

W. J. YEOELL.

METHOD OF PRODUCING PRINTING SURFACES.

APPLICATION FILED MAY 18, 1904. RENEWED DEC. 28, 1911.

1,034,329.

Patented July 30, 1912.

Fig. 1

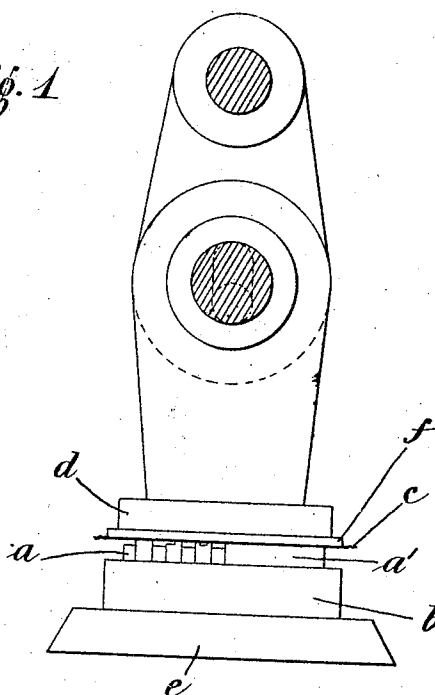


Fig. 2

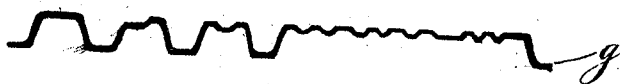
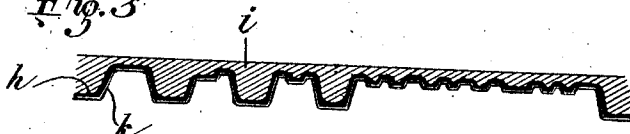


Fig. 3



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METHOD OF PRODUCING PRINTING-SURFACES.

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Specification of Letters Patent.

Patented July 30, 1912.

Application filed May 18, 1904, Serial No. 208,632. Renewed December 28, 1911. Serial No. 668,327.

To all whom it may concern:

Be it known that I, WILLIAM J. YEOELL, of New York, N. Y., have invented a certain Improved Method of Producing Printing-Surfaces, of which the following description is a specification.

This invention relates to the production of printing surfaces, and is of particular utility for producing in large quantities and at a high rate of speed, replicas of type matter and cuts to be distributed to publications throughout the country for printing advertisements and articles illustrated and otherwise, although I contemplate its utilization in any field to which may improvements may be applied by reason of their nature.

The object of my invention is to reproduce by mechanical means the surface of type characters closely related as set up in text, etc., and the printing surface of cuts, engravings or the like, this replica to be in the form of a plate, clear, sharp, and thick enough to print from direct on its relief side or to serve on its intaglio side as a matrix in which to form by pressure of a kneading or rolling character other printing surfaces. By this method I produce a device presenting the advantages of the electrototype and stereotype without their defects, and obviating the slow and tedious minutiae of the processes by which they are produced.

One novel feature of my improved method resides in forcing together the type or plate original, and the soft metal blank, by a swaging or kneading pressure, by which the metal of the blank is worked into every crevice, and intimately against every projection of the original, producing a sharp plate, with all the details of the original and of even thickness throughout.

I prefer to use for the material of the blank a metal of high ductility and tenacity to yield to the swaging pressure but not be ruptured thereunder, and as the replica produced under such conditions lacks stability for many subsequent purposes of reproduction, I have adopted the novel step of hardening the replica, preferably using steel or an alloy thereof, presenting the desired ductility, tenacity and capability of tempering, without impairment of its sharpness and detail.

