J. GERNAERT.

MANUFACTURE OF PAPER.

APPLICATION FILED AUG. 31, 1909.

964,014.

Patented July 12, 1910.

2 SHEETS—SHEET 1.

Fig. 3

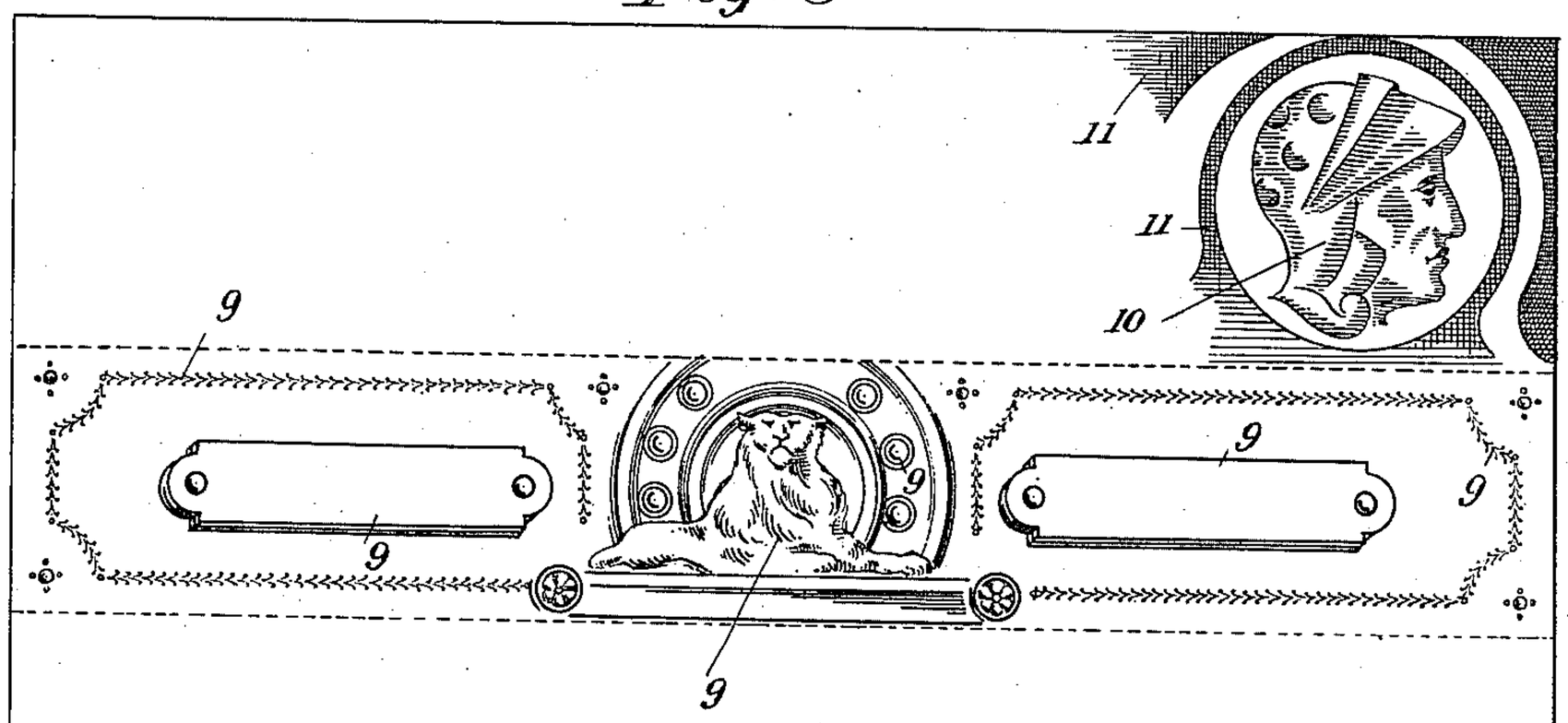


Fig. 1.

