A. B. EVANS & G. C. H. WICHMANN.

ROTARY PRINTING MACHINE.

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Patented May 17, 1910.

Fig. 1.

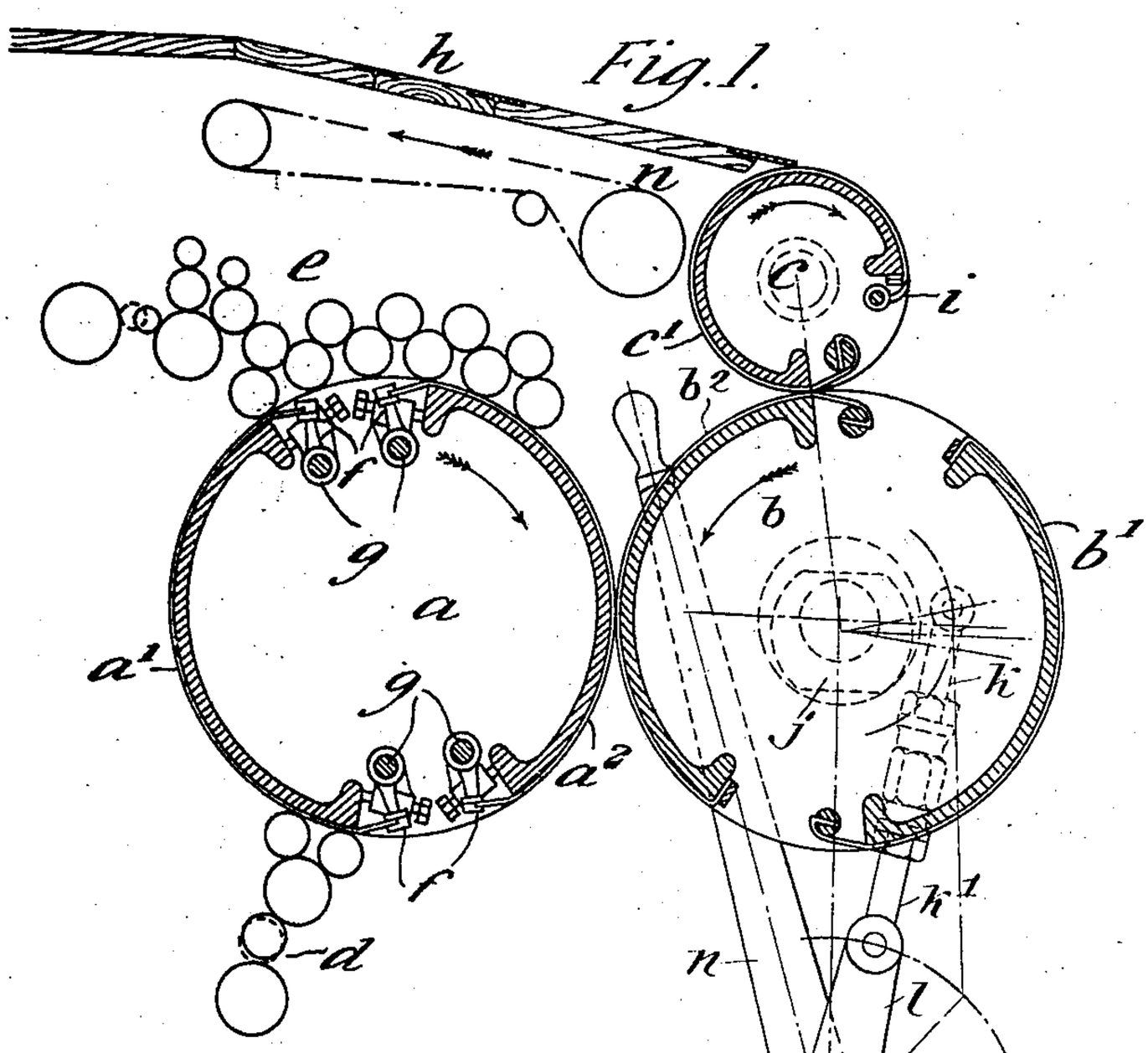
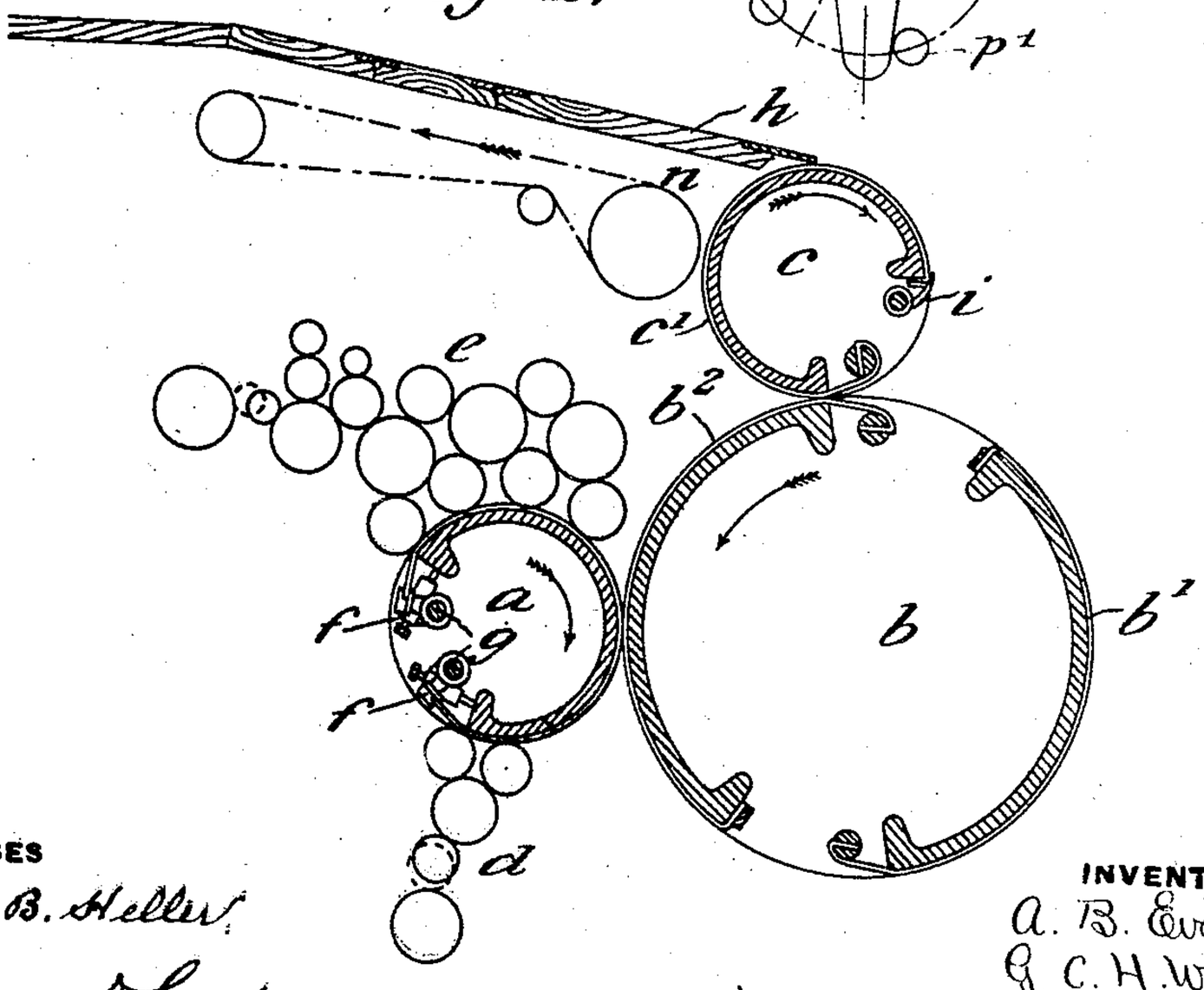


