

# UNITED STATES PATENT OFFICE.

ALBERT SCHMITZ, OF ESSEN, GERMANY, ASSIGNOR TO THE FIRM OF FRIED.  
KRUPP, OF SAME PLACE.

PROCESS OF IMPROVING THE QUALITY OF STEEL ARMOR-PLATES.

SPECIFICATION forming part of Letters Patent No. 506,446, dated October 10, 1893.

Application filed May 6, 1893. Serial No. 473,266. (No specimens.)

*To all whom it may concern:*

Be it known that I, ALBERT SCHMITZ, a subject of the King of Prussia, residing at Essen, in the Kingdom of Prussia, Germany, have invented a new and useful Process for Improving the Quality of Steel Armor-Plates, of which the following is a specification.

This invention refers to a process for improving the quality of steel armor plates consisting in the combination of the three following operations in the order indicated: first, hardening the plates by immersing the whole plates in oil, water, or other media, after having previously raised them to a temperature at which the molecules have acquired the capability of ready re-arrangement; secondly, annealing the plates at a temperature which is as high as possible without however reaching the temperature at which said capability of ready re-arrangement begins; thirdly, hardening the plates on one side or face at the same or at a lower temperature than that specified in the preceding or second operation.

In order to avoid great deviations from the form desired to be given to the plates through the last of the three above named combined operations, that is through the hardening of the side exposed to the projectile, the present invention consists in interposing between the second operation of annealing and the last operation a further new operation, namely the hardening of the dead or false side of the plate not exposed to the projectile. For this hardening the annealing heat may be used. By this interposed operation, the hardening effect of which is nullified or destroyed by the heating of the last operation, the plate undergoes an alteration of form which is counteracted by or opposite to the alteration of form produced by or resulting from the last hardening by which the side or face exposed to projectiles is hardened so that the form of the finished hardened plate corresponds with the form before the commencement of the operations. For the same purpose the process

may be carried out also in a simplified manner, consisting in substituting the first operation of chilling the whole mass of the plates, by chilling only the side or face of the plate, which is not to be exposed to projectiles, then glowing the whole mass of the plate and finally hardening by chilling the side or face of the plate which is to be exposed to projectiles. By the subsequent hardening of both sides of the plate and by the intervening reheating between the two hardening operations exactly the same properties are given in the case of thinner plates, to the main mass of the latter, while the central layer of the metal of very thick plates does not receive these excellent properties in a quite perfect degree.

Having now fully described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A process for hardening armor plates on one side, consisting in first hardening the plates throughout their entire mass by chilling, then annealing in their entire mass, then hardening the side not to be exposed to the action of projectiles, and finally after reheating again hardening by chilling the side or face to be exposed to projectiles, substantially as set forth.

2. A process for hardening armor plates on one side, consisting in first hardening the plates by chilling on the side not to be exposed to the action of projectiles, then annealing the plates in their entire mass, and finally again hardening the plates on the side to be exposed to projectiles by chilling, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALBERT SCHMITZ.

Witnesses:

MAX UHLENHAUT,

ALBERT KLINGHAMMER.