UNITED STATES PATENT OFFICE.

JAMES YATES, OF ROTHERHAM, ENGLAND.

IMPROVEMENT IN THE MANUFACTURE OF STEEL PLATES AND BLOCKS.

Specification forming part of Letters Patent No. **188,458**, dated March 13, 1877; application filed July 26, 1876.

To all whom it may concern:

Be it known that I, JAMES YATES, of Rotherham, in the county of York, England, esquire, have invented certain new and useful Improvements in the Manufacture of Plates and Blocks for Ship and Fort Armor, and other purposes, of which the following is a true, full, and exact description:

My invention consists in the production of compound blocks or masses of steel of proper strength and quality, suitable for forts, (fixed or floating,) ships' armor, beams, supports, and other purposes, most of which are now produced by welding, stamping, or rolling wrought-iron.

In carrying out my said invention I construct the above-mentioned steel blocks or masses by running into an open or closed mold molten steel of one temper or hardness, and then upon its upper surface running a second layer of molten steel of another temper or hardness, and repeating the operation when required, so as to form as many strata of different-tempered steel as may be desired, and arranged according to their temper or hardness as may be required, forming thereby one solid and compact compound mass, to be either at once used or to be stamped, rolled, or pressed, to give them the form required, and to impart strength to bear greater pressure or strain tensibly, compressively, or by impact from projectiles or heavy blows. The molten steel, of varying temper and hardness, is successively poured into the mold before the preceding stratum is cold.

With regard to the materials to be employed, I prefer such steel as is commonly known as "Bessemer steel," which can be made of a hard, soft, or medium temper or hardness; but I do not confine myself to this product or material. And with regard to the method of compression, I prefer to employ the means or method of effecting pressure indicated in the specifications of Letters Patent for Great Britain granted to me, No. 542, 6th February, 1863, and No. 2,051, 18th August, 1863; but other methods may be adopted.

In the term "steel" I include all compounds of iron containing less carbon than is contained in cast or pig iron, and which compounds are capable of being reduced to a molten condition.

Having now described and particularly ascertained the nature of my said invention, and the manner in which the same is or may be used or carried into effect, I would observe in conclusion that what I consider to be novel and original, and therefore claim as the invention secured to me by the hereinbefore in part recited Letters Patent, is—

1. The process of forming armor-plates, beams, or other blocks or masses from steel of varying temper and hardness, by running the same in a molten condition successively into molds, substantially as herein set forth.

2. The process of forming armor-plates, beams, or other blocks or masses from steel of varying temper and hardness, by first running the same in a molten condition successively into molds, and by then stamping, rolling, or pressing the same, substantially as set forth.

3. As a new article of manufacture, compound blocks or masses of steel suitable for ships' and fort armor, beams, supports, girders, rails, tires, boiler and ship plate, and other purposes, consisting of strata of steel of varying temper and hardness, prepared and treated in the manner herein described.

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

JAMES YATES.

Witnesses:

F. F. HIBBERT,

JNO. HY. DAVIDSON.