

UNITED STATES PATENT OFFICE.

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PROCESS OF LITHOGRAPHIC PRINTING.

SPECIFICATION forming part of Letters Patent No. 420,765, dated February 4, 1890.

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To all whom it may concern:

Be it known that I, WILHELM BRINGS, a subject of the Emperor of Germany, and a resident of Freiburg, Breisgau, Baden, in the Empire of Germany, have invented new and useful Improvements in the Process of Lithographic Printing, of which the following is a specification.

This invention relates to an improved process of transferring upon stone or zinc plates, by which ordinary printing-ink without resin and fat is used instead of fatty transfer-ink now in use.

In the process heretofore employed of transferring upon a lithographic stone or upon a zinc plate a transfer-ink containing fat and resin has invariably been used. This transfer process never produced quite clean copies, which in the further treatment of the stone deteriorated still more. This was the case to a very high degree if transfers upon stone were to be made from copper plates, wood blocks, or the like. It has not hitherto been possible to produce transfers which are perfectly like the original from fine engravings or the like, owing, as above stated, to two causes: First, the fatty transfer-ink heretofore known, when applied to either copper, wood, steel, or stone, produces only imperfect copies, in which the beauty of the original engraving is lost, and, secondly, the treatment of the stone upon which the design is struck off is so complicated that even with the most skillful workman the transfer is liable to suffer in this treatment.

Quite perfect transfers can only be obtained if the printing is effected with the common printing-ink adapted to the plate—thus in the case of a copper plate with ordinary Frankfort black, in the case of a wood block or cliché with printer's ink, and in the case of lithography with ordinary lithographic ink. Hitherto, however, it has not been possible to prepare in the case of such transfers a stone ready for printing, which is the object of the new process. With ordinary ink a copy is made from the copper plate or wood block, cliché, stone, or other plate upon transfer-paper and is struck off upon the stone. The stone is then gummed, washed with water, and then by means of a piece of cloth with a tincture, which consists of a solution of

fat, soap, and resins in turpentine-oil. After this the stone is treated with ink and colophony, is etched, and is ready for printing.

If the manipulation in the old and new processes is compared in succession, (in respect of which it is again observed that in the old process, owing to the fatty transfer-ink, which contains resin, perfectly-finished artistic transfers are impossible,) there are the following single operations. The old process is as follows: first, transfer upon stone with fatty transfer-ink; second, lightly gumming the stone, which is then allowed to dry; third, preparation of an ink one half of which consists of transfer-ink and the other half of common printing-ink, and which is diluted with turpentine-oil to such an extent that it is liquid enough for use; fourth, removal from the stone of the gum coating by washing with water; fifth, application of gum-water to the stone by means of a sponge; sixth, rubbing by means of a sponge the gummed stone which is still wet with the ink prepared according to No. 3; seventh, drying and allowing to stand several hours; eighth, washing and correcting; ninth, rubbing with colophony, powder, and talc; tenth, lightly etching with diluted nitric acid or a mixture of salt and nitric acid; eleventh, gumming and allowing to dry; twelfth, washing with water; thirteenth, when the gum has been removed, washing with turpentine-oil; fourteenth, distribution of strong common printing-ink by rolling; fifteenth, sixteenth, and seventeenth, repetition of No. 9 or Nos. 10 and 11, respectively, a stronger etching-liquid being, however, used than in the case of No. 10. When the gum has been removed by washing, the printing can be effected, provided that in the second etching operation the design was not spoiled, which, as above stated, occurs frequently enough, especially when, according to No. 7, the stone has not been allowed the necessary time to stand.

The new process is as follows: First, transfer with common printing-ink free from resin and fat, and composed, preferably, of ink or soot with linseed-oil and varnish without the addition of resins or fats; second, liberally gumming the stone and allowing it to dry; third, washing off the gum, (the gumming is not absolutely necessary;) fourth, washing

the stone with the new transfer-tincture by means of a clean piece of cloth; fifth, distribution of strong common printing-ink by rolling; sixth, rubbing with colophony and tale, (the tincture is, however, so effective that this manipulation can even be dispensed with;) seventh, etching with a mixture of nitric acid and a solution of gum. When this etching has been washed off, the printing can be commenced at once.

The advantages of the new process are as follows:

First. The transfer-ink hitherto used, which never produces quite sharp artistically-finished copies, is no longer required, and common printing-ink can be used for transferring.