Fig. 2.



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ROTARY PRINTING-MACHINE.

958,484. Specification of Letters Patent. **Patented May 17, 1910.**

Application filed January 29, 1909. Serial No. 474,961.

To all whom it may concern:

Be it known that we, ARTHUR BURROUGHES EVANS and GEORG CARL HEINRICH WICHMANN, both subjects of the King of Great Britain, residing, respectively, at 13 Belle Vue avenue, Roundhay, Leeds, in the county of York, England, engineer, and 4 Ladywood road, Roundhay, Leeds, aforesaid, engineer, have invented certain new and useful Improvements in Rotary Printing-Machines, of which the following is a specification.

This invention consists of a machine, for printing upon paper, card or the like, or metal or like hard substance in the form of sheets which can be bent around a cylinder.

The machine comprises suitable printing surfaces grouped upon the periphery of three constantly rotating cylinders, which may be brought into mutual contact or removed from such contact as may be required during the working of the machine. The first cylinder carries on its printing surface or surfaces, one, two or more designs in the same or different colors, which are inked or damped and inked in the usual letterpress or lithographic manner. The second cylinder carries a number of printing surfaces adapted to receive impressions from the printing surface or surfaces of the first cylinder. The third cylinder carries a single printing surface adapted to receive impressions from the surfaces on the second cylinder, and the diameter of this third cylinder is a submultiple of the diameter of the second cylinder, such submultiple corresponding with the number of printing surfaces carried on the second cylinder. Such a machine, by bringing into use all or some of the printing surfaces and by suitable adjustments of the gripping and releasing mechanism, can be arranged to print upon the paper, card, metal or the like in one, two or more colors, upon either side or both sides, according to the immediate requirements of the operator of the machine.

