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IMPRESSION CYLINDER FOR PRINTING MACHINES

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2 Claims. (Cl. 101—279)

This invention relates to a printing machine of the type in which the impression cylinder is raised and lowered in each printing action, and has particular reference to a two revolution printing press. In the printing machines of this kind so far known the motion of the impression cylinder was controlled by an eccentric shaft mounted in the machine frame under the type bed, by rotation of which shaft the impression cylinder is raised and lowered through draw rods engaging its two ends; the impression cylinder in this case is guided in slots of the machine frame. Another known control operates with a non-positive drive, in such a way that the impression cylinder is raised by springs and lowered by control rods arranged outside of the machine frame, the motions of these control rods on both sides being synchronised by a shaft.

It is an object of the invention to achieve a considerable simplification and improvement of this control.

With this and further objects in view, according to the invention the printing cylinder is loosely rotatable on a fixedly mounted shaft which is eccentrically shaped so that by its rotation the impression cylinder is controlled in relation to the type bed. Thus the draw rods at both sides of the impression cylinder which were so far required as well as the slide guide in the two walls of the machine frame and the special control shaft distributing the control motion to both sides can be dispensed with. The function of the control shaft so far arranged under the type bed between the two walls of the machine frame in case of the present invention is transferred to the eccentric shaft on which the impression cylinder is loosely arranged so as to be rotatable. Owing to the large diameter of the impression cylinder this eccentric shaft can be made sufficiently strong, so that it will resist to torsion; hence it can be controlled unilaterally.

By omission of the additional connecting shaft the construction of the machine becomes clearer. Owing to the fact that the eccentric shaft is not moved during the printing operation and is rotated only for the control motion, its stationary bearing is less stressed which is favorable for the life of this bearing. Moreover the bearing in the machine frame can be made simple and very accurate. The control motion is no longer non-positive, but there is a positive control, whereby its faultless function is absolutely ensured. In view of the extremely heavy pressure forces required in such a cylinder type printing machine, the advantages of the rigidity of the bearing attainable by means of the invention are felt, in that minimum time is required for making ready, and eventually the function of the whole printing machine and the quality of the prints are favorably effected.

While the driving cog wheel for the impression cylinder so far was fastened to its shaft, it is now secured directly to the impression cylinder whose rigidity against torsion ensures a rotation which is uniform through the whole of its length.

According to the invention the impression cylinder is mounted on its shaft by means of ball or roller bearings which hereinafter are more generally referred to as "antifriction bearings." Compared to the slide bearings exclusively used for this purpose so far, this offers the advantage of a light running and of a narrow bearing which therefore is more satisfactory from the standpoint of statics. The distance between the antifriction bearing and the bearing for the shaft in the wall of the machine frame can be made so short that no bending

2

forces can occur in the shaft. In the conventional construction of a cylinder type printing machine the arrangement of an antifriction bearing was impossible for lack of space.

- 5 Advantagously the antifriction bearings are arranged in a neck portion of the cylinder which is recessed in diameter with respect to the outer diameter of the impression cylinder, for mounting the per se known control cams which are loosely seated on this neck portion.
- 10 Thus it is possible to accommodate all control organs required in known manner for the impression cylinder and for the feeding and delivery devices to be controlled jointly therewith, within a very compact design.

The stationary mounting of the shaft for the impression cylinder according to a further feature of the invention permits to arrange each of its two bearings in a bearing bracket whereby it is possible to interpose thin sheet metal inserts between the bearing bracket and the side wall of the machine frame so as to vertically adjust the shaft of the cylinder to different heights in accordance with the height of the letters which may vary within wide limits. According to a still further feature of the invention such a stationary bearing in a bearing bracket permits to connect the bearing bracket with the machine frame under preliminary tension so that the strain in the connecting screws does not change between a maximum and zero with each printing action, but remains constant, whereby the accuracy of the bearing remains constant during the whole life of the machine.

Other and further objects, features and advantages of the invention will be pointed out hereinafter and appear in the appended claims forming part of the application.

In the accompanying drawings a now preferred embodiment of the invention is shown by way of illustration and not by way of limitation.

