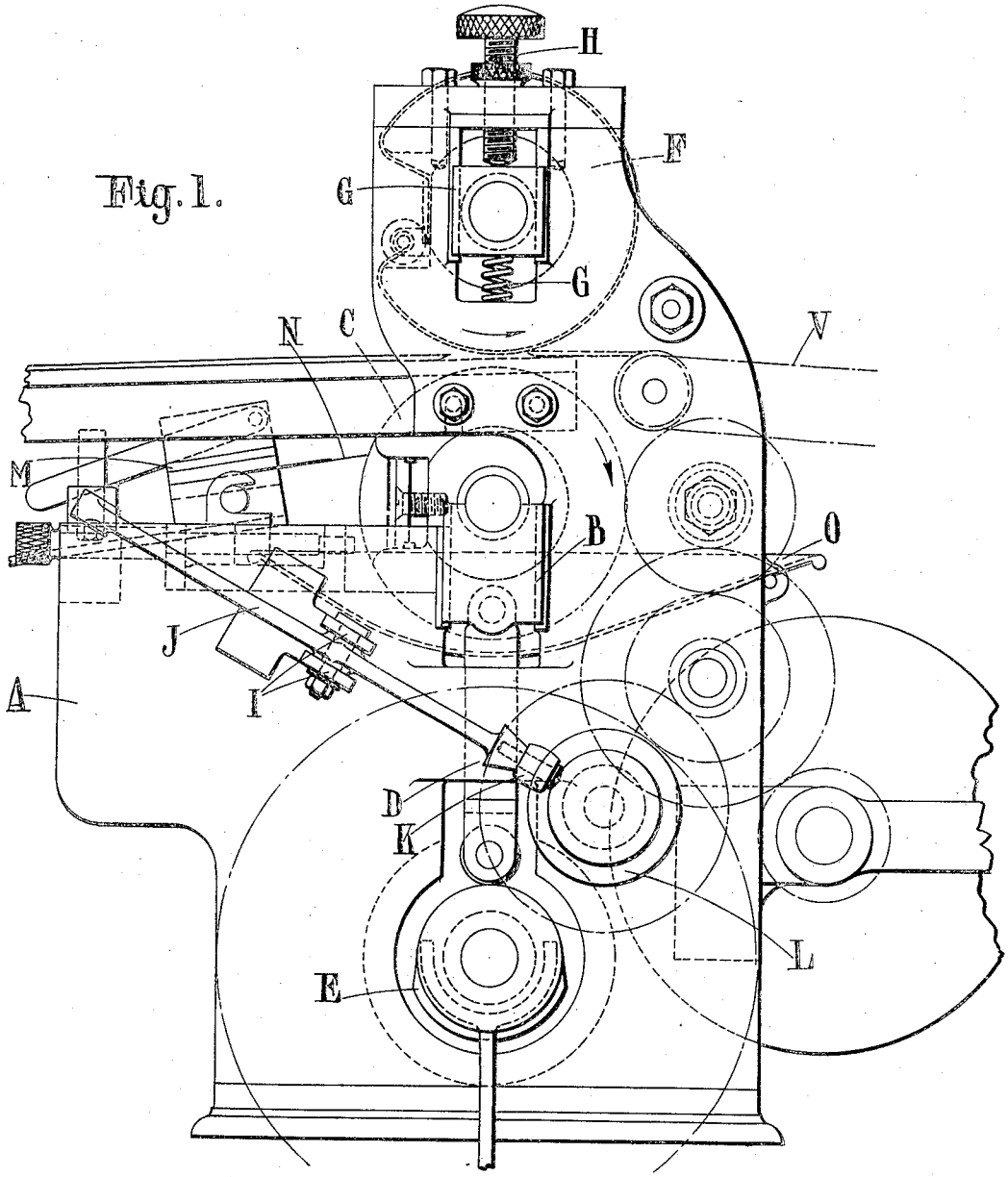
Dec. 27, 1927 1,654,431

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ROTARY INTAGLIO PRINTING MACHINE

Filed Feb. 19, 1926 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

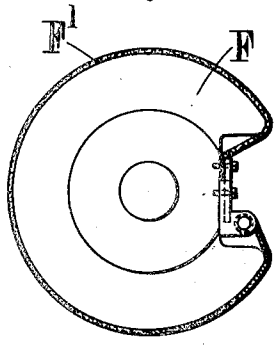
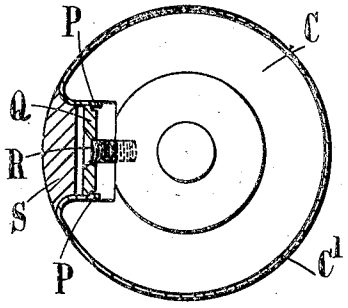


Fig. 3.



