

T. F. ELSWORTH.
 ROTARY PRINTING MACHINE.
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1,065,228.

Patented June 17, 1913.

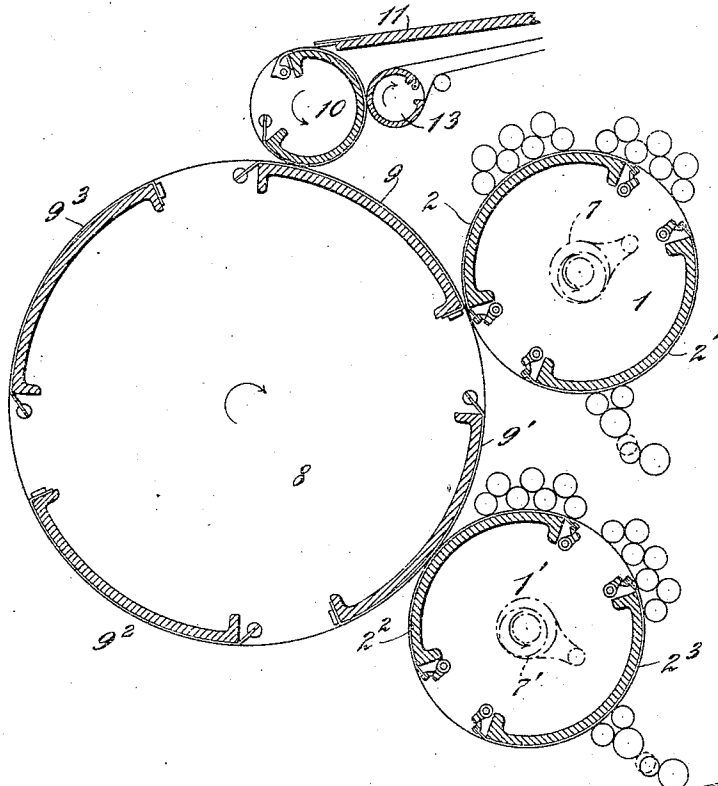


Fig. 3.

Fig. 1.

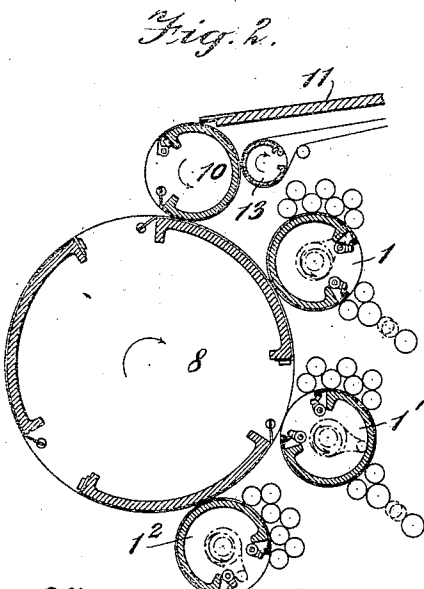
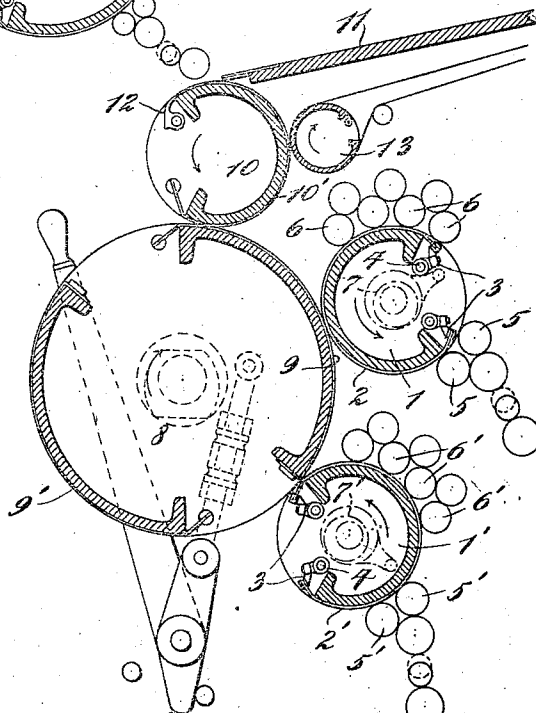


Fig. 2.



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THOMAS FRANK ELSWORTH, OF LEEDS, ENGLAND.

ROTARY PRINTING-MACHINE.

1,085,228.

Specification of Letters Patent.

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Application filed April 30, 1913. Serial No. 764,555.