- 35 Fig. 1 is a side view of the machine,
Fig. 2 is a cross section on line A—B of Fig. 1,
Fig. 3 is a fragmentary perspective view of the drive, and

40 Fig. 4 is a horizontal section through the impression cylinder.

Referring now to the drawings in greater detail, it will be seen that the sheets coming from the feeding apparatus 1 are fed to the impression cylinder 4 over the horse 3 by means of the well known feeding device 2 and taken along by the impression cylinder, whereby the sheet is printed by the composition or matter 6 over which the ink has been distributed by the inking apparatus 5, whereupon the printed sheets are fed to the delivery pile board 8, by the chain delivery 7 having two grippers 58, 58'. The composition 6 is enclosed in a type bed 9 which is supported, by four slide guides 10, in corresponding tracks 11 of the machine frame. Each track 11 rests on vertical supports 12, which in turn are supported on the lower chord 13 of the main transverse girder of the machine frame formed in connection with the slanting stay 14 and the upper chord 16. The vertical stays 12 underneath each track 11 terminate in ribs 17 connected with the front walls 18. As shown, the lower chord 13 is slightly U-shaped. The upper chord 16 is laterally displaced in relation to the impression line in such a way that the toothed segment 19 in spite of its straight direction can pass by the same, said toothed segment driving the rack 20 provided in the middle of the type bed 9 for moving the same to and fro. The stay 14 is bulged at 21 to provide space for free movement of the toothed segment 19. The toothed segment 19 is mounted on a shaft 22 which is supported at 23 and 24 and bears outside of the side wall 25 of the machine frame a toothed segment 26 which, as shown in Fig. 3, is formed at each end with a projection 27 having a cycloidal recess 28. The toothed segment 26 engages alternately a toothed segment 29 and a toothed segment 29', said segments 29 and 29' being fastened to two oppositely rotating toothed wheels 30 or 30', respectively. At the end of each toothed segment 29, 29' is provided a roller 31, 31' for alternate engagement in the cycloidal recesses 28, whereby the movement of the toothed segment 26 on engagement of one roller and disengagement of the other roller is retarded or accelerated. Conventional means (not shown) are provided for driving the toothed

3

wheels 30 and 30' in opposite directions, by insertion of a reversing wheel, from the driving shaft 32.

As the type bed 9 returns, the impression cylinder 4 has to be raised in relation to the same. To this end it is mounted to be loosely rotatable, through antifriction bearings 60, Fig. 4, on a shaft 61 having eccentric journals 62 which are mounted in bearing brackets 63. These bearing brackets are screwed together with the side walls 25 of the machine frame, under preliminary tension, with the aid of tie rods 64, and interposing washers 65, if desired. Hence, by swinging the shaft 61 with the aid of the swingable arm 66, the impression cylinder 4 can be raised and lowered.

The antifriction bearings 60 are arranged in a cylindrical neck part 4' on which control cams 67, 68 and 69, 70 are loosely mounted for single turn revolution. These control cams in per se known manner serve to control various devices; for instance, the cylinder grippers 71 controlled by the cam 67. The cams 67 and 68 are turned through one revolution by the gear wheel 72, and the cams 69 and 70 are driven by the gear wheel 73. The driving cog wheel 74 of the cylinder 4 is mounted at one side thereof.

The section shown in Fig. 4 shows at one side the recess of the cylinder for the grippers 71, on the other side the packing adjusting board 75 as well as the cylinder bearers 76 running on the bed bearers of the type bed 9.

While the invention has been described in detail with respect to a now preferred example and embodiment of the invention it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended, therefore, to cover all such changes and modifications in the appended claims.

Having thus described the invention, what is claimed is:

4

1. In a printing press of the character described having a reciprocating type bed, a rotatable impression cylinder adapted to be raised and lowered with respect to said type bed, and cam controlled accessory devices for intermittent operation with respect to movements of said cylinder and said type bed, the combination which comprises a shaft for carrying said cylinder, eccentric journals for said shaft for movement of said shaft and said cylinder with respect to said type bed, throat portions of reduced diameter at each end of said cylinder, antifriction bearings within said throat portions for free rotation of said cylinder on said shaft, drive means mounted directly on said cylinder for rotation thereof on said bearings, and cam control surfaces of predetermined contour on said reduced diameter throat portions for control of said accessory devices.

2. In a printing press of the character described having a reciprocating type bed and an impression cylinder shaft eccentrically mounted above said bed for movement with respect thereto, an impression cylinder arrangement which comprises in combination a cylinder mounted on said shaft, reduced diameter throat portions at each end of said cylinder, antifriction bearings within said throat portions for free rotation of said cylinder about said shaft, grippers on said cylinder for holding sheets of paper to be printed thereon, cam controlled means effecting intermittent operation of said grippers coordinated with movement of said cylinder, cam control surfaces for said cam controlled means mounted on said reduced diameter throat portions, and drive means for said cylinder mounted directly thereon and independent of said shaft.

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