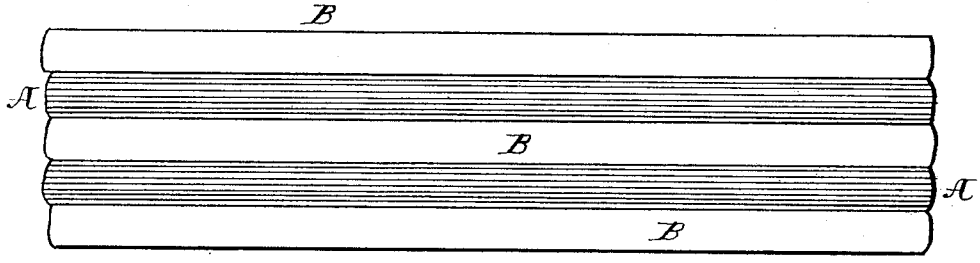
(No Model.)

J. FARREL.

COMPOUND WELDED PLATE FOR BURGLAR PROOF SAFES, &c.

No. 365,300. Patented June 21, 1887.



Witnesses.
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UNITED STATES PATENT OFFICE.

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COMPOUND WELDED PLATE FOR BURGLAR-PROOF SAFES, &c.

SPECIFICATION forming part of Letters Patent No. 365,300, dated June 21, 1887.

Application filed June 19, 1886. Serial No. 205,719. (No model.)

To all whom it may concern:

Be it known that I, JOHN FARREL, of the city, county, and State of New York, have invented a new and useful Compound Welded Plate for Burglar-Proof Safes and other Purposes, whereof the following is a specification.

My improvement relates to a single integral plate or bar composed of a number of layers of varying texture and quality brought into intimate union by welding the component parts, and so forming one solid body.

The annexed drawing shows a number of the plates of which the compound plate is made and the manner of fagoting them for welding.

Compound plates have been made of "high" and "low" steel—that is, of steel that will take a temper, welded to other steel which will not receive a temper, meaning by "temper" a hardness induced by the operation called "tempering," in this instance consisting of immersing the plate when at a red heat in a proper liquid or solution, resulting in imparting a hardness to those portions or strata of the plate which will receive a temper, while the other parts or strata remain soft. Such high-and-low steel plates, though able to resist the effects of battering-tools, may be overcome, so as to be easily penetrated within a burglar's time, by means of the drill, aided by the use of the blow-pipe in connection with the flame of a spirit-lamp or that of a gas-burner wherein air is mingled with gas before combustion, with which accessories the temper may be drawn from the metal as the drill, advancing, encounters the hardened strata of the plate. In this way such high-and-low steel plate may be cut through as rapidly as if it had never been subjected to a hardening process. To prevent this it has been the practice in building burglar-proof safe-walls to back the aforesaid plate with a heavy mass of metal, such as franklinite or like cast metal, capable of resisting the progress of the drill in case the compound plate should be cut through, but tending, in the first instance, to draw off local heat applied to such plate with a view to soften it, and diffuse such heat in the surrounding substance.

The present invention provides a new compound plate which not only resists the effect of battering implements thereon, by virtue of tough and ductile properties, and the action of drills and cutting-tools, by the quality of its hardness, but is also able to maintain this hard and impervious quality under the operation of the blow-pipe, and not yield or soften when subjected to such operation; besides which it is proof against the diamond drill in the hands of a burglar. The new plate is of special value for burglar-proof safe-walls, since the protecting body of franklinite metal is thereby rendered unnecessary and obsolete, and walls of safes now made four and five inches in thickness, built up of disintegral parts or pieces riveted and bolted together, are by this new compound plate superseded in a solid wall consisting of a single plate less than half said thickness, at the same time affording enhanced security, while economizing material and greatly reducing weight—important particulars, especially in portable burglar-proof safes.

In practicing my invention I employ a number of layers of ductile steel, or good wrought-iron, with layers of a kind of steel called "self-hardening," and which will readily weld, but is characterized by a peculiar hardness which, though not due to nor obtainable by any tempering process, is yet capable of effectually resisting all drills and cutting-tools. In this combination not only do the layers of the ductile metal enable this compound plate to resist the effect of blows and percussion and the layers of the special steel to resist the drill, as before said, but the special steel, possessing, as it does, a hardness not induced by tempering, cannot be made to yield to the use of the blow-pipe for drawing the temper, because there is no temper to be withdrawn. Thus the one plate is itself proof against the sledge-hammer, the drill, and the blow-pipe, and this without any auxiliary or extraneous aid. The said special or self-hardening steel, as made by different manufacturers, is all of one general variety, and usually contains more or less of tungsten or titanium in alloy with carbon and silicon, and a good example is that known as "Mushet's" steel. This special steel is now employed exclusively for machinists'

and other mechanics' cutting-tools, and, by reason of its inherent hard quality, is well adapted for the purpose. Said steel is malleable when heated to a white heat, but in cooling and when cold it assumes a hardness equal to that of tempered steel, becoming at the same time very brittle. For these reasons it has always been esteemed as worthless for safe-walls, and has never hitherto been used for that purpose or any other analogous thereto.

To produce a compound plate according to my invention I take a plate, A, of the special steel—say one-quarter of an inch in thickness—and place it between two plates of ordinary ductile steel, B, a little thicker; or I take two plates of the special steel, A, place a plate of the ordinary steel or wrought-iron between and a plate of the ordinary ductile steel beneath and another on top, making five in all, apply a suitable flux, and weld the pile together. When the several laminæ thus welded form a complete union and become one solid body, the plate or bar thus made is rolled down, usually to about half the original thickness or height, by which the integrality of the welded mass is further perfected. For a flux I use those composed of borax, sal-ammoniac, and sand. The extreme brittleness of the special steel entirely unfits it for the purpose of safe-walls in its ordinary state; but in the process of manufacture into compound plates described the said steel is materially modified, partaking of the alternated softer metal at the place of junction therewith, and so losing more or less of its brittleness, while retaining its capacity to withstand the action of burglars' tools and its self-hardening property.

In my said new compound plate I have first made it practicable to utilize self-hardening tool-steel for safe-walls and for other parts of burglar-proof safes by welding it in layers to a softer metal. While such combination results in a product which is effectual in resisting both battering-tools and cutting implements, at the same time, the impervious strata being without a factitious or induced hardness known as temper, the plate remains wholly unaffected by heat locally applied, as by a blow-pipe, for drawing the temper, there being no temper which can be drawn.

My said invention is not only valuable for walls of safes and bank-vaults, and for doors and fastenings thereof—such as bolts, bars, lock and bolt spindles or arbors, &c.—but is also useful for armor-plates of ships and forts, and for any structures required to maintain a stubborn and prolonged resistance to attack from without.

I claim as my invention—

1. The compound metallic plates or bars described, composed of self-hardening steel specified, alternated with plates of low steel or iron, and all welded together.

2. Compound plates made of a steel combining carbon, silicon, and tungsten or titanium, welded to low steel or its equivalent, substantially as described.

JOHN FARREL.

Witnesses:
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