To all whom it may concern:

Be it known that I, THOMAS FRANK ELSWORTH, a subject of the King of Great Britain, residing at Leeds, in the county of Yorkshire, England, have invented certain new and useful Improvements in Rotary Printing-Machines, of which the following is a full, clear, and exact description.

This invention relates to improvements in rotary printing presses and more especially to that type which comprises printing surfaces grouped upon the peripheries of three constantly rotating cylinders which can be brought into and out of contact with each other, and in which the second or transfer cylinder is furnished with two or more printing surfaces which receive their own individual designs from the design or plate cylinder without super-printing and transfer these in sequence to the sheet or impression surface carried by an impression cylinder. A rotary printing press of this type is shown and described in Letters Patent No. 958,484.

The invention in this instance consists in an improved construction which comprises substituting for the design or plate cylinder of such a machine, two or more cylinders each furnished with inking and damping rollers, according to the nature of the design surface carried thereby, each cylinder being in printing contact with a transfer cylinder or wholly removed therefrom. The design cylinders may be of smaller diameter than the transfer cylinder and are preferably a submultiple thereof, corresponding to the number of spaces or printing surfaces on the periphery of the transfer cylinder or corresponding in ratio with the number of spaces or printing surfaces on the transfer cylinder to the number of design surfaces on each of the design cylinders. The number of design or plate cylinders depends upon the number of colors or designs which it is desired to print upon the sheet.

The invention also consists in the combination and construction of parts set forth in the specification and claims appended hereto.

In the drawings, Figure 1 is a diagrammatic sectional view through the cylinders of a rotary press constructed according to the invention; Figs. 2 and 3 are similar views showing modifications.

Referring first to Fig. 1, the cylinders 1 and 1' are of equal diameter and are each

adapted to carry a single design surface or plate 2, 2', respectively, which are held to the cylinders by means of the adjustable grippers 3 mounted on the shafts 4. The design surface or plates 2, 2' may be made of aluminum, zinc or the like, which are commonly used in litho printing, in which case damping rollers 5, 5' are required as well as inking rollers 6, 6', which are shown diagrammatically and are of the well known type. If the machine is used for letterpress printing, a plate of the stereotype form may be used, in which case the damping rollers 5, 5' are not required. The cylinders 1, 1' are mounted on eccentric bearings 7, 7' so that the design surfaces or plates carried thereby may be moved bodily into and out of contact with the peripheral printing surfaces of the transfer cylinder 8. The cylinders are moved by any suitable mechanism (not shown) so that the design surface or plate 2 will only be impressed on the printing surface 9 of the cylinder 8 and the plate 2' only upon the printing surface 9'. The printing surfaces 9 and 9' are similar to those used in the patent above referred to and consist of blankets made of rubber or the like which are adapted to receive the impression from the design surface or plate 2, 2' at each revolution and transfer it at each revolution to the sheet to be imprinted, which is fastened to the impression cylinder 10, or to the printing surface or blanket 10' when a sheet is not carried by the impression cylinder on that revolution. As shown in the patent above referred to, the cylinder 8 may be moved into and out of contact with the cylinder 1, 1' and the impression cylinder 10. The sheets to be printed are fed from a table 11 and are seized by grippers 12 which are of any well known construction and may be provided with any well known mechanism for automatically releasing the printed sheet, so that it may be removed by the take-off mechanism 13, and for automatically seizing the next sheet to be printed. It is also well known how such a mechanism may be arranged to cause grippers to seize a sheet at each revolution or at a second or third revolution only if desired.

Fig. 2 shows a modification in which there are three design cylinders 1, 1', 1² spaced for cooperation with the transfer cylinder 8 carrying a like number of printing surfaces 9, 9', 9². It is to be noted that with

this form, the diameter of the impression or printing cylinder 10 is made substantially one-third of that of the transfer cylinder 8 and is to be so geared that it will make three revolutions to each revolution of the transfer cylinder or one revolution for each of the transfer or printing surfaces carried thereby.

If a larger number of plate or design cylinders than three is required, and such is not a prime number, it is better to provide each cylinder with more than one printing surface so as to reduce the number of printing cylinders required.

