

H. A. W. WOOD.
RELIEF AND INTAGLIO PRINTING PRESS.
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1,200,565.

Patented Oct. 10, 1916.
2 SHEETS—SHEET 1.

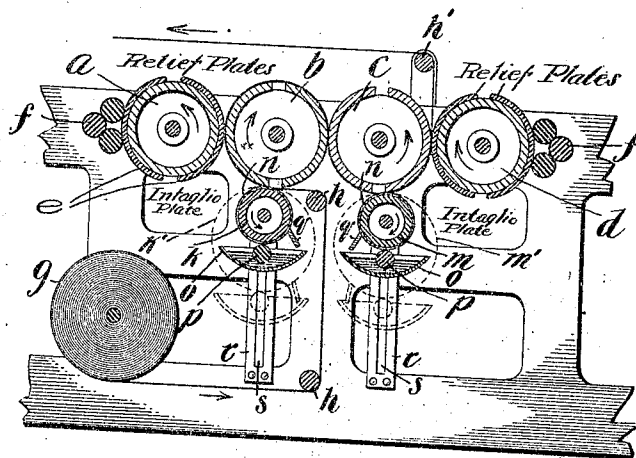


Fig. 1.

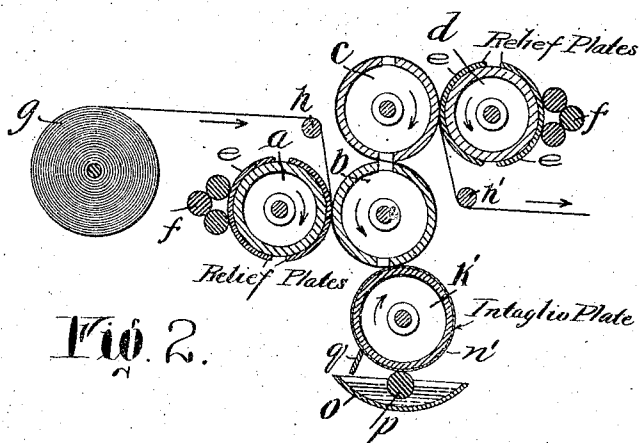


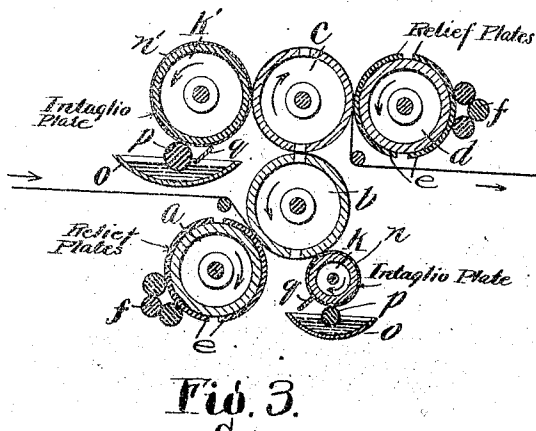
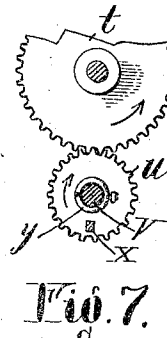
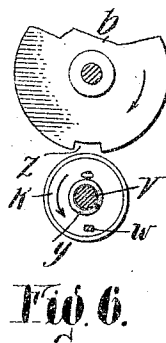
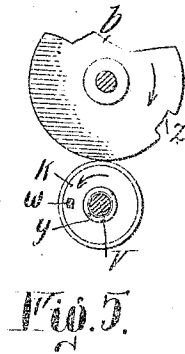
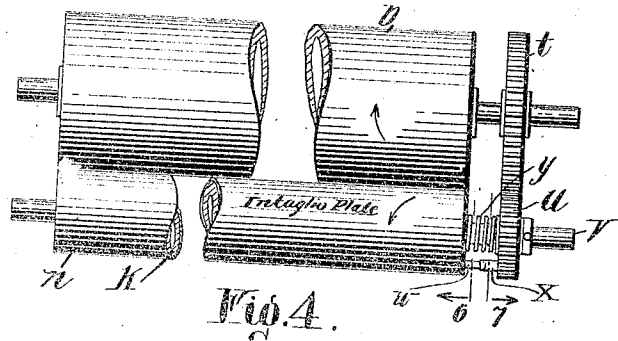
Fig. 2.

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UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, N. Y., ASSIGNOR TO WOOD & NATHAN COMPANY,
OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

RELIEF AND INTAGLIO PRINTING PRESS.

1,200,565.

Specification of Letters Patent.

Patented Oct. 10, 1916.

Original application filed December 27, 1906, Serial No. 549,717. Renewed August 25, 1911, Serial No. 646,036. Divided and this application filed November 10, 1913. Serial No. 800,094.

To all whom it may concern:

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Relief and Intaglio Printing Press, of which the following is a specification.