The production by the kneading or swaging pressure can be accomplished in any

suitable apparatus, and the replica can be used for printing, with or without backing, in any suitable press or apparatus. When used as a matrix it may be suitably backed, and secondary replicas produced by pressing into it blanks of the same metal or any suitable metal, copper, brass and aluminum being useful, they being easily worked, responding kindly to the swaging or kneading which it is desirable to utilize in this step. Such replicas, being light, can be mailed without excessive postage, and it will be readily understood that from the type matter once set up, or the etched or engraved plate, or the electrototype or stereotyped originals, replicas can be produced by the above method, comparable in printing qualities with the originals, or with any existing kind of reproduction, this being to the best of my knowledge the first successful method of producing solely by pressure replicas capable of being printed from, although many unsuccessful attempts have, I am aware, been made to accomplish this end, the production of a replica combining both illustration and text in a single plate and at one operation being an especially valuable result of my new process. It will be seen also that my novel method permits the production of a male and female plate in one.

The various features of my invention will be illustrated and described fully in the accompanying drawings and specification and pointed out in the claims.

In the drawings Figure 1 shows in side elevation part of an apparatus suitable for carrying my invention into effect; Fig. 2 shows in section a replica in the construction of which my improvements have been embodied; and Fig. 3 shows the same provided with a backing and serving as a matrix for the formation of secondary replicas.

In carrying my improved method into effect, the form from which the printable replica is to be produced, and which form may contain type *a* with or without illustrations as *a'*, or an electrototype, stereotype, cut or any other suitable printing characters may and preferably will be arranged in a suitable holder *b* such as the ordinary galley or chase in which it should be securely locked. To the surface of the form is applied a blank *c* of metal possessing the qualities of ductility necessary to permit its conformation to the surface contour of the form, tenacity

to prevent rupture by the sharp edges of the type or other elements of the form, and preferably a considerable degree of rigidity to enable the replica to be used, without backing, for the purposes of reproduction of the design presented by the form, the relief surface of the replica being used for this purpose which will be the rear surface when the replica has been reproduced from type or a like relief form.

One suitable metal for the blanks to be formed into replicas is steel which presents the qualities above detailed and presents also the capability for being tempered or hardened, a feature not so much of importance in instances where the replica itself is to be used for printing, as in instances where the original replica is to furnish a matrix or form for the production of secondary replicas and therefore must resist deformation when in accordance with my invention the similar blanks for secondary replicas are to be forced into it, a step in my method to be described hereinafter.

In accordance with my invention the replica blank, of steel, phosphor-bronze, or other suitable metal applied as above indicated to the form surface, is pressed thereagainst by any suitable means that will apply a swaging, kneading pressure resulting in coaxing the metal of the blank closely upon the surface of the form and deeply into the interstices thereof. This pressure may be accomplished in any suitable manner and by any suitable means, as for example a press having a platen *d* with a rocking motion, cooperating with a plunger *e*. In the use of such a press the form *a* may be placed upon the plunger *e*, a piece of thin annealed steel *c* about one-thousandth or two-thousandths of an inch in thickness laid upon the surface of the form and at times it may be desirable to lay a piece of rubber or the like *f* over the steel before bringing the plunger of the press up toward the platen, by the rocking motion of which platen results the kneading or swaging effect desired to coax the steel into the form, the resulting replica *g* being illustrated in Fig. 2 on a much enlarged scale.

To afford an adequate printing surface where a half-tone plate or the like constitutes the form, a relatively shallow replica will suffice, especially where there is considerable detail with no broad non-printing portions to be produced in or sunk beneath the printing surface of the replica. For replicas from forms of type not set very closely a deeper swaging of the replica into the form is desirable, and at times I substitute for the rubber or similar backing above mentioned, the die *d*, which may be conveniently formed from lead or other soft metal by preliminary application of the same to the form surface with sufficient pres-

sure of the plunger to work the form into the soft metal slightly, and it is always within the province of my method to utilize such a die when desired, whether produced in this manner or otherwise, or where the material for the die is not subjected to preliminary pressure before the steel or other replica blank is interposed between it and the form. The average depth of relief for a replica from half-tone illustrations may be three and one-half thousandths of an inch while the relief for replicas from type of over 14 point or thereabout may run to twenty thousandths of an inch and over. The replica thus produced, if of steel, may be treated by a varnish or lacquer to prevent rust and to act to a certain extent to soften the sharpness of its edges.