Fig. 3 shows that form of modification in which there are four design surfaces 2, 2', 2², 2³, carried by two plate cylinders 1 and 1', each cylinder carrying two design surfaces. The transfer cylinder 8 carries four cooperating or transfer surfaces 9, 9', 9², and 9³, each of which is adapted to cooperate with only one of the design surfaces. It is to be noted therefore that the cylinders 1, 1' are mounted to be moved into and out of contact with the transfer cylinder 8 in such a manner that the design plates 2, 2' are imprinted on the surfaces 9, 9², respectively, while the design surfaces 2², 2³ are imprinted upon the surfaces 9' and 9³, respectively. Means for moving the plate cylinders is shown diagrammatically as at 7 and may consist of any well known form of gearing and the like which will be properly timed to produce this result. The impression or printing cylinder 10 in this modification is made one-fourth the diameter of the transfer cylinder so that it is adapted to take an impression from each of the printing surfaces carried by the transfer cylinder.

These modifications are each adapted to be used in the various ways set out in the patent before referred to; for printing simultaneously on both sides of the paper with either the same designs or colors, as is necessary in transparent work, or with different designs and colors; by feeding a sheet of material for each revolution of the impression cylinder, the press may be used to print the same designs on a like number of sheets as there are surfaces on the transfer cylinder, one for each revolution of the impression cylinder so increasing the outfit of the press to any desired degree; the press may also be used for printing two, three, or more designs or colors consecutively on the same sheet by retaining the sheet on the impression cylinder for one revolution of the transfer cylinder, in which case each of the printing surfaces will be transferred to the sheet in turn depending upon the number of individual design or color plates which may be used; or the press may be arranged so that a plurality of designs or colors will be printed on one side and a different design or color on the other

side simultaneously. By properly feeding the sheet, negative plates may be used on some of the design cylinders which will in turn be transferred to the blankets of the transfer cylinder and impressed upon the blanket of the impression cylinder which will give the correct design on the inside of the sheet carried thereby.

Having thus described my invention, I claim:

1. A rotary printing machine comprising a rotary impression cylinder, a rotary transfer cylinder having a plurality of printing surfaces adapted for printing contact therewith, a plurality of rotary design cylinders adapted to hold design surfaces equal in number to the number of printing surfaces, and means for bodily moving said design cylinders for impressing each design surface upon a surface of the transfer cylinder, respectively.

2. A rotary printing machine comprising a rotary impression cylinder, a rotary transfer cylinder having a plurality of printing surfaces in printing contact therewith, a plurality of rotary design cylinders each having a design surface, and means for bodily moving said design cylinders toward and away from said transfer cylinder to impress each design surface upon a surface of the transfer cylinder, respectively.

3. A rotary printing machine comprising an impression cylinder, a transfer cylinder having a plurality of printing surfaces on its periphery adapted for printing contact with said impression cylinder, a plurality of rotary design surfaces each movable toward and away from the peripheral surface of said transfer cylinder, and means for moving each of said design surfaces into contact with one of said printing surfaces, respectively, whereby each design surface is impressed on a surface of the cylinder without super-printing.

4. A rotary printing machine comprising a continuously rotating first cylinder, a plurality of printing surfaces on its periphery, a plurality of continuously rotating cylinders of different diameter than the first cylinder, printing surfaces on said second named cylinders adapted for contact with the surfaces of the first cylinder, a continuously rotating third cylinder of a diameter which is a submultiple of that of the first cylinder, a single printing surface on said third cylinder, and means carried by the third cylinder for retaining a sheet to be printed when fed thereto.

5. A rotary printing machine comprising a continuously rotating transfer cylinder, a plurality of printing surfaces on its periphery, a corresponding number of continuously rotating design cylinders each of a diameter which is a submultiple of that of the transfer cylinder, the printing surfaces on said

design cylinders being equal in number to those on the transfer cylinder, a continuously rotating third cylinder of a diameter which is a submultiple of that of the transfer cylinder, a single printing surface on said third cylinder, and means carried by the third cylinder for retaining a sheet to be printed when fed thereto.

6. A rotary printing machine comprising a plurality of continuously rotating design cylinders, a plurality of printing surfaces on the peripheries thereof, each adapted to carry a different design, a continuously rotating transfer cylinder having printing surfaces equal in number to the sum of those on the plurality of design cylinders, a continuously rotating third cylinder having a single printing surface, and means for imparting consecutively to one face of a sheet

to be printed an impression of each of said designs.

7. A rotary printing machine comprising a rotary impression cylinder, a transfer cylinder having a plurality of printing surfaces adapted for printing contact therewith, a plurality of rotary design cylinders adapted to hold design surfaces equal in number to the sum of the printing surfaces, and means for bodily moving one of said last two named sets of cylinders relative to the other for impressing each design surface upon a surface of the transfer cylinder respectively.

In witness whereof, I subscribe my signature, in the presence of two witnesses.

THOMAS FRANK ELSWORTH.

Witnesses:

GEORGE MELLIS,

CHARLES E. TAYLOR.