This is a division of my patent filed Dec. 27, 1906, granted May 12, 1914, No. 1,096,483.

For the purpose of compensating for differences in diameter of the intaglio cylinder due to the taking off of the surface to enable it to receive successive etchings or engravings, means is provided for permitting a circumferential yielding of this cylinder as a whole or of the impression cylinder.

Reference is to be had to the accompanying two sheets of drawings which constitute a part of this specification, and illustrate practical ways of carrying out the inventions and in which—

Figure 1 is a longitudinal sectional view of a rotary web press supplied with intaglio printing cylinders, in accordance with this invention. Figs. 2 and 3 are similar views showing method of carrying out the invention on presses of a somewhat different type. Fig. 4 is a front elevation of an impression cylinder and cooperating intaglio cylinder. Figs. 5 and 6 are sectional views of the same on the line 6 of Fig. 4, and Fig. 7 is a sectional view of the same on the line 7 of Fig. 4.

Intaglio printing cylinders are made in the form of copper shells, usually about a half inch thick. As the intaglio printing cylinder and the impression cylinder are run together, and must maintain the same surface velocity, they have had to be accurately fixed in diameter. As these copper cylinders are quite expensive and as there is a great loss in remelting them, I have provided means whereby they can be used several times, the etched or engraved surfaces being successively removed and a new design etched or engraved on the smooth surface. This results in a gradual reduction in diameter on the intaglio cylinder which therefore increasingly drags upon the impression cylinder against which it works. While heretofore this has not prevented the repeated use of a cylinder, it has necessitated the abandonment of it with great loss after it has been used three or four times only.

For the purpose of reducing this loss and permitting the use of the copper shell a greater number of times, I have provided a yielding connection between either the intaglio cylinder or the impression cylinder and its shaft, whereby the impression cylinder may cause the intaglio cylinder even though greatly reduced in diameter to rotate with it at the same circumferential velocity until a gap in the impression cylinder is reached, when the yielding means will bring the yielding cylinder back into proper position with relation to its shaft. In the way illustrated during each revolution of the impression cylinder, which has two gaps, the printing cylinder will return twice to proper position and almost the entire thickness of the copper shell can be used before it is abandoned. Two ink supplies may, of course, be used, each touching its own surface to be supplied, or one that is operable to both; any ordinary construction of the same being employed to produce this result.

Referring specifically to the drawings, and first to Fig. 1, it will be seen that a rotary web press is shown as arranged so that the illustrations may be printed in intaglio, and the type in relief, as has been stated above. It will be observed that the cylinders *a*, *b*, *c* and *d*, represent the ordinary printing couples of a rotary web press, the inner cylinders being the impression cylinders. On each of the printing cylinders *a* and *d* are shown two relief printing plates *e* in accordance with the usual construction. Suitable inking mechanism *f* is also indicated. The web passes from the web roll *g* around guide rollers *h* over the impression cylinder *b* in contact with the plates on the printing cylinder *a*, then around the impression cylinder *c* in contact with the plates on the printing cylinder *d* in the usual way, but the relief plates are so constructed that while all the type and other desired portions are in relief as usual, those parts which would ordinarily be provided with a surface for printing illustrations, which it is desired to print in a more artistic way than can be done with relief printing, the left blank, and additional cylinders *k* and *m* are provided on which are mounted intaglio plates or tubes *n* having the desired designs thereon located to register, of course, with the blank spaces on the relief plates.

In the form indicated in this figure, each of the intaglio cylinders is of a diameter equal to one half of that of the relief printing cylinder, and it is, of course, timed to make a complete revolution during a half revolution of the relief cylinder. With this construction the intaglio design will be repeated for the two impressions obtained from the relief plates, and, therefore, there will be two sets of imprints which will have the intaglio portion thereof in duplicate and which ordinarily will also have the relief in duplicate, as the two relief plates are normally the same. It is to be noted that the intaglio cylinders are located beneath or at one side of the impression cylinders so that the ink which drips therefrom will not come into contact with the impression cylinders. The intaglio cylinders are supplied with ink from fountains *o* beneath them, these fountains being in the present instance provided with rollers *p*, and cleaning blades or other devices *q* being employed in the usual way. The fountains and cleaning devices are mounted below or at one side of the intaglio cylinders so that the fountains will receive the drip therefrom and no ink will be discharged on the impression cylinders. A preferable position is to have the intaglio cylinders below the center of the impression cylinders and their inking devices below the centers of the intaglio cylinders. In order that each of the intaglio cylinders *k* and *m* may be replaced by a cylinder of a different diameter, the fountains *o* are made adjustable and with them the rolls *p* and cleaning devices *q*. As shown in Fig. 1, they are mounted on a frame *r* and can be moved up and down in slots *s* therein. This figure shows these parts in dotted lines in position to receive a larger intaglio cylinder *k'* and *m'*. Also in this figure, it will be seen that the web passes over the roll *k'* to the left in order that its last printed side, which is usually handsomely illustrated, will be on the outside and when run over the former will not have to come in contact with the roll at the head thereof or with the turning roll, thus better preserving the effect of the printing on this side of the sheet.

