

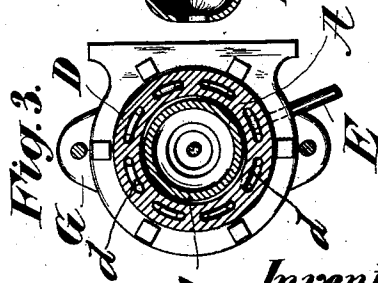
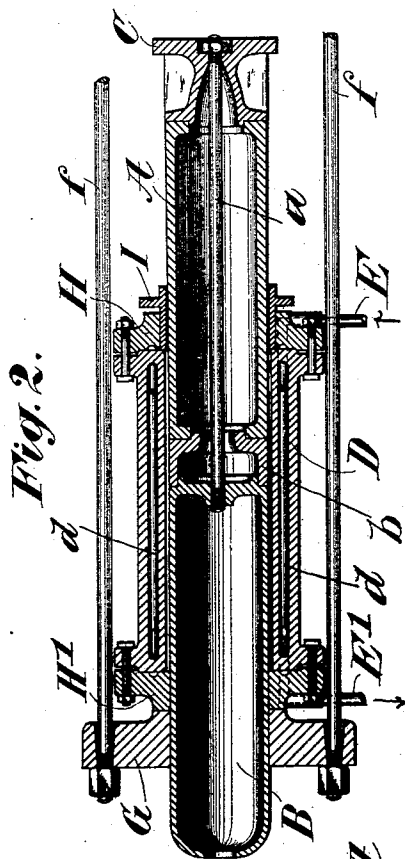
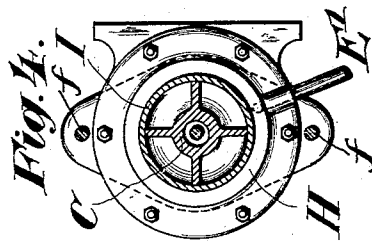
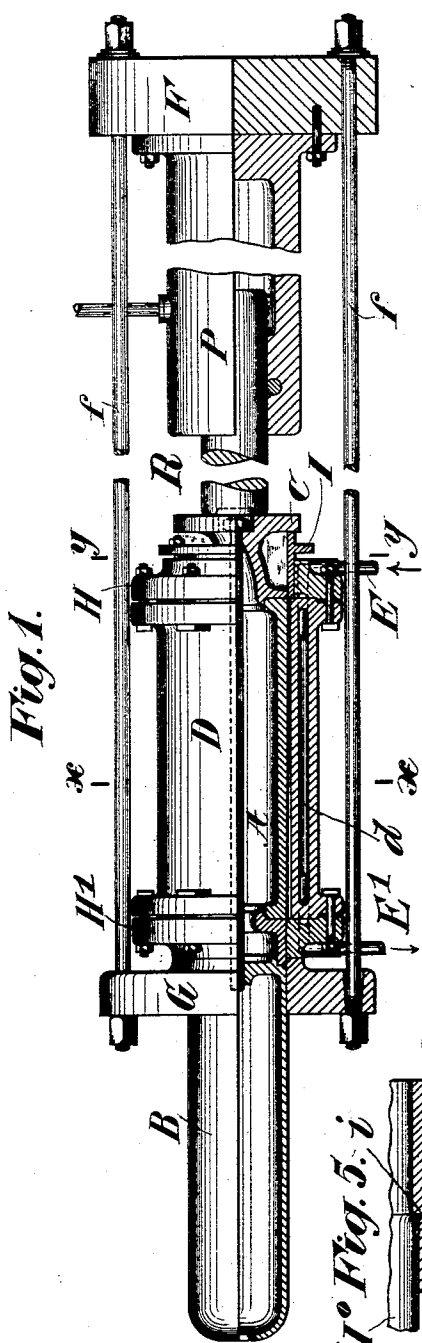
(No Model.)

H. ZIEGLER-REINACHER.

METHOD OF PRODUCING CELLULOID ROLLERS WITH PRINTING SURFACES.

No. 573,564.

Patented Dec. 22, 1896.



Witnesses:

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METHOD OF PRODUCING CELLULOID ROLLERS WITH PRINTING-SURFACES.

SPECIFICATION forming part of Letters Patent No. 573,564, dated December 22, 1896.

Application filed September 5, 1895. Serial No. 561,506. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH ZIEGLER-REINACHER, a citizen of the Republic of Switzerland, and a resident of Aadorf, Switzerland, have invented certain new and useful Improvements in Celluloid Rollers with Surface-Printing Designs, of which the following is a specification.

My invention has relation to the art of producing forms for printing purposes having either a plane or flat face or an arcuate or cylindrical face, and the subject-matter to be printed either in relief or cameo or in intaglio on or in such face.