Second. For the rubbing with the liquid prepared from transfer-ink, which operation takes a very long time, is substituted the washing of the stone with the new tincture, which is effected very rapidly.

Third. A repetition of the rubbing with colophony, the etching and gumming are dispensed with, whereby much time is gained.

Fourth. The transfers produced by the new process are much sharper and cleaner than those made with transfer-ink, and they resist the etching even with the strong acid extremely well, so that in the etching a stone will never be spoiled, whereas this is very often the case in the old process.

In order to point out the difference between the old and new process still clearer, it may be advisable to consider somewhat more clearly the whole proceeding of the lithographic transfer. In order to make the matter clear, it should be recollected that the lithographic stone (Sohlenhof slate, calcium carbonate) has the property of intimately combining, as it were, with the fatty and resinous substances, while the lithographic stone etched by acids loses this property. Upon such a stone are therefore etched and unetched places, and if through the medium of a roller a fatty substance is applied in the form of any printing-ink used for lithography the stone will take up the ink in the unetched places, but not in the etched places. Upon this property of the Sohlenhof slate lithography is based. (By "unetched places" are meant those in which the design is produced by fatty ink or chalk.) Now, if a design is to be produced upon a lithographic stone, this can be effected in various manners; but all the methods (pen and chalk drawing, and also engravings) have in common that the stone, in the places where it is to take up ink, protects against the action of the etching-liquid, (acid.)

It appears unnecessary to deal here with the several aforesaid methods at greater length, and it will be sufficient to direct attention directly to the transfer—that is to say, to the process of transferring the design from an original plate onto another stone. The object of this is, first, the saving of the

original, and, second, quicker work, as from the original plate two, four, six, eight, to fifty and more transfers, according to requirements, can be brought upon another stone, and a corresponding number of designs can thus be produced by one impression.

For making the transfer the mode of procedure heretofore adopted has been exhaustively described under the heading of "old process." The principal difficulty in connection with this process consisted, however, in striking off the design upon the stone in an ink which cannot be attacked by acid. This could only be effected by making use of a transfer-ink which contained much fat and resin. Such a transfer-ink could, however, never produce a clean copy equal to the original, and all the lines were much broader than in the original. In order to lessen this defect, the transfer-ink had to be mixed with common printing-ink; but the chemical action of the transfer-ink was thereby lessened and the stone was liable to be spoiled by etching—that is to say, it was etched in places where it was to remain intact. All these inconveniences are obviated in the new process, by which, moreover, a great deal of time is saved.

Instead of adding fats and resins to the ink employed for the transfer, use is made of common printing-ink free from resin and fat, which will perfectly reproduce the original design.

By the treatment with the new transfer-tincture the design is protected at once, and in a much more perfect manner than in the old process, against the action of the etching-liquid.

Repeated attempts recently made have demonstrated, as should be specially pointed out, that the rubbing with colophony and tale (referred to under No. 6 of the former description) is quite superfluous.

The increased action of the transfer-tincture must be attributed mainly to the asphaltum and resin contained therein. Moreover, the transfer cannot only be produced from stone, but from any plate—such as copper, wood block, and the like—inasmuch as only printing-ink is used for the transfer. The difference therefore consists in this, that heretofore a large portion of the fats and resins was brought upon the stone with the transfer-ink, which, as a rule, was prepared from shellac, turpentine, mastic, white wax, and Venetian soap, and was afterward diluted with printing-ink and turpentine-oil for further washing the transfer. The novelty therefore is not the washing with a resinous fatty tincture, but consists in the possibility of producing the transfer with common printing-ink free from resin and fat, which has not hitherto been possible, and is rendered possible by the use of the new tincture, which does not contain any ink.

The tincture is prepared by mixing four parts of wax, four parts of asphaltum, four

parts of resin, and forty-four parts of turpentine. These quantities may, however, be varied without materially changing the result.

5 The important difference between my new process and the old resides in the fact that in the old process fats and resins are brought upon the stone with the transfer-ink, whereas in my process these substances are not brought upon the stone until after the printing.

10 I claim—

The process herein described of transferring upon stone or zinc plates, which consists in effecting the transfer with common print-

ing-ink free from resin, and then rubbing the plate after drying with a solution of approximately equal proportions of wax, asphaltum, and resin in turpentine, substantially as set forth. 15

In testimony whereof I have hereunto signed my name, in the presence of two subscribing witnesses, at Wandsbeit's Inn, August 18, 1888. 20

WILH. BRINGS.

Witnesses:

W. ECKERT,
F. ECKERT.