In the construction represented in Fig. 2, an ordinary type of press is provided with a single intaglio cylinder *k'* so that the illustrations will appear on one side of the sheet only. When the circumferential product of the plate cylinder is to be collected as shown the intaglio cylinder *k'* is made equal in diameter to the plate cylinder *a* so that a separate set of illustrations may be printed upon each half of the cylinder. The cylinder *k'* is shown as provided with printing tube *n'* having two intaglio designs thereon.

In Fig. 3 is illustrated another type of press in which a half sized intaglio cylinder

k is shown in connection with an impression cylinder *b* and in connection with an impression cylinder *c* is shown a full sized intaglio cylinder *k'*. It may be considered that the change from one size intaglio cylinder to the other is only partly accomplished in the form shown in this figure.

In other forms, and in fact in any form in which the invention may be embodied, it is preferable that the fountain, the intaglio printing cylinder, and its plate all be removable either endwise or sidewise, so that the press may be run without them, and so that they can be changed as may be desired.

Figs. 4, 5, 6 and 7 illustrate the yielding connection between the intaglio cylinder and its shaft. The impression cylinder *b* is shown in this invention as fixed to its shaft on which is a gear *t* operating a gear *u* on a shaft *v* on which the intaglio cylinder *k* is loosely mounted. The intaglio cylinder is provided with a lug or stop *w* adapted to engage a lug or stop *x* on the gear *u* and this is the only positive connection between the intaglio cylinder and its gear. A spring *y* of any desired form yieldingly connects these two elements. Now, it will be seen that while the intaglio cylinder runs in contact with the impression cylinder if it is of a smaller diameter than the impression cylinder, or if the latter is not an exact multiple of the intaglio cylinder on account of the turning down of the surface of the intaglio shell, it will remain in proper registration with the impression cylinder, its lug *w* gradually drawing away from the lug *x*. The spring *y* opposes this action but is not strong enough to prevent it. Now, when a gap *z* in the impression cylinder comes into such position as to relieve the intaglio cylinder from pressure as shown in Fig. 6, the spring will be free to act to return the intaglio cylinder to such position that the two lugs *w* and *x* will again engage and the two cylinders will then be in proper relation with each other, the intaglio cylinder and its gear being in exactly the same relative position as they would be if they were positively connected together. At this time the lugs or stops do form a positive connection between these elements. This will occur twice during each revolution of the impression cylinder and thus permit the use of the cylinder or shell after it has been materially turned down so that it is of much less diameter than it originally was. A similar operation will take place when the impression cylinder is yieldingly mounted instead of the intaglio cylinder. In either case the couple may be driven through the plate cylinder gear, or through the impression cylinder gear.

Although I have herein shown and described a particular relationship among the several cylinders and an adjustable connecting device, I do not herein claim the same as

it forms the subject matter of my above mentioned original patent.

While I have illustrated and described special forms in which the invention may be embodied, I am aware that it can be practised in many other ways without departing from the spirit of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular mechanism shown, or to the particular types of printing presses referred to, but

What I do claim is:—

1. A printing press having a shaft, a complete intaglio printing cylinder loosely mounted thereon, an intaglio printing member fixed on the cylinder, yielding means for permanently and constantly connecting the cylinder and shaft and tending to turn the cylinder on the shaft in one direction, and positive means for limiting the motion of the cylinder on the shaft in that direction, said cylinder having an unlimited range of motion on the shaft in the other direction in opposition to said yielding means.

2. In a printing press the combination of a shaft, an intaglio member loosely connected with the shaft and capable of rotating therewith, yielding means permanently and constantly connecting the shaft with the said intaglio member for resisting the rotation of said member faster than the shaft, and stops for positively connecting the shaft

and intaglio member, said stops being located in position to be moved apart when the intaglio member is rotated faster than the shaft and to engage each other and limit the reverse motion of the intaglio member caused by said yielding means.

3. In a printing press, the combination of a positively driven shaft, a lug connected therewith, a cylinder loosely mounted on the shaft, a lug on the cylinder adapted to engage the first named lug to transmit the motion of the shaft positively to the cylinder, and yielding means for connecting the shaft and cylinder.

4. In a printing press, the combination of a shaft, a gear thereon, means for positively driving said gear, a lug on said gear, a cylinder loosely mounted on said shaft and having a lug located in the path of the first named lug, whereby when they are in contact the motion of the gear will be positively transmitted to the cylinder, and a spring connecting said gear and cylinder to yieldingly transmit the motion of the gear to the cylinder when said lugs are not in contact with each other.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

HENRY A. WISE WOOD.

Witnesses:

LILLIAN C. JONES,
B. M. STOEGER.