The invention has for its object the provision of means whereby forms for printing purposes can be produced in a very rapid manner, without much labor, and at a very low cost as compared with the time, labor, and expense involved in the production of the forms for printing purposes now in general use. Inasmuch as the processes by which forms for printing purposes such as are now used are well known, it is not necessary to enter into a detailed description thereof for a full understanding of the mode or process of producing such forms in accordance with my invention.

The invention consists, essentially, in a form for printing purposes, of celluloid, having the subject-matter to be reproduced by printing either in relief or intaglio on or in its printing-surface; and my said invention consists, further, in the mode of producing these forms.

In carrying out my invention I first prepare a matrix or form having the subject-matter to be reproduced formed on its face by well-known photographic processes. For instance, if the form to be printed from is to have the subject-matter to be reproduced in relief the matrix, as a sheet of metal, will have a photographic negative of such matter. If, on the other hand, the form to be printed from is to have the subject-matter in intaglio, then said matrix will have a photographic positive of such matter. The mode of producing these photographic negatives and positives for use as matrices is so well known that a detailed description thereof will not be necessary.

From the matrix, prepared as described, the celluloid printing-form is obtained by the transfer process and while the celluloid is in a sufficiently plastic state, the transfer being effected in a suitable press, and when the celluloid form has again hardened it can be removed from the matrix and is ready for use.

For the purpose of transferring the subject-matter to be reproduced by printing from the matrix to the celluloid printing-form the work can be greatly simplified and expedited by the provision of means for softening the celluloid form while in contact with the matrix and before the application of pressure, as, for instance, by providing means for heating the celluloid form, and after the transfer withdrawing the heat and allowing the form to harden again, and this may also be expedited by substituting a cooling agent for the heating agent.

The more costly forms for printing purposes are those of cylindrical form—i. e., printing cylinders or rolls—and I will describe my invention in detail in relation to the production of such forms, from which description the production of forms having a plane or flat printing-surface can be readily deduced, reference being had to the accompanying drawings, in which—

Figure 1 is a half-elevation and half-longitudinal section of an apparatus embodying my invention. Fig. 2 is a longitudinal axial fragmentary section thereof. Figs. 3 and 4 are sections on lines *xx* and *yy* of Fig. 1, and Fig. 5 is a detail sectional view.

Similar symbols of reference are employed to indicate like parts wherever such may occur in the described figures of drawings.

The apparatus consists of a cylinder D, in the walls of which are formed interconnected chambers or passages *d*, whose inlet and outlet ports are in the opposite ends of the cylinder and communicate with the inlet and outlet passages in the respective cylinder-heads H and H', said passages being connected by inlet and outlet pipes E and E', respectively. The inlet-pipe E is connected with a suitable source of steam and cold-water supply in such manner as that either steam or cold water may be caused to circulate through the walls of cylinder D for the purpose of heating or

cooling the latter, and as such arrangements are well known I have deemed it unnecessary to illustrate the same.

Inasmuch as the cylinder D is not subjected to great pressure a thin-walled cylinder can be used and provided with a heating-jacket, a construction that is also well known.

In the cylinder D works a hollow plunger constructed in two sections A and B, the latter serving as a guide extension for the former, said sections being detachably connected through the medium of an intermediate thimble *b*, a head C for the plunger-section A, and a connecting-rod *a*. As shown, the plunger-section A is of slightly-increased diameter from the point of contact with the thimble *b* to its head C, so that a cylinder of celluloid drawn onto such a plunger will firmly adhere thereto. The interior diameter of the cylinder D relatively to the greatest exterior diameter of the plunger A is such as not only to accommodate the latter and the celluloid jacket thereon, but also to accommodate a matrix I°, Fig. 5, of sheet metal. Any suitable means may be provided for imparting endwise motion to the plunger A B into and out of the cylinder D. In the drawings, Fig. 1, I have shown a hydraulic ram, the cylinder P of which is secured to one of the machine-heads F, while the ram R is adapted to impinge upon the head C of the plunger A B and push the same into cylinder D, the movement of the plunger out of said cylinder being effected by hand, as this requires no great power; but it may also be effected through the medium of the ram by connecting the same to the head C and constructing the ram in the form of a piston, in which case the cylinder P will be provided with admission and exhaust ports at each end, or an ordinary steam cylinder and piston may be used, these modifications being within the province of any skilled mechanic.

The machine-head F is connected by means of rods *f* with a second machine-head G, to which the cylinder H' is secured, said heads F and G being constructed with bases and performing the function of supports for the machine.