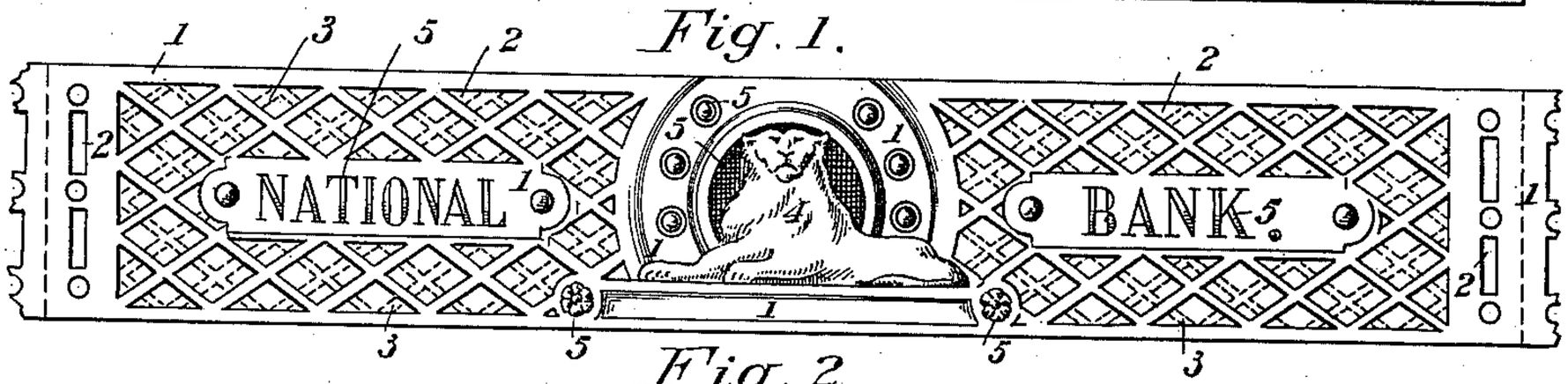
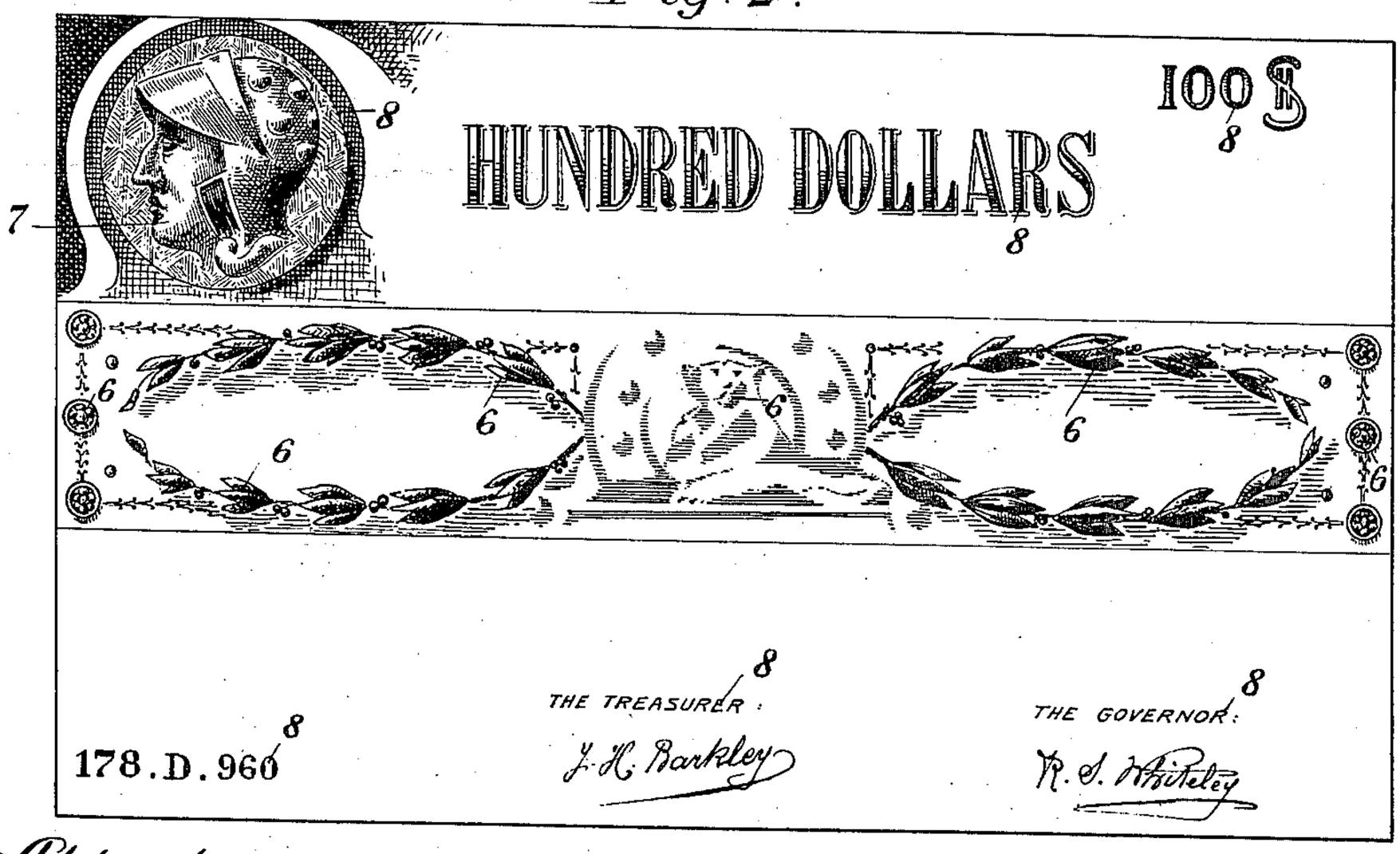