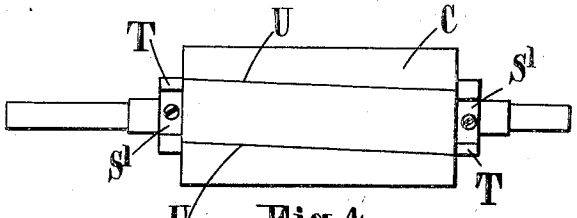


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ROTARY INTAGLIO PRINTING MACHINE.

Application filed February 19, 1926, Serial No. 89,459, and in Great Britain March 4, 1925.

This invention relates to rotary intaglio printing machines and has for its object (inter alia) to provide a simple, efficient and much less costly printing machine than heretofore, and one which is particularly well adapted for intaglio photogravure printing.

Until recently, photogravure printing has been done from an engraved solid cylinder, usually of copper. This was a very expensive method, especially where a variety of subjects had to be printed, since after the required number of prints had been made of a subject, the surface of the cylinder had to be ground down, polished and a fresh subject then engraved thereon; or alternatively a large number of solid and expensive printing cylinders had to be kept.

More recently it has been proposed to wrap or "mantle" an engraved metal sheet on the printing cylinder, the sheet being capable of ready removal and replacement; and this arrangement has considerably lessened the cost of photogravure printing, but the machines themselves are still large, comparatively complicated and expensive. For example, devices known as "grippers" are generally employed to feed the sheets of paper into the machine and to guide them through it so as to ensure correct registration and the desired margins etc.

The machine according to the present invention employs a system of metal sheet mantling, dispenses with "grippers", provides an arrangement whereby the printing and impression rollers are kept rotating continuously, the printing operation being performed only during alternate revolutions of the printing cylinder and the latter is automatically raised into and lowered out of contact with the impression roller during the printing and idle revolutions respectively.

The printing cylinder is mantled with a metal (usually copper) printing sheet by any suitable method but preferably in the manner hereinafter described, the construction including arrangements whereby the "doctor" is prevented from dipping into the joints between the edges of the capping piece employed to close the longitudinal gap in the printing cylinder and the turned in portions of the printing sheet.

Furthermore according to this invention, the "doctor" is preferably so geared that as it reciprocates along the printing surface it reverses each time at a different point on the periphery of the printing cylinder which has been found to improve its effectiveness.

One form of rotary intaglio printing machine in accordance with the present invention is illustrated in the accompanying drawings in which:—

Fig. 1 is a view in side elevation of the complete machine.

Figs. 2 and 3 are transverse sectional views of the impression and the printing cylinders respectively.

Fig. 4 is an elevational view on a reduced scale of a printing cylinder illustrating one method of preventing the "doctor" dipping into the joints of the gap as aforesaid, and of securing the capping piece in position.

Referring to these drawings:—

Mounted to slide vertically in the frame A of the machine are bearings B carrying a mantled printing cylinder C and resting through the medium of links D on cams E geared to rotate at half the speed of the printing cylinder C in such a manner that the latter is lifted by said cams at each alternate revolution into contact with an impression cylinder F carried in bearings G which are resiliently supported by springs G^1 and adjusted by screws H. The impression cylinder F is provided with a "blanket" F^1 secured in any convenient manner for instance as shown in Fig. 2.

Mounted to rock in lugs I on the frame A is a double ended lever J, the lower end of which is furnished with a roller K running on the face of a cam L fixed to one of the intermediate gears. The other end of the lever J is connected to the block M carrying the steel "doctor" N. The block M is slidable in the lengthwise direction of the printing cylinder C and the gearing of the cam L is such that the block M through the medium of the lever J is caused to change its direction at a different point on the periphery of the printing cylinder C.

O is the ink retaining receptacle through the contents of which the printing cylinder C rotates continuously.

As illustrated more particularly in Fig. 3 the mantled printing sheet C^1 has its ends thickened or beaded at P, in any suitable manner, for instance by turning over the ends one or more times, and these beads P are engaged by a fixing bar Q adapted to be screwed down by several screws R to apply an equal and simultaneous pull to both

ends of the printing sheet. When the latter is bedded firmly on the cylinder the gap in its periphery is covered by a capping piece S provided with end portions S^1 adapted to extend over the ends of the roller and be screwed to bosses T forming part of the cylinder as shown in Fig. 4.