The bore of the machine-head G and the cylinder-head H is of such diameter as to practically form a fluid-tight joint with the guide extension B of the plunger A B, and as the interior diameter of the cylinder D is greater than the diameter of said bores an annular shoulder is formed, against which the celluloid, when rendered plastic, is crowded to fill the space between the plunger and the matrix I°, the clamping-sleeve I performing the same function at the opposite end of the cylinder D. This clamping-sleeve serves to clamp the matrix I° to the cylinder D, said matrix being provided with an annular flange *i'*, overlapping the cylinder end, and said sleeve being detachably connected by bolts and nuts *i* to said cylinder D, as clearly shown in Fig. 5.

The mode of transferring subject-matter to be printed from a matrix to a cylindrical celluloid printing-form is as follows: The plunger A B being pushed out of cylinder D a sheet-metal cylindrical matrix I°, having the subject-matter to be transferred to a celluloid cylinder in relief or intaglio on its inner periphery, is inserted into said cylinder D and clamped thereto by means of the sleeve I. The plunger A B, with its celluloid jacket, is then pushed into the cylinder as far as this can be done, in view of its gradually-increasing diameter, and steam is turned on to heat the cylinder D and soften the celluloid, when the ram R is set in operation to force the plunger fully home, thereby bringing the more or less plastic celluloid into intimate contact with the matrix and transferring the matter thereon to the celluloid. The supply of steam is now cut off and cold water or another cooling agent supplied to the cylinder D, whereby the latter and the celluloid jacket or cylinder on the plunger-section A are cooled, thereby hardening the more or less plastic celluloid. The clamping-sleeve I is now removed and the plunger A B pushed out of the cylinder D, carrying with it the matrix I°. The celluloid cylinder is now slipped off the mandrel, the matrix is removed, and the gelatin positive or negative, rendered insoluble by prior exposure to light, is by means of a suitable lye and water softened and destroyed, the entire operation described taking about half an hour.

The operation of stripping the plunger may be facilitated by disconnecting the guide extension B therefrom, which can readily be done by removing the nut *n* at the outer end of rod *a*, Fig. 2.

Printing-cylinders prepared as described possess, irrespective of their low cost, decided advantages over the printing-cylinders now in use in that they are adapted to receive not only the coarser or more open designs and patterns, but also the finer, and, in fact, the most elaborate designs without additional labor or expense over and above the labor and expense involved in providing such cylinders with the coarser or more open designs or patterns, since the labor and expense involved in the photographic production of the matrices and the labor and expense involved in the transfer of the designs are substantially the same in both cases, a little more care being perhaps involved in the production and transfer of very elaborate designs or patterns. Furthermore, for chromatic work, either in ordinary or chromatic printing-presses or in printing on fabrics, as in calico-printing presses, rolls having the design or pattern in relief instead of intaglio will readily be appreciated by those conversant with these arts.

Although my improved rolls can be as readily repaired as the metallic rolls now used, should this become necessary, this trouble and expense may, however, be avoided by simply discarding the damaged cylinders and substituting new ones, in view of the very low

cost thereof and of the fact that the material itself can be used over and over again.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In the mode of producing cylindrical printing-forms; forming a matrix by producing upon a flexible support a gelatin photographic positive or negative, forming a hollow cylinder therewith having such positive or negative on its interior surface, introducing a cylinder of celluloid into the matrix and effecting the transfer of the positive or negative by the application of heat and pressure, substantially as set forth.

2. The mode of producing cylindrical celluloid printing-forms, which consists in forming a matrix by producing upon a flexible support, as one of sheet metal, a photographic positive or negative of the subject-matter to be reproduced, bending the support into a cylindrical form with the matrix on its inner face, introducing a cylinder of celluloid into the cylindrical matrix, reducing said celluloid cylinder to a plastic state, transferring the subject-matter to the plastic cylinder by pres-

sure and allowing the cylinder to cool and harden prior to its removal from the matrix, substantially as set forth.

3. The mode of producing cylindrical celluloid printing-forms, which consists in forming a matrix by producing upon a flexible support, as one of sheet metal, a photographic positive or negative of the subject-matter to be reproduced, bending the support into cylindrical form with the matrix on its inner face, introducing a hollow cylinder of celluloid into the cylindrical matrix, reducing said celluloid cylinder to a plastic state, transferring the subject-matter to the plastic cylinder by pressure applied from within, and allowing the cylinder to cool and harden prior to its removal from the matrix, substantially as set forth.

In testimony whereof I hereunto sign my name, in the presence of two subscribing witnesses, this 26th day of July, 1895.

HEINRICH ZIEGLER-REINACHER.

Witnesses:

EMIL BLUM,
H. LABHART.