Fig. 2.



Attest.

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2 SHEETS—SHEET 2.

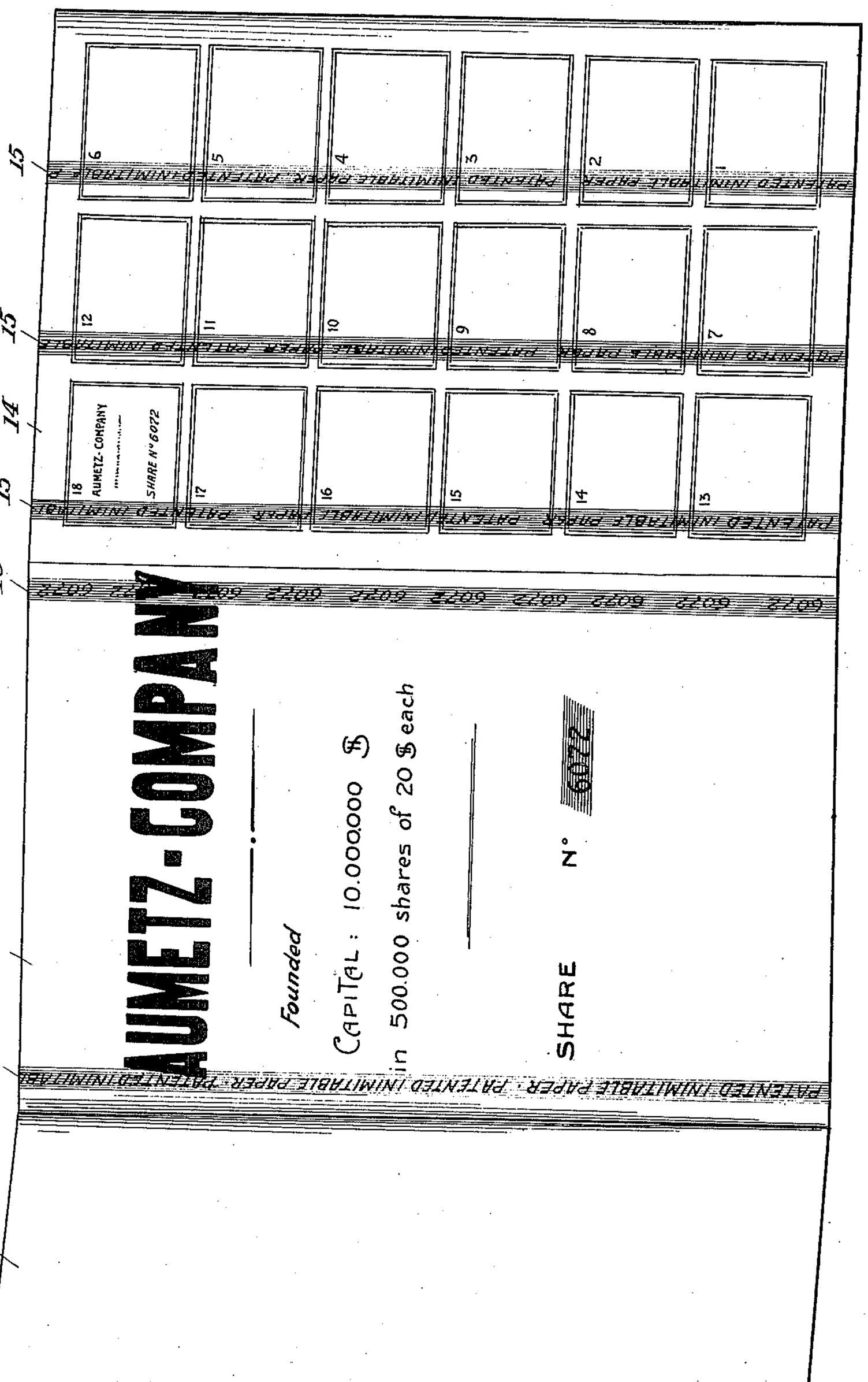

Fig. 4.

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UNITED STATES PATENT OFFICE.

JULES GERNAERT, OF BRUSSELS, BELGIUM.

MANUFACTURE OF PAPER.

964,014. Specification of Letters Patent. Patented July 12, 1910.

Application filed August 31, 1909. Serial No. 515,490.

To all whom it may concern:

Be it known that I, JULES GERNAERT, engineer, a subject of the King of the Belgians, residing at Brussels, No. 13 Rue Ducale, in the Kingdom of Belgium, have invented new and useful Improvements in or Relating to the Manufacture of Paper, of which the following is a specification.

Processes for the manufacture of paper that cannot be imitated, for the manufacture of securities, title-deeds etc. are well known, which consist in spreading or distributing small sheets of paper or of fibrous materials cut out in various shapes, on the paper pulp or in the paper pulp during the manufacture of the paper. As, however, it is impossible, in thus spreading in the paper pulp or stuff, these small bits of cut out paper, to distribute them in a thoroughly uniform manner, and as the distribution in question is left to chance; and as on the other hand by means of the said processes it is possible to obtain at the outside straight or curved bands containing the said small bits of paper, it is impossible to obtain by means of the said process securities, title deeds etc. in any quantity, the paper of which would be absolutely identical in every respect. An essential condition for obtaining a paper that cannot be imitated, is however the possibility of verifying at every moment whether the bank note or the security is genuine, which can only be done by an exact comparison with the original. It is therefore of the utmost importance for the manufacture of paper that cannot be imitated, to be able to manufacture any quantity of pieces or bands of paper, identical down to