Passing to the portion of my invention which relates to the production of what I may term secondary replicas from the replica produced as above described, the latter may be used in any suitable way for this purpose and as one convenient mode of such use, I may back the replica as follows. The replica *h* of steel, phosphor-bronze or the like is heated to a suitable temperature and its relief face applied to a block *i* of soft alloy such as that known as "fusible metal," or lead, into which the steel or the like is sunk and cooled thereby being provided with a backing strong enough to resist subsequent pressure when duplicate blanks are forced into it. The original replica now constitutes a sharp, clear, hard female die embedded in a block of metal which may be placed in the press or other suitable apparatus in place of the original form, and the blanks for the secondary replicas may be kneaded and swaged into it substantially in the manner described with reference to the production of the original replica, a secondary replica *k* being shown in Fig. 3. The blanks for the secondary replica may be made from a wider range of materials than a replica which is to be used for a matrix, inasmuch as less stability and less sharpness of intaglio is requisite as well as less relief.

Having thus described fully my improved method it will be understood that I do not limit myself to any specific materials or apparatus nor in general otherwise than as set forth in the claims read in connection with the foregoing specification.

What I claim and desire to secure by Letters Patent is:

1. That improvement in the art of producing printable replicas of type and engraved, or other relief or intaglio forms presenting a multiplicity of closely related printing characters, said improvement consisting in coaxing, by a swaging or kneading pressure, into the interstices and over the high portions of said form, a blank of metal of sufficient ductility to enter into in-

intimate contact with every portion of the contour of said form, and of sufficient tenacity to withstand rupture upon the sharp edges of said form, and of sufficient thinness to present a sharp, clear, printable relief surface opposite to the surface applied to said form, substantially as described.

2. That improvement in the art of producing printable replicas direct from type and engraved, or other relief or intaglio printable forms, said improvement consisting in coaxing, by a swaging or kneading pressure of a reciprocating character, applied through the medium of a yielding but highly resistant backing into the interstices and over the high portions of said form, a blank of metal of sufficient ductility to enter into intimate contact with every portion of the contour of said form, and of sufficient tenacity to withstand rupture upon the sharp edges of said form, and sufficient thinness to present a sharp, clear, printable relief surface opposite to the surface applied to said form, substantially as described.

3. That improvement in the art of producing printable replicas of type and engraved, or other relief or intaglio forms, said improvements consisting in coaxing, by a swaging or kneading pressure, into the interstices and over the high portions of said form, a blank of metal of sufficient thinness and ductility to enter into intimate contact with every portion of the contour of said form, and to present a sharp, clear, printable relief surface opposite to the surface applied to said form, and of sufficient tenacity to withstand rupture upon the sharp edges of said form, and forcing into said original replica blanks to constitute secondary replicas, substantially as described.

4. That improvement in the art of pro-

ducing printable replicas of type and engraved, or other relief or intaglio forms, said improvement consisting in coaxing, by a swaging or kneading pressure, into the interstices and over the high portions of said form, a blank of metal of sufficient thinness and ductility to enter into intimate contact with every portion of the contour of said form, and of sufficient tenacity to withstand rupture upon the sharp edges of said form, and heating the original replica, providing the same with a backing of metal, and forcing into said original replica blanks to constitute secondary replicas, substantially as described.

5. That improvement in the art of producing printable replicas of type and engraved, or other relief or intaglio forms, said improvement consisting in swaging gradually against a form a blank of steel or other metal capable of tempering and of receiving a printable relief surface opposite to the surface applied to said form, and thereafter tempering said replica, substantially in the manner and for the purpose set forth.

6. That improvement in the art of producing printable replicas of type and engraved, or other relief or intaglio forms, said improvement consisting in swaging a metal blank into said form, so that one surface of said replica presents a matrix from which printable secondary replicas can be produced, and thereafter swaging secondary blanks into said original replica, substantially as described.

Signed at New York in the county of New York and State of New York this sixteenth day of May A. D. 1904.

WILLIAM JOHN YEOELL.

Witnesses:

ALEXANDER C. PROUDFIT,
CHARLES ALVIN ROGERS.