

(No Model.)

J. SPRUCE.
Forming Articles of Brass.

No. 241,084.

Patented May 3, 1881.

FIG. 1.

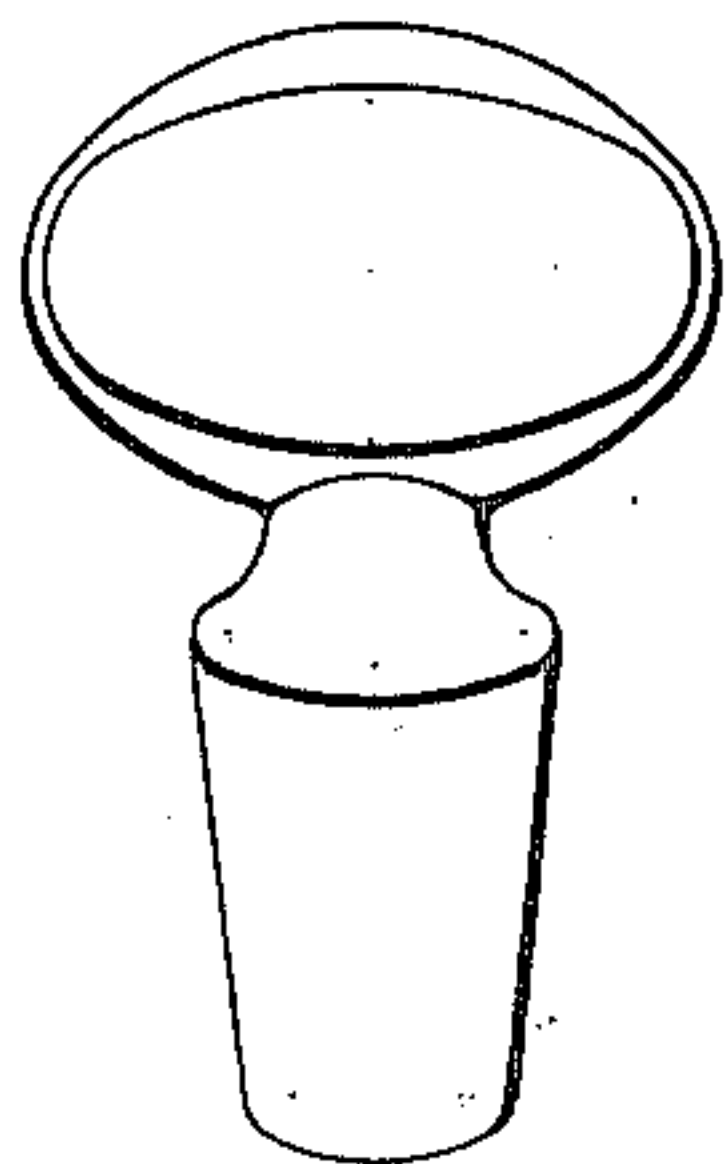


FIG. 2.

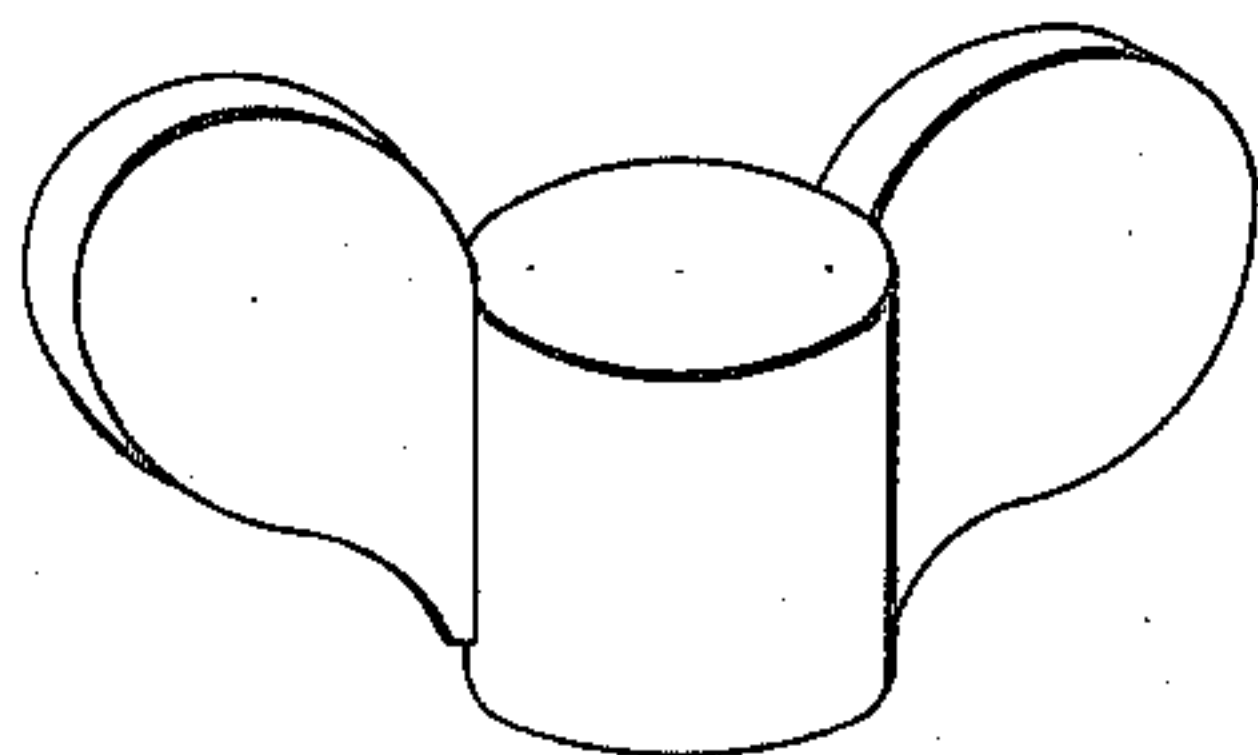


FIG. 3.