their minutest details, in which given starting points would coincide in a mathematically accurate manner, not only as regards their shape, but also as regards their place and distribution on the paper. That condition is complied with by the present process, owing to the introduction between two still half-moist layers of paper pulp, thin colored or uncolored linings, in the shape of bands which can be cut out, stamped out or perforated, and one or both faces of which could be printed with patterns which always recur. Owing to the use as an inner material of these bands, of thin sheets stamped out, cut out or perforated in accordance with recurring given patterns, it becomes possible, as will be readily understood, to produce paper bands or sheets of any length and in any desired quantity, identical with each other in every detail. By the introduction of the said bands into the paper pulp or stuff and by the arrangement of the cut out portions, perforations, etc., through which the fibers of the two layers of pulp can join each other and become felted together, the position and the distribution of the inner material in the paper are insured, and the separation of the paper from the inner material is rendered impossible. As inner material can be used metal sheets with varied patterns, gelatin sheets or collodion films, or paper bands. In the same way, inner bands with various patterns in gelatin, collodion or paper films can be used as vehicular matters for the sheets of metal with various patterns. In that case it is advisable to arrange and to secure the metal sheets, before the introduction of sheets or bands into the paper pulp, at the predetermined points of the vehicular material, in accordance with the ever-recurring arrangement. It is only owing to the use of the said vehicular materials for very thin metal or other sheets, that it becomes possible to distribute them in a very uniform manner in the paper pulp, which would have been impossible if they were simply thrown in into it.

