

# UNITED STATES PATENT OFFICE

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## COUNTER-DIE AND METHOD OF MAKING SAME.

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*To all whom it may concern:*

Be it known that we, PAUL LEHNERT and MAX LEHNERT, subjects of the German Emperor, and residing at Dresden, Germany, have invented certain new and useful Improvements in Counter-Dies and Methods of Making Same, of which the following is a specification.

The present invention relates to a new kind of counter-die and the method of manufacturing such die, which is used as a base in order to make high-relief impressions in card, cardboard, sheets of metal, and the like. It has already been attempted in various ways to make such counter-dies, and a brief outline of such attempts may be given. A fairly well-known manner of manufacture is the following: A flat sheet of pasteboard is taken. The outline of the figure which is to form the relief is then cut out in paper and as many of these pieces are stuck one over another until the desired height of the relief is obtained. It is easily understood that the making of such counter-dies requires very much time and is very expensive. Another kind is obtained by a negatively-engraved stamp being impressed in a pulpy mass and left to stand therein until the mass becomes hard. By adding various materials it is endeavored to make the hardness of the stiffened mass as great as possible; but counter-dies of such a kind are also imperfect because they do not prove durable enough, and thereby—i. e., on account of their rapid wearing away—are very expensive in use.

The object of the present invention is to produce a counter-die showing considerable advantages above and differing essentially from all of these, including durability, incomparably exceeding everything already known, an easy and rapid manufacture, and very little expense. A further point may be strongly emphasized—namely, that the new counter-die is remarkable for sharp and clean outlines and in consequence the reliefs prove exceedingly sharp and clean.

We will now describe the manufacture of the new counter-die according to the present invention. We make a plate of what we term “embossing-pulp,” which must possess the following qualifications, to wit: First, it must be capable of receiving mechanical impressions and retaining such impressions

without drying or other treatment; second, it must be compressible into a smaller harder mass and will not swell, warp, or shrink when such pressure is removed. Such pulp can be prepared from various materials. It may be rag-pulp, if manufactured in a specially suitable manner, or pulp of so-called “shearings”—that is, quite short wool and cotton waste. Likewise wood-pulp made of ground wood and also cellulose can be used, as also certain powdery substances, as sawdust, wheat-bran, or the like, are possible. Pure pulp may be used, or additions or admixtures may be added which may appear suitable and useful. A certain thickness pulp, greater than the thickness of the finished die in order to allow the necessary play for compression, is of course taken for granted.

The plate which is made in the above-described manner is now exposed to a strong pressure of any kind with any kind of devices suitable for the purpose and which do not require any more detailed description at this time, it being essential that the pulp be brought by the pressure into that condition which is denoted by the term and which condition will be permanently retained “compressed.” It is to be emphasized that not only the relief portion, but the whole counter-die (both the relieved and level surfaces simultaneously) is compressed simultaneously, the relief portion being forced into depressions in the surface of the impressing device, which may be a metal block, form, or plate, the compression taking place over all parts of the pulp-plate quite uniformly at the relieved places only, with the slight differences which result from the height of the relief. After this suitable pressure is exerted and the compression is finished the form is at once ready for use and can be used for stamping forthwith without drying, hardening, or other further treatment.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. A counter-die formed from a sheet of compressible material of greater thickness than any portion of the finished die, such sheet being simultaneously compressed in all of its parts and flat on one side and embossed on the other the embossed portions being compressed less than the plain portions, the material being such that the differently-com-

pressed plain and embossed portions retain their relative forms without further treatment after compression.

2. The herein-described process of manufacturing counter-dies, consisting in preparing a suitable embossing-pulp, forming thereof a plate of a thickness greater than any portion of the finished die, and subjecting all parts of this plate to pressure by a form leaving one side plain and the other side partially plain and embossed, the embossed portions being compressed less than

the plain portions, the material being capable of retaining its compressed and embossed condition without drying, hardening, or other treatment. 15

In testimony whereof we affix our signatures in presence of two witnesses.

PAUL LEHNERT.  
MAX LEHNERT.

Witnesses:

PAUL E. SCHILLING,  
PAUL ARRAS.