Figure 1 of the accompanying drawings is a diagrammatic section through the cylinders of a printing machine constructed according to the invention, and Fig. 2 is a like view of a modification.

In Fig. 1 the machine is arranged for printing in a single color.

The cylinders a and b of equal diameter, are each adapted to carry two printing surfaces and cylinder c of one half the diameter of a or b is adapted to carry a printing surface and the sheet to be printed. As in this case only one color is to be printed, there is only one set of inking rollers e. The printing surfaces a' and a^2 on cylinder a may be plates of aluminium, zinc or the like, as are commonly used in litho-printing, in which case there is a set of damping rollers d in addition to the inking rollers e; or if the machine is used for letter-press printing, a printing surface of stereotype form may be used, in which case the damping rollers are not required. Whatever the surface, it is held by adjustable grippers f mounted on shafts g. Cylinder b carries two rubber blankets or the like b' b^2 adapted to receive the impression from the surfaces a' a^2 at each revolution and to transfer it at each revolution to the sheet to be imprinted on cylinder c, or to the printing surface c' when a sheet is not carried at that revolution.

The sheet to be printed is fed down the table h to be seized by the grippers i. These are of any known construction and may be provided with any well known mechanism for automatically releasing the printed sheet so that it can be removed my the take-off mechanism n and for automatically seizing the next sheet to be printed. It is well known how such mechanism may be arranged to cause the grippers to seize a sheet at each revolution or at every second or third revolution.

When one sheet is fed to the cylinder c to each revolution of cylinders b and a, this can be made to receive its impression from one of the printing surfaces on cylinder b, say b', and the impression surface c' to receive the impression from b^2, thus in the operation of printing, the sheet which is fed down the table h receives at the same time an impression upon the outer side from the printing surface b' and upon the inner side from the printing surface c' during each revolution of cylinders a or b.

Two different designs can be printed on the outer side of the sheets for each revolution of cylinder b, or twice the output can be obtained when there is a single design, by feeding a sheet to each revolution of the

cylinder *c*, in which case the grippers may be arranged to take and release a sheet at every revolution of cylinder *c*.

One variation of working the machine consists in removing plate a^2 and blanket b^2 in which case a sheet is fed at every other revolution of the cylinder *c*, and is printed upon its outer side by the impression on the blanket *b'*. Another variation consists in removing plate *a'* only, in which case the impression is transferred from a^2 to blanket b^2, thence to blanket *c'*, and thence to the inner side of the sheet. Blanket *b'* forms in this case an impression surface for the purpose of pressing the sheet upon the blanket *c'* at the point of contact between *b* and *c*. It is obvious that as the design is in this case impressed through one more surface than in the preceding case the design upon the plate a^2 in this case is of opposite hand to that on the plate *a'* in the preceding case to give the same effect on the printed sheet.

The machine may be adapted for printing in two colors consecutively on the same side of the sheets, or printing on both sides of the sheet in different colors at the same time. For this purpose an additional set of inking rollers is necessary and each of these two sets must be adapted in known manner to be out of contact with the cylinder when the printing surface to which it does not apply is passing it. When two colors are being printed on the same side of the sheet, the gripping mechanism is arranged in known manner to retain the sheet on cylinder *c* during two revolutions thereof. When the two colors are printed on opposite sides of the sheet the gripping mechanism is arranged to retain the sheet only for one revolution of cylinder *c*, and the printing is obtained in a manner similar to that already described for printing on both sides of the sheet. If cylinder *c* be made one-third of the diameter of cylinder *a* or *b*, and cylinder *a* has three printing surfaces and cylinder *b* three blankets, the machine will print three colors, or two colors on one side of the sheet and one color on the other. Three sets of inking rollers would then be required and each must be arranged to be out of contact with cylinder *a* for two-thirds of each revolution.

In Fig. 2, cylinder *a* is of the same diameter as cylinder *c* and carries only one printing surface adapted to transfer an impression to each of the blankets *b'* b^2 at each revolution of the machine. If, therefore, a sheet is fed to cylinder *c*, at each revolution thereof there will be two sheets printed at every revolution of the machine. Or if a sheet of paper is fed to cylinder *c* at every alternate revolution thereof, there will be only one sheet printed at each revolution of the machine, but this will be printed on both sides, the two prints being in register, an effect which is of value for transparencies and the like.