The nature of the vehicular materials selected can be, if desired, such that they would become dissolved on contact with the water contained in the paper pulp, so that the said vehicular materials become completely invisible in the finished paper, and that only the metal sheets distributed in a uniform manner, are visible. To that end can be used as vehicular matter gelatin, collodion films, etc.

The invention accordingly consists in the several steps and the relation and order of each of the same with respect to one or more of the others thereof, which will be exemplified in the art hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings wherein is shown one method of carrying on this art, Figure 1 represents a ribbon or band of any suitable material. Fig. 2 represents the front face of a bank note or the like containing the ribbon or band shown in Fig. 1. Fig. 3 is a rear face of the bank note shown in Fig. 2. Fig. 4 represents a stock certificate or the like.

Referring to Fig. 1, 1 represents a band

or ribbon or any suitable material having perforations 2 formed therein in any suitable manner. 3 represents a second band or ribbon also provided with perforations and positioned behind the band or ribbon 1 to which it may be secured in any suitable manner. 4 represents a design or figure formed of thin material and secured to the front of band 1. Suitable designs or characters 5 may be printed or otherwise formed on the face of band 1 and also if desired upon the face of band 3.

Referring to Fig. 2 in which the band is represented as being positioned within a bank note, 6 represents designs of any appropriate character printed on the outer front face of the bank note and arranged in such a way as to cover certain parts of the designs, characters or perforations of the band or ribbon 1, thereby preventing the latter from being photographed. 7 represents any suitable design, which may be a water mark produced in the body of the front face. 8 represents characters denoting the denomination of the note printed upon the face of the note.

Referring to Fig. 3, 9 represents suitable designs printed on the outer rear face of the note and arranged in such a way as to cover certain portions of the designs, characters or perforations of the band. 10 represents a design or a watermark produced in the body of the rear face and corresponding with, or combined with, the design or watermark 7. Any suitable imprint as 11 may be provided if desired.

Referring to Fig. 4, 12 indicates the certificate proper having secured thereto a counter foil 13. 14 indicates the coupon sheet attached to the certificate 12 and consisting of a number of coupons, as indicated. Extending across the coupon sheet is a plurality of ribbons or bands similar to the bands above described, which are introduced into the paper pulp in such a manner that each coupon will contain a portion thereof. If desired, a band 16 containing the number of the share may be inserted in the pulp of which the certificate is formed. It will of course be understood that although the bands 15 run in a longitudinal direction, they can be made to run in a transverse direction without departing from the invention.

In order to carry out the process, it is preferable to work in the following manner: The inner material which may or may not be colored, and which may have any form obtained by cutting out, stamping out, perforation, dyeing, is placed on the paper pulp, and a second layer of paper pulp is poured on the same. When the pulp passes between the calendering rollers, the paper pulp is forced through the holes and around the edges of the inner material, which results in the two layers of paper becoming thoroughly connected together through the inner material. If it is desired, several layers of paper pulp and of inner material could be arranged alternately. The materials forming the inner or intermediate layer, can occupy the whole surface of the paper, or only certain portions of the same.

The very thin and ductile sheets used as inner material, can be of metal or other suitable mineral, vegetable or animal material, such as gelatin or collodion films, or very thin paper whether prepared or not. If inner bands with varied patterns are used as vehicular materials for metal sheets with varied or other patterns, in the same way as in every other case, the said vehicular materials can have the shape of leaves, bands, threads, fabrics, nets etc. and be dyed, or printed upon, in any desired manner. When the printing is different on both sides of the inner material, either as regards the color or the drawing, the colors which are visible by transparency in the finished paper could be made to complement each other. In the same way, the metal sheets could be dyed or printed upon by means of metal inks, or provided with a coating by electroplating process. The mass of paper containing the inner material, could be provided with water marks or be itself perforated, and in that case the inner metallic or other material could be uncovered at any predetermined point. Any desired patterns could also be printed specially on the inner material visible on the surface, by means of metallic or other suitable inks. The unfinished paper is cut to the desired dimensions, and one or various patterns could be printed on it, either before or after, on one or both sides, the said prints or the colors completing each other by the shape or the color of the inner materials.

