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C. DEXHEIMER

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MEANS FOR PREVENTING DAMAGE TO THE DOCTOR AND PRINTING
CYLINDER OF COPPER PLATE PRINTING MACHINES

Filed Dec. 6, 1928

2 Sheets-Sheet 1

Fig. 1

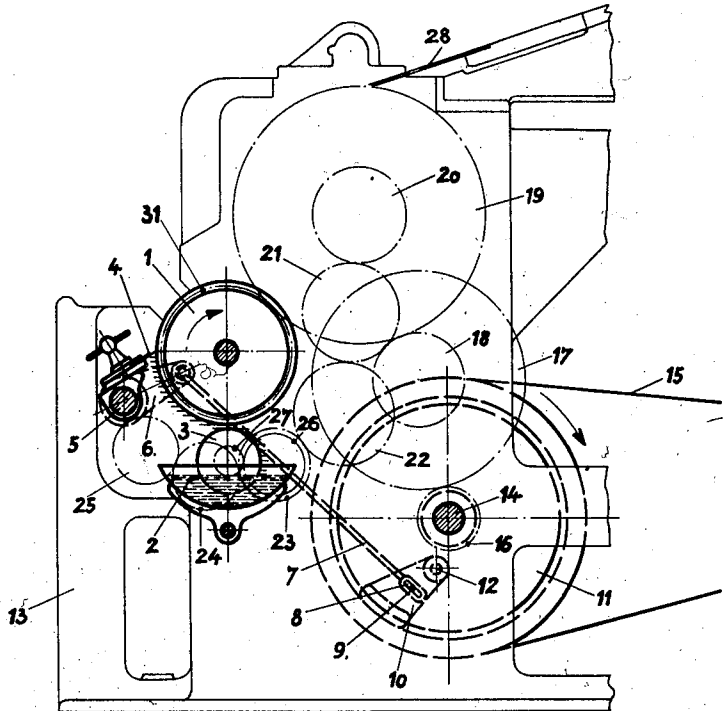
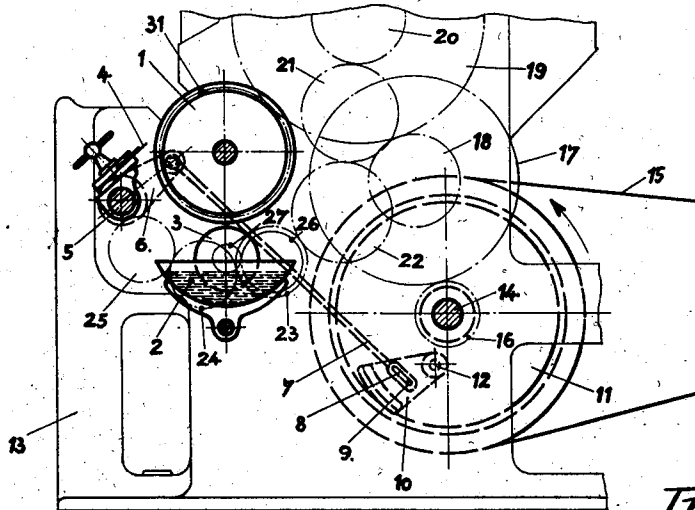


