Feb. 4, 1941. H. A. W. WOOD 2,230,395

UTILIZATION OF RELIEF PRINTING PRESSES FOR INTAGLIO PRINTING

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Fig. 1.

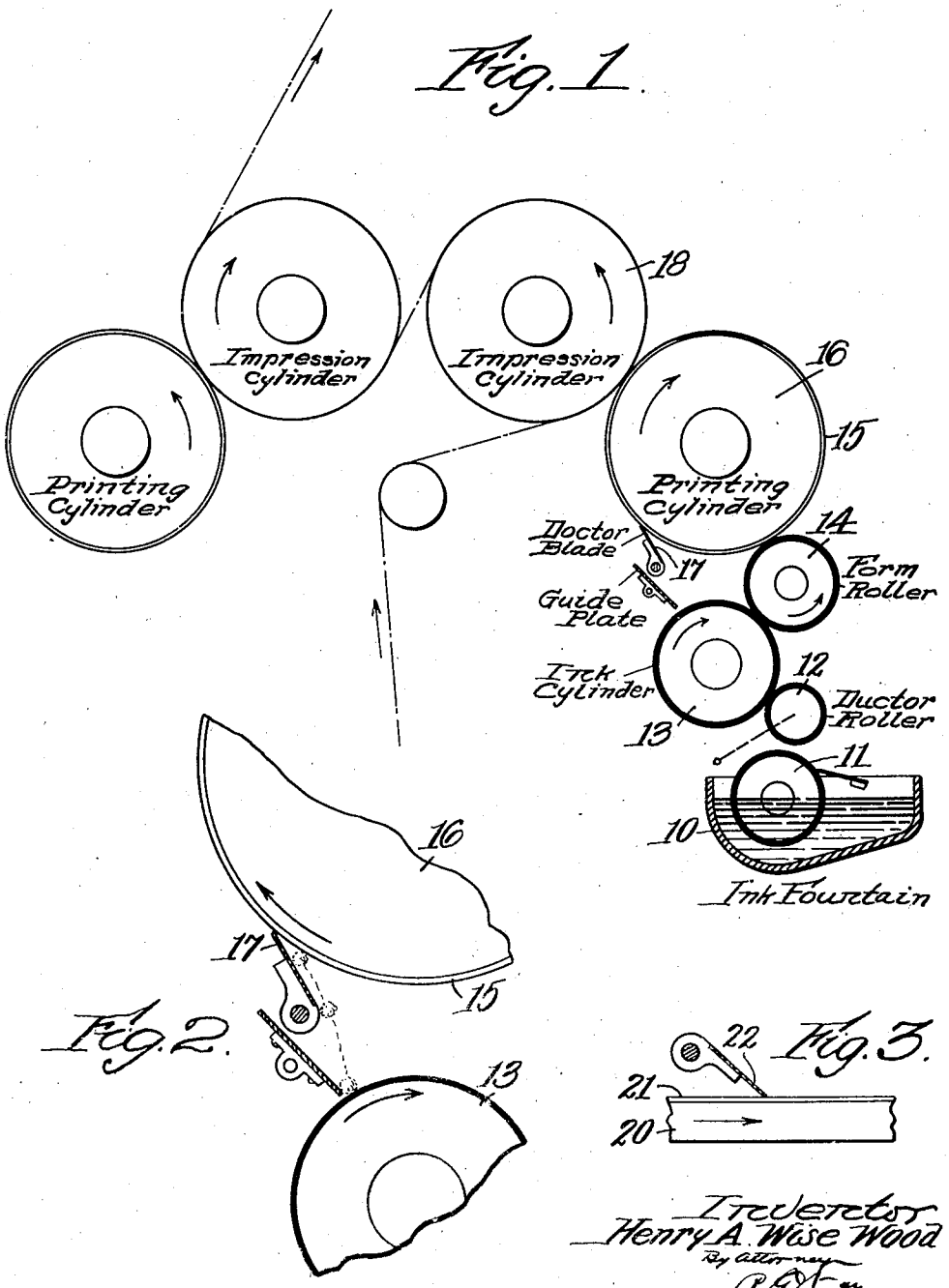


Fig. 2.