Having now fully described my invention what I claim is:

1. A process of forming paper that cannot be imitated, which consists in providing, on an endless machine, a layer of paper pulp, placing thereon a very thin ductile printed and perforated band provided with recurring configurations of colored or colorless paper, superposing mechanically upon said first mentioned layer and upon said band, a second layer of paper pulp, and causing the pulp to pass through the perforations so to produce a homogeneous whole body, cutting the paper so formed, into sheets, each of which will contain an identical portion, with identical configurations, printings and perforations, and will occupy the same relative position, and finally printing on one or both faces of the paper so produced, all kind of figures which must exactly join with the printings and perforations of the inner band.

2. A process of forming paper that cannot be imitated, which consists in providing on an endless machine, a layer of paper pulp, placing thereon a very thin and ductile printed and perforated band of colored or colorless paper, superposing mechanically upon said first mentioned layer and upon said band, a second layer of paper pulp and passing the prepared material between pressing rollers whereby the pulp will be forced to pass through the perforations so to produce a homogeneous whole body, cutting the paper so formed into sheets, each of which will contain an identical portion, with identical configurations, printings and perforations and will occupy the same relative position, and finally printing on one or both faces of the paper so produced, all kind of figures which must exactly join with the printings and perforations of the inner band.

3. A process of forming paper that cannot be imitated, which consists in providing, on an endless machine, a layer of paper pulp, placing thereon, at predetermined intervals a plurality of very thin and ductile printed and perforated bands of colored or colorless paper, superposing mechanically a second layer of paper pulp, upon the first layer and upon said bands, and causing the pulp to pass between the perforations so to produce a homogeneous whole body, cutting the paper so formed, into sheets, each of which will contain an identical portion, with identical configurations, printings and perforations, and will occupy the same relative position, and finally printing on one or both faces of the paper so produced, all kind of figures which must exactly join with the printings and perforations of the inner bands.

4. A process of forming paper that cannot be imitated, which consists in providing, on an endless machine, a layer of moist paper pulp, providing a sheet of material adapted to dissolve in water and carrying one member or several members of material of a special configuration, perforated or not, adapted to withstand the action of water, placing same sheet of material and the member or members carried thereby upon said layer of paper pulp, placing a second layer of moist paper pulp upon said sheet and said member or members, and subjecting the assembled material to pressure, whereby the sheet will be dissolved, leaving the member or members embedded in the paper, cutting the paper so formed, into sheets, each of which will contain some identical members which will occupy the same relative position, and finally printing on one or both faces of the paper so produced all kind of figures which must exactly join with the said member or members.

5. A process of forming paper that cannot be imitated which consists in providing a layer of moist paper pulp, providing a sheet of material adapted to dissolve in water and carrying a member of material adapted to withstand the action of water, placing said sheet of material and the member carried thereby upon said layer of paper pulp, placing a second layer of moist paper pulp upon said sheet and said members and subjecting the assembled material to pressure, whereby the sheet will be dissolved, leaving the member embedded in the paper.

6. A process of forming paper that cannot be imitated which consists in providing a layer of moist paper pulp, providing a sheet of material adapted to dissolve in water, and carrying a plurality of equally spaced members of material adapted to withstand the action of water, placing said sheet of material and the members carried thereby upon said first layer of paper pulp, placing a second layer of moist paper pulp upon said sheet and subjecting the assembled material to pressure, whereby the sheet will be dissolved, leaving the members within the paper in equally spaced relation.

7. A process of forming paper that cannot be imitated which consists in providing a layer of moist paper pulp, providing a sheet of material adapted to dissolve in water and carrying a perforated member of material adapted to withstand the action of water, placing said sheet and member carried thereby upon said first layer of paper pulp, placing a second layer of moist paper pulp upon said sheet and subjecting the assembled material to pressure, whereby the sheet will be dissolved and the pulp will be forced through the perforations of said member to retain the same in position.

In witness whereof I have hereunto set my hand in presence of the witnesses.

JULES GERNAERT.

Witnesses:
E. MEYER,
GREGORY PHELAN.