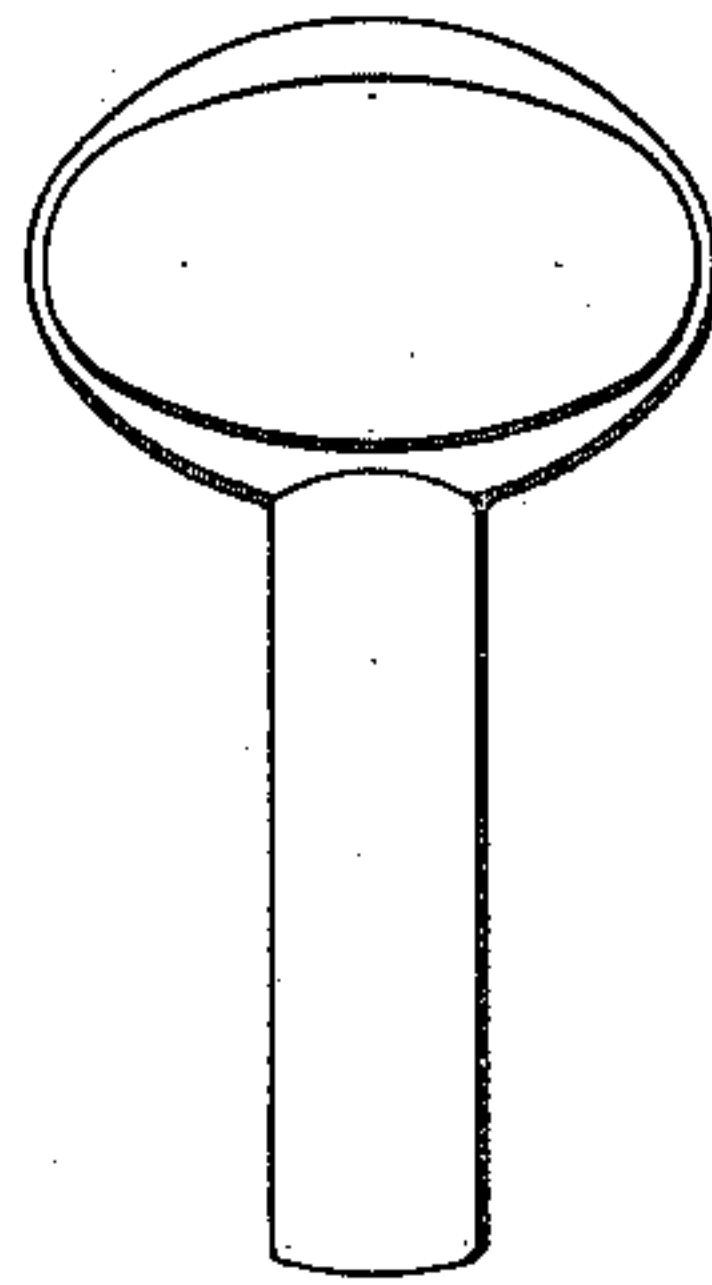


FIG. 4.

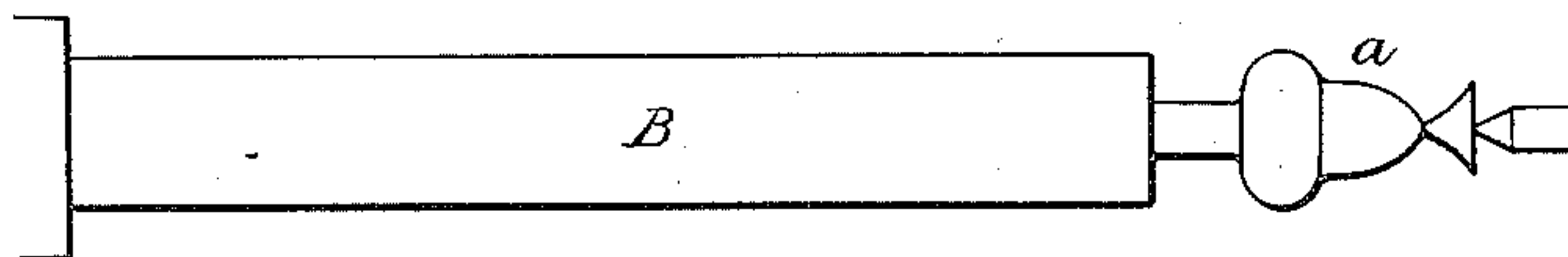


FIG. 6.

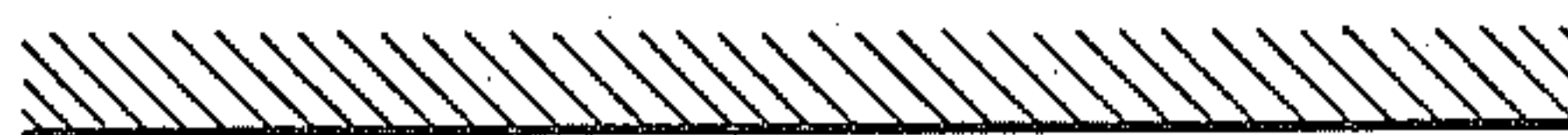


FIG. 5.