It is obvious that the position of the take-off mechanism *n* is not necessarily that shown in the figures in every case. If only one sheet is fed to every two revolutions of the cylinder *c* and if that sheet is only carried once past the point of contact of the cylinders *b* and *c*, the sheet may be carried around the cylinder *c* under the board *h* and delivered to a take-off mechanism situated between the board *h* and the point of contact of the cylinders on the other portion of the periphery of the cylinder *c*.

In Fig. 1 is shown means whereby the cylinders are adapted to be brought into and out of contact with each other. For this purpose cylinder *b* is journaled in an eccentric bearing *j* pivotally connected by jointed rods *k*, *k'* to one or more levers *l* fixed to a shaft *m* mounted in the frame of the machine. Shaft *m* can be rocked by means of a hand lever *n* fixed thereto, the movement of the shaft being limited by the engagement of another lever *o* on the same shaft with either stop *p'* or stop p^2 attached to the frame. In the position indicated on the drawing the three cylinders *a*, *b*, *c* are in contact with each other. If lever *n* is shifted so as to cause lever *o* to abut against stop p^2 the eccentric bearing *j* is moved whereby the cylinder *b* is taken out of contact with cylinders *a* and *c*.

Having thus described the nature of our said invention and the best means we know of carrying the same into practical effect, we claim:—

1. A rotary printing machine comprising a continuously rotating first cylinder adapted to hold a printing surface, a continuously rotating second cylinder in printing contact with the first cylinder and adapted to hold a plurality of printing surfaces on its periphery, a continuously rotating third cylinder in printing contact with the second cylinder and adapted to hold a single printing surface on its periphery, the diameter of the said third cylinder being a submultiple of that of the said second cylinder, and grippers carried by said third cylinder adapted to retain a sheet to be printed when fed thereto during the rotation of the cylinder.

2. A rotary printing machine comprising a continuously rotating first cylinder adapted to hold a printing surface, a continuously rotating second cylinder in printing contact with the first cylinder and adapted to hold a plurality of printing surfaces on its periphery, and a continuously rotating third cylinder in printing contact with the second cylinder and adapted to hold a single printing surface on its periphery, the diameter of the said third cylinder being a submultiple of that of the said second cylinder, the said three cylinders being adapted to be brought

out of printing contact with each other when required, and grippers carried by said third cylinder adapted to retain a sheet to be printed when fed thereto during the rotation of the cylinder.

3. A rotary printing machine comprising a continuously rotating first cylinder, a plurality of printing surfaces on its periphery, a continuously rotating second cylinder of the same diameter as the first cylinder, printing surfaces on the second cylinder equal in number to those on the first cylinder, a continuously rotating third cylinder of a diameter which is a submultiple of that of the second cylinder, a single printing surface on the said third cylinder, the three cylinders being adapted to be moved into and out of printing contact with each other and means carried by the third cylinder for retaining a sheet to be printed when fed thereto.

4. A rotary printing machine comprising a continuously rotating first cylinder, a plurality of printing surfaces on its periphery each adapted to carry a different design, a continuously rotating second cylinder of the same diameter as and in direct printing contact with the first cylinder, printing surfaces on the second cylinder equal in number to those on the first cylinder, a continuously rotating third cylinder having a single printing surface, and means for imparting simultaneously to a sheet to be printed impressions of said designs, one of said impressions being on one face of the sheet and another of said impressions being on the other face.

5. A rotary printing machine comprising a continuously rotating first cylinder, a plurality of printing surfaces on its periphery each adapted to carry a different design, a continuously rotating second cylinder of the same diameter as the first cylinder, printing surfaces on the second cylinder equal in number to those on the first cylinder, a continuously rotating third cylinder having a single printing surface, the three cylinders being adapted to be moved into and out of printing contact with each other, and means for imparting simultaneously to a sheet to be printed impressions of said designs, one of said impressions being on one face of the sheet and another of said impressions being on the other face.

6. A rotary printing machine comprising a continuously rotating first cylinder, a plurality of printing surfaces on its periphery each adapted to carry a different design, a continuously rotating second cylinder of the same diameter as the first cylinder, printing surfaces on the second cylinder equal in number to those on the first cylinder, a continuously rotating third cylinder having a single printing surface, and means for imparting separately and consecutively to one face of a sheet to be printed an impression of each of said designs.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ARTHUR BURROUGHES EVANS.
GEORG CARL HEINRICH WICHMANN.

Witnesses:
GEORGE RIGBY CARTER,
FR. LEMCKE.