Also as shown in Fig. 4 the longitudinal gap in the cylinder C is set at an angle to the axis of the cylinder so that the narrow joints U along the edges of the capping piece cannot allow the "doctor" which is set parallel with the axis of the cylinder to drop into them during rotation of the cylinder.

Another suitable method of preventing this dipping of the "doctor" is that described in Berry's British patent specification No. 238,402.

The machine is provided with any convenient means for feeding the paper sheets or other surfaces to be printed into the gap between the printing and impression cylinders in such a manner that the sheet is engaged between the cylinders when the printing cylinder is lifted. The printing surfaces are delivered on to tapes V, printed face downwards, and are conducted by said tapes to the desired place where they are delivered in such a manner that they are caused to turn printed face uppermost.

What we claim is:—

1. In a rotary intaglio printing machine, the combination of a driven printing cylinder, a longitudinal gap in the surface of said cylinder, a securing device for fixing in said gap the ends of a detachable metal sheet constituting the printing surface, a capping piece for covering the said gap to restore the circular contour of the cylinder, a driven impression cylinder yieldingly supported, means for raising and lowering the printing cylinder into and out of contact with the impression cylinder during alternate revolutions thereof, a cleaning knife or "doctor" arranged to be reciprocated lengthwise of the printing cylinder, and a system of tapes for delivering the printed surfaces from the machine.

2. In a rotary intaglio printing machine, the combination of a driven printing cylinder, a longitudinal gap in the surface of said cylinder, a fixing bar adapted to engage the ends of a detachable metal printing sheet and to be screwed into said gap to exert tension on said sheet to bed same on the cylinder, a driven impression cylinder yieldingly supported, means for raising and lowering the printing cylinder into and out of contact with the impression cylinder during alternate revolutions thereof, a cleaning knife or "doctor" arranged to be reciprocated lengthwise of the printing cylinder, and a system of tapes for delivering the printed surfaces from the machine.

3. In a rotary intaglio printing machine, the combination of a driven printing cylinder, a longitudinal gap in the surface of said cylinder disposed at an angle to the axis of the cylinder, a securing device for fixing in said gap the ends of a detchable metal sheet constituting the printing surface, a capping piece adapted to cover the said gap above the fixing device to restore the circular contour of the cylinder, a driven impression cylinder yieldingly supported, means for raising and lowering the printing cylinder into and out of contact with the impression cylinder during alternate revolutions thereof, a cleaning knife or "doctor" arranged to be reciprocated lengthwise of the printing cylinder, and a system of tapes for delivering the printed surfaces from the machine.

4. In a rotary intaglio printing machine, the combination of a driven printing cylinder, a longitudinal gap in the surface of said cylinder, disposed at an angle to the axis of the cylinder, a securing device for fixing in the said gap the ends of a detachable metal sheet constituting the printing surface, a capping piece for covering the said gap to restore the circular contour of the cylinder, a driven impression cylinder yieldingly supported, a set of driven cams, links reciprocated by said cams to raise and lower the printing cylinder into and out of contact with the impression cylinder during alternate revolutions, a cleaning knife or "doctor" arranged to be reciprocated lengthwise of the printing cylinder and geared to reverse at different circumferential points on the cylinder in successive revolutions thereof, and a system of tapes for delivering the printed surfaces from the machine.

5. In a rotary intaglio printing machine, the combination of a driven printing cylinder, a longitudinal gap in the surface of said cylinder disposed at an angle to the axis thereof, a metal sheet constituting the printing surface wrapped on the printing cylinder with the ends of said sheet lying in the gap in the cylinder, thickened portions at the ends of said sheet, a fixing bar adapted to engage the thickened ends of said sheet and to be screwed down into the gap in the cylinder to exert tension on said sheet, a capping piece covering the gap above the fixing bar to restore the contour of the cylinder, a driven impression cylinder yieldingly supported, means for raising and lowering the printing cylinder into and out of contact with the impression cylinder during alternate revolutions thereof, a cleaning knife or "doctor" arranged to be reciprocated lengthwise of the printing cylinder, and to reverse at different circumferential points on the cylinder in successive revolutions thereof, and a system of tapes for delivering the printed surfaces from the machine.

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