Fig. 3.

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UTILIZATION OF RELIEF PRINTING PRESSES FOR INTAGLIO PRINTING

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1 Claim. (Cl. 101—157)

This invention relates to the printing of magazines, magazine sections of newspapers, and the like.

The principal objects of the invention are to extend materially the field of what is called "rotogravure printing;" to bring into use numerous relief printing presses of various kinds and sizes, now idle for want of work and to put additional men to work, without taking any work away from those now occupied; to provide for operating these relief presses with intaglio cylinders or plates at the full speed of these presses when printing from relief surfaces; and to provide a new and important way of supplying ink to the printing surfaces of intaglio cylinders and plates, whereby the ordinary relief printing machines can be used without costly alterations.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawing, in which

Fig. 1 is an end view of a rotary relief printing press arranged in accordance with this invention;

Fig. 2 is an enlarged view showing the doctor blade and the guard plate for draining excess ink on the ink cylinder; and

Fig. 3 is an end view indicating the application of this invention to a plate relief printing press but not showing the press in detail.

Of recent years a new method of printing illustrated work has come into the printing art, particularly with respect to magazines and the magazine sections of newspapers. This is called in the trade rotogravure printing. Technically, it is spoken of as being done from intaglio printing surfaces, which are engraved upon copper cylinders, the design being in intaglio and not in relief.

The films carrying the design, laid down on the copper surfaces of intaglio cylinders, have been photographed through a ruled screen comprising a network in which the reticulations carry the design. The design is composed on the plate of pockets which vary in superficial area and in depth. Between these pockets run lines, at right angles to each other. These lines comprise the high or relieved parts of the copper plates, which are smooth, and serve as a bearing for a "doctor" blade, beneath which the cylinder rotates in order that the blade may skive off the ink from its relieved or smooth portions. These relieved, smooth portions are in reality the walls between the indentations, wells, or pockets, which comprise the design. They have no functions in printing other than that of providing walls and a bearing upon which the doctor blade may bear and perform its function of cleaning off the excess printing ink after the pockets, or wells, have been charged with ink. These pockets have varying depths so that they may contain a deeper or a shallower body of ink, the shallower body giving the lighter tones in color, while the heavier bodies give the darker tones. This, as I have said, is known as rotogravure printing.

Another, a somewhat like method of printing, consists in using "reversed half-tones." Half-tones usually carry relief printing surfaces. The design, which has been photographed through a reticulated screen upon a plate, is comprised of the varying widths, of the relieved lines, which in a rotogravure plate are the walls which separate one well, or pocket, from another.

As in relief printing, the pockets, or wells, are not printed from, but the tops of the separating walls are. No doctor blade is used for the removal of the ink that is carried by the tops of the walls, for it is this ink that prints. But in intaglio printing by the reversed half-tone process, a doctor blade is used, for the cleaning of the intervening walls which surround the color wells of the design. By this method the design is printed from ink with which these wells are charged, but, as the wells have a uniform depth, one advantage of the rotogravure process which it has is that all the varying depths of the "pile" of ink taken by the paper from each well give a variety of tones to the design as a whole.

Both rotogravure and reversed half-tone printing are known as intaglio printing because of sunken surfaces in the printing plate.

In both of these methods the design carried by the cylindrical printing plate is rotated in an ink fountain, which carries the printing pigment. The plate picks up what pigment it needs and thereafter passes beneath a doctor blade. This doctor blade skives off excess color so that only that which remains in its intaglio portions can be printed from, the excess ink going back into the fountain.

In intaglio printing there are two methods of applying the ink to the wells, or pockets, either by rotating the printing cylinder in a reservoir of ink as just described, or by flowing the ink against the design cylinder as it rotates, as by supply pipes or channels. In both of these methods the ink, having been put on in bulk, its excess must be removed before the moment of printing, and this is done by the doctor blade,

usually of finely tempered steel, thin and elastic, which may be maintained carefully with respect to the smoothness of its working edge.