Fig. 3



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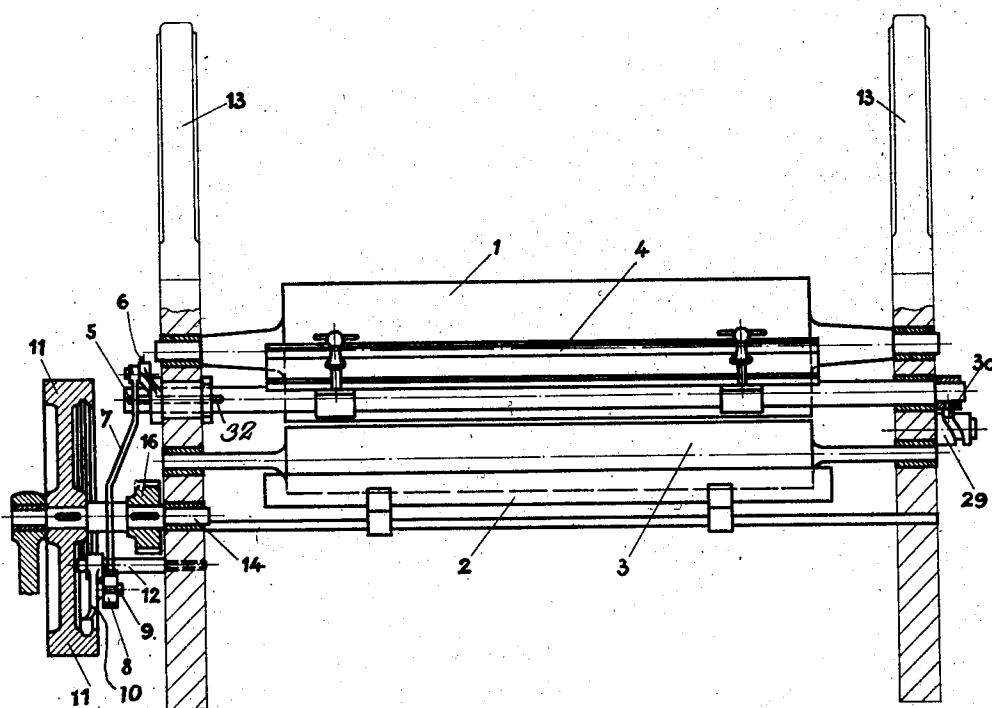


Fig. 2

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MEANS FOR PREVENTING DAMAGE TO THE DOCTOR AND PRINTING CYLINDER OF
COPPER-PLATE PRINTING MACHINES

Application filed December 6, 1928, Serial No. 324,290, and in Germany December 19, 1927.

The present invention relates to copper-plate printing machines of the type in which a doctor-blade bears against a rotating cylinder which carries deeply etched printing plates, from which engravings are produced by rotary printing.

One of the objects of my invention is to prevent injury to the etched plates attached to the rotating cylinder, such as might be occasioned by an incision made by the doctor-blade whenever a reverse movement of the cylinder takes place.

A second object of my invention is to provide means in a copper-plate printing machine whereby reverse movement thereof is rendered impossible unless the said doctor-blade above mentioned is first withdrawn from contact with the plates attached to the printing cylinder.

Other objects of my invention will appear in connection with the drawings and specifications hereinbelow, in which drawings:

Figure 1 represents a side elevational view, partly diagrammatic, showing the printing cylinder carrying the engraved plates and the doctor-blade bearing against said plates, while performing its function of removing surplus ink from the surface of the plates, leaving ink in the etched portions.

Figure 2 is a side elevational view of the same machine showing only such parts thereof as come within the scope of the present invention.

Figure 3 is a side elevational view of the same nature as that shown in Figure 1 but showing the doctor-blade out of contact with the printing plates on the cylinder and showing the machine and the parts thereof in the position that they will assume when the machine is desired to be operated in the reverse direction.

In rotatory copper-plate printing machines the inking of the plates by means of which the printing is effected is carried out substantially in the following manner:

The cylinder 1, which is provided with the engraved etched plates, is so arranged that it may either rotate directly in a bowl-shaped ink container 2, or alternatively, and as shown in the drawings herein, be thickly

coated with ink by means of an ink transferring roller 3. In order to relieve the etched printing plate of the excess ink so that the same may contain ink only in the etched depressions thereof, recourse is had to a sharp edged steel rule commonly termed a "doctor-blade" 4, hereinafter referred to as simply the doctor, which blade exerts a scraping action against the etched plate and removes all superfluous ink from the surface thereof. In the drawing, the surplus ink upon the engraved plates attached to the roller 1 is indicated by a number of short lines extending from the surface of what is designated as cylinder 1, but which lines are discontinued above the point where the blade of the doctor 4 impinges upon the etching surface.

After the engraved and etched plate is thus provided with ink in the depressions thereof, it then makes contact in the usual course of procedure with the paper upon which the engraving is to be produced, whereby the paper will take the ink from the depressions of the etching and a picture or illustration will therefore result. Further revolution of the cylinder thereupon again brings the engraved and etched plate into contact with the ink-transfer roller 3 and the process thereupon repeats itself.

As will be seen from the position of the parts in Figure 1, the doctor 4 makes a sharp incidental contact with the plates mounted on cylinder 1, which, however, when the rotation is as indicated by the arrow in Figure 1, is not deleterious to the said plates. However, if the machine were to be operated in the reverse direction, which often becomes necessary during the make-ready and preparation of the machine for printing, severe injury to the plates would be caused because if the cylinder runs in the reverse direction the doctor will make a sharp indentation in the engraved plates, thus injuring the same. It therefore becomes necessary, in order to prevent injury to the plates by the doctor, and also to prevent injuring the edge of the doctor by its incidence with the plates on the cylinder upon the reverse rotation of the cylinder, to withdraw the doctor 4 from the surface of the plates thereon before the print-

ing machine is allowed to make a reverse movement. In the machines as now known the withdrawal of the doctor 4 is effected by hand and is often overlooked so that severe damage to the doctor and to the cylinder surface and the thereto attached plates frequently occurs when the cylinder 1 makes a reverse movement.

The disadvantages hereinabove described are eliminated by my present invention.

Referring to the drawings herein, in which the essential parts are shown by heavy lines and the parts not directly involved in the invention by lighter lines, the doctor 4 is secured by any convenient and usual means to the shaft 5. In accordance with my invention, I also provide, fastened upon the shaft 5, a lever arm 6 which is coupled at its end with a rod 7, this rod being capable of pivotal movement about its point of attachment to the said lever arm 6. The other end of the rod 7, which is bent in the shape shown best in Fig. 2, is elaborated into a flat terminus which has within it a slot 8, which is in engagement with a bolt 9 that is provided upon a pawl 10. The said pawl 10, is of the frictional type such as is commonly used to prevent the reverse operation of a driving wheel, in the present case the driving wheel 11. In its preferred form, the part 10 is that of a noiseless pawl. It will be understood, however, that other known locking devices of a similar type, provided only that they prevent the reverse movement of the cylinder, may be employed.

The said pawl 10 is loosely pivoted upon a bolt 12, which, for example, may be attached to a stationary part of the printing machine, as, for example, to the side wall 13 thereof. The driving wheel 11 is driven, for example, by a suitable belt 15 and is provided with a central shaft 14. Upon the same shaft 14 there is fixed a suitable pinion 16 which is in gear with the pinion 17. On the shaft of the pinion 17 there is fixed a further pinion 18, which also is in gear with the pinion 19, whereby rotatory movement is imparted to the cylinder 1 by means of a friction rim 31 fixed to the cylinder 1 and engaging the periphery of the pinion 19. On the shaft of the pinion 19 there is fixed a pinion 20 which drives by means of intermediate pinions 21, 22, 23, 24 and 25 a cam roller 29 (visible only on Fig. 2). This cam roller is in engagement with a roller 30, which is fixed upon the shaft 5 of the doctor. On the shaft of the pinion 23 there is fixed a further pinion 26 which, by engagement with pinion 27, serves to impart movement to the ink transferring cylinder 3.

The operation is as follows:

During the normal operation of the machine (shown in Fig. 1), the cylinder 1 on the driving wheel 11 rotates in the direction indicated by the arrows. It will be seen that the doctor 4 bears against the surface of the

cylinder 1, or more accurately speaking, against the surface of the engraved and etched printing plates thereto affixed. The ink scraped off is indicated by the short horizontal lines already hereinabove referred to. The pawl 10 which rides about the inner periphery of the driving wheel 11 does not oppose any resistance to the rotation of the driving wheel 11 in the direction indicated. If, however, for any reason an attempt be made to rotate the driving wheel 11 in the reverse direction, as, for example, in the direction of the arrow shown in Fig. 3, such reverse movement is made impossible by the locking action of the pawl 10, which in case of reverse movement, engages the periphery of the wheel and locks the same securely against rotation. This brings the entire machine to a standstill, and therefore prevents injury to the engraved plates attached to cylinder 1 by the doctor 4. As, however, the reverse movement of the machine is at times essential, this can be effected by withdrawing the doctor-blade 4 from its incidence with the surface of the engraved plates on the cylinder 1 by throwing it into the position shown in Fig. 3. By reason of the connection of the lever arm 6 and the thereto attached rod 7, and its connection with the pawl 10 by means of the bolt 9, the pawl 10 will be pulled into the position shown in Fig. 3, out of contact with the inner periphery of driving wheel 11, whereupon it becomes possible to run the machine in the reverse direction.

The precise method shown of connecting the doctor-blade with the pawl within the inner periphery of the driving wheel, need not be that shown in the drawings but may be effected by any suitable mechanical equivalent thereof, provided only that the result obtained is that of preventing the reverse movement of the printing machine as long as the doctor-blade 4 is in contact with the etched and engraved plates attached to the printing cylinder 1.

Having now particularly described and ascertained the nature of my present invention and the manner in which the same is to be performed, I claim:—

1. In a rotary printing machine employing rotary cylindrical engraved printing plates provided with inking devices and a doctor blade for removing excess ink from said plates, means for preventing injury to said plates and doctor blade which comprise a connection between said doctor blade and a locking device that prevents reverse movement of said machine.

2. In a rotary printing machine employing rotary cylindrical engraved printing plates provided with inking devices and a doctor blade for removing excess ink from said plates, means for preventing injury to said plates and doctor blade which comprise a locking device for preventing reverse movement

of the printing machine and a connection between said blade and said locking device.

3. In a rotary printing machine employing rotary cylindrical engraved printing plates provided with inking devices and a doctor blade for removing excess ink from said plates, means for preventing injury to said plates and doctor blade which comprise a locking device for preventing reverse movement of the printing machine, and a connection between said blade and locking device whereby the latter may be rendered inoperative when the doctor blade is withdrawn from its contact with the printing plate.

4. In a rotary printing machine employing rotary cylindrical engraved printing plates provided with inking devices and a doctor blade for removing excess ink from said plates, means for preventing injury to said plates and doctor blade which comprise a locking device comprising a pawl for preventing reverse movement of the printing machine, and a connection between said blade and said pawl whereby the pawl may be rendered inoperative when the doctor blade is withdrawn from its contact with the printing plate.

5. In a rotary printing machine employing rotary cylindrical engraved printing plates provided with inking devices and a doctor blade for removing excess ink from said plates, means for preventing injury to said plates and doctor blade which comprise a locking device for preventing reverse movement of the printing machine so long as the doctor blade is in contact with the printing plates comprising a pawl in sliding contact with the periphery of the driving wheel of the machine, and a connection between the said pawl and said doctor blade whereby, when the doctor blade is withdrawn from contact with the printing plate, said pawl will be rendered inoperative and reverse movement of the machine made possible.

6. In a rotary printing machine the combination of a rotating cylinder bearing engraved printing plates, a doctor blade normally in peripheral contact with said plate for removing excess ink therefrom, a driving wheel for said machine, locking means for preventing reverse movement of said wheel, and a connection between said locking means and said doctor blade whereby on withdrawal of said doctor blade from contact with said plates said locking means will be rendered inoperative.

7. A safety device to prevent injury to printing plates of rotary printing machines employing doctor blades for removing excess ink from said plates which comprises in said machine the combination of a driving wheel actuating said machine, a pawl permitting rotatory movement of said wheel in one direction only, a doctor blade for removing ink from said plates, a rod and a lever con-

necting said pawl and blade whereby when said blade is moved the said pawl is rendered inoperative.

8. In a rotary printing machine the combination of a rotatory cylinder carrying printing plates, a doctor blade normally bearing against the surface of said plates, a shaft on which said blade is pivoted, a lever on said shaft, a driving wheel on said machine, intermediate gearing connecting said wheel and cylinder to impart movement to the latter, a pawl bearing against the inner periphery of said wheel permitting movement of the wheel in one normal direction only and a rod connecting said pawl and said lever whereby, when the blade is withdrawn from contact with the surface of said plates, the pawl will be withdrawn from contact with the wheel and reverse operation of the latter made possible.

In testimony whereof I affix my signature.
CHRISTIAN DEXHEIMER.

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