(No Model.)

R. C. TOTTEN.

CASTING.

No. 420,646. Patented Feb. 4, 1890.

Fig. 1.

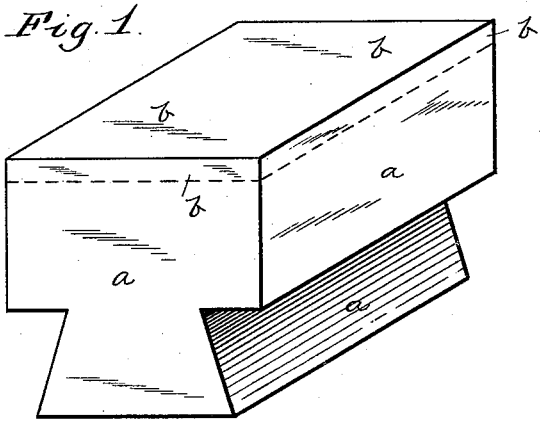
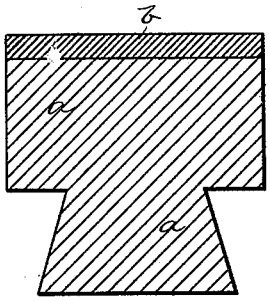


Fig. 2.



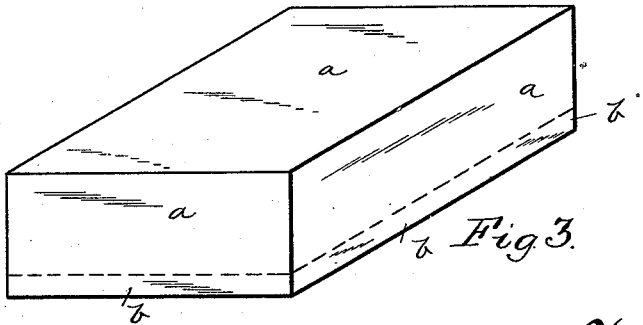


Fig 3.

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ROBERT C. TOTTEN, OF ALLEGHENY, PENNSYLVANIA.

CASTING.

SPECIFICATION forming part of Letters Patent No. 420,646, dated February 4, 1890.

Application filed June 19, 1889. Serial No. 314,865. (No model.)

To all whom it may concern:

Be it known that I, ROBERT C. TOTTEN, a resident of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Castings; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to castings—such as dies, ingots, and other castings—its object being to provide a casting having a hard and tough surface, possessing fine wearing properties, and a soft body having strength necessary for the work to which it is subjected, and which soft body can be "machined," or turned, lathed, or drilled, as is found necessary, according to the purpose for which the casting is to be used.

Within the last few years a certain metal has been invented which possesses peculiar qualities of toughness and hardness, the steel being known as "manganese" steel, and being described in Letters Patent to Robert Hadfield, Nos. 303,150 and 303,151, dated August 5, 1884, and consisting, generally stated, in steel containing from seven to thirty per cent. of manganese. This metal has attracted considerable attention on account of its peculiar qualities, as above referred to, which qualities are very desirable in dies and other articles; but it has not been employed to any great extent on account of one great drawback—namely, that it is so hard that it is not practical in any way to machine or dress it, it requiring the hardest tools for this purpose, and even when such tools are employed requiring such slow work as to render the dressing of it practically impossible. The metal is, however, well adapted for many purposes—such as the faces of dies and hammers, agricultural plates, and other such articles requiring high wearing properties, as well as toughness sufficient to prevent the cracking or spawling of the metal under hard blows or strains, though it has not to any extent been applied to any of such uses.

The object of my invention is to provide a casting by which the difficulties in the use of this manganese steel can be overcome; and it consists, generally stated, in a casting having a facing of manganese steel and a body of soft steel united thereto by fusion, so that while providing for a hard wearing-face by means of the manganese steel I am enabled to support the same and provide for the turning, planing, or other machining of the casting, and so am enabled to utilize the hard face of the manganese steel for purposes to which it has heretofore been wholly inapplicable.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a perspective view of a die embodying my invention. Fig. 2 is a cross-section of the same, and Fig. 3 is a view of the ingot embodying my invention.

Like letters of reference indicate like parts in each.

The castings embodying my invention—such as shown in the drawings—have the body *a* formed of a steel low in carbon and sufficiently soft to be dressed by any suitable tools, either turned, drilled, planed, or otherwise machined; and under the term "soft steel" I include a steel or iron as low or free from carbon as can be cast in a mold. The facing *b* of the casting is formed of this manganese steel before referred to, this metal being a steel containing a proportion of from about seven to thirty per cent. of manganese, and the article and method of making the same being described in said Letters Patent, Nos. 303,150 and 303,151, above referred to. This facing or shell of manganese steel is united to the body of soft steel by fusion, so that the facing and body form practically one casting, and the facing is properly supported by the body, the casting therefore having in its facing or shell all the desirable properties found in the manganese steel, such as a hard working-surface and a toughness which will prevent the cracking or spawling or other such action usually found in chilled cast-iron or other such hard metal, together with the soft-metal body, which can be machined or dressed as is found necessary in fitting the die or other casting to place, or for other such purposes where it is necessary to dress or machine the body of the casting, and so overcoming the difficulty in the use of this manganese steel for many purposes in the arts.

In Fig. 3 is shown an ingot embodying my invention, having the soft-steel body *a* and

the manganese-steel facing *b*, this ingot being capable, when properly heated, of being rolled or forged to the desired shape, according to the article or articles to be formed therefrom, and the ingot itself, or the articles formed therefrom, possessing the desirable qualities above referred to—namely, the hard and tough surface together with the soft body capable of being machined. The plates or bars produced from such ingot, while having the hard and tough wearing-surface, provides for the finishing of the plate or bar by reducing the thickness of the manganese steel therein, so that the same can be sheared or punched much more easily than a solid manganese-steel bar. As the cost of making the manganese steel is higher than the cost of the ordinary soft steel, the castings can be formed at a much lower cost than like castings made entirely of manganese steel.

In making castings embodying my invention I melt the manganese steel and the soft metal intended for forming the same, and the proper amount of manganese steel for forming the facing of the casting is first poured into a mold, and while this is still hot I introduce the molten soft steel, filling the mold, the two metals uniting so as to form practically one casting. The same method may be followed in forming ingots, which are to be subsequently rolled or forged to the desired shape, and the castings made formed either in sand molds or metal molds, as desired, though in forming ingots the ingot-mold is necessarily cast on its side, instead of on its end.

Where the casting is to be used in the shape to which it is cast, the soft-steel body of the metal can be planed, turned, drilled, or otherwise machined to bring it to the desired shape, while, if necessary, the surface of the manganese-steel face may be finished by grinding.

What I claim as my invention, and desire to secure by Letters Patent, is—

As a new article of manufacture, a casting having a facing of manganese steel and a body of soft steel, substantially as and for the purposes set forth.

In testimony whereof I, the said ROBERT C. TOTTEN, have hereunto set my hand.

ROBERT C. TOTTEN.

Witnesses:
JAMES I. KAY,
J. N. COOKE.