Now I have discovered a new way of supplying ink to an intaglio printing surface by which intaglio plates may be run on ordinary relief printing presses and inked by means of the method of inking ordinarily used in relief printing and by the usual inking rollers of a relief printing press.

In a relief printing press the ink is carried by a fountain, in which a roller rotates in the ink and carries out of the fountain an ink film of desired thickness, which is determined by a screw-operated fountain blade, usually of steel adjacent to the roller. As the fountain roller rotates with its ink, it comes into contact with what is known as a ductor roller. This roller picks up its supply of ink and transfers it to the ink distributing system of the press, which consists of a number of inking rollers of rubber, or "composition," which serve to spread it into a more even and thinner film of ink until that film has been reduced to the smooth and thin film of ink which it is desired to lay down upon the relief printing plate by "form rollers."

Therefore, it will be seen that in relief printing, the surface of the printing plate governs and comprises the design which it itself prints, whereas in intaglio printing the design is carried by the printing plate in a large number of minute wells, or pockets, which pockets carry the ink and form the design.

Now, I convert a relief printing press into an intaglio printing press by laying down the ink in the usual method used in relief printing, by means of a fountain **10**, fountain roll **11** and rubber ductor roller **12**, either with or without a distributing system intervening. I prefer to use at least an iron ink cylinder **13** and a rubber form roller **14**. The latter supplies color to the entire surface of the intaglio plate **15** on the printing cylinder **16**, including the tops of its reticulated walls which form the design, as well as charging the design itself with ink and thereafter passing the printing cylinder **16** beneath a doctor blade **17**. The blade removes the ink from the surface of the walls, pressing and smoothing it into the wells between the walls, and leaving the intaglio surface charged with ink, while the relieved wall surfaces are cleaned thereof. Thus, when it comes to the act of printing between the printing cylinder **16** and the impression cylinder **18**, the plate will be in the condition that an intaglio plate is normally, that is: its intaglio portions charged with ink and its relieved portions or walls of design cleansed thereof by the doctor blade. The ink removed by the doctor blade **17** is directed on to the ink cylinder **13** by means of a guide plate **17***a*. Thus, when such a plate goes to printing, it acts as an intaglio plate and not as a relief plate. In this manner intaglio plates may be printed upon relief printing machines and at the full speed thereof, a speed which it is not possible now to attain with intaglio printing machines.

Therefore, I need only enable relief presses, of which there are many in the world, to perform the functions of intaglio printing presses, of which there are but few, by the mere addition of doctor blades, which may be easily applied, working in conjunction with their printing cylinders, and the use of suitable printing inks.

While the chief application of this invention will be to rotary newspaper printing presses, printing from rolls of paper, it may be applied to rotary presses printing from sheets or to flat bed presses printing from flat intaglio printing plates, with suitable provision for handling refuse ink scraped off from the printing plate.

In the form of relief press indicated in Fig. 3 the bed **20** carries a flat intaglio plate **21** and a doctor blade **22** is employed as in the other case.

I consider it of inestimable value to the printing trade that it should be enabled so easily to set to work upon a popular form of the printing art a great number of relief printing presses which are now idle because this new fashion of printing has come into vogue to which they have never been adapted.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claim, but what I claim is:

The combination in a rotary printing press, of an intaglio printing cylinder carried thereby, an ink fountain, a fountain roll in the ink fountain, a ductor roller arranged and adapted to remove ink from the fountain roll periodically, an ink cylinder on which the ductor roller deposits ink periodically, a form roller receiving ink from the ink cylinder continuously and depositing the ink in a thinned film on the printing cylinder, a doctor blade engaging the printing cylinder, removing surplus ink from the printing cylinder, and smoothing the ink into the indentations therein, said doctor blade slanting downwardly from the surface of the ink cylinder, and a guide plate in position to receive the surplus ink removed by the doctor blade from the printing cylinder and direct the ink thus taken up by the doctor blade back on to the surface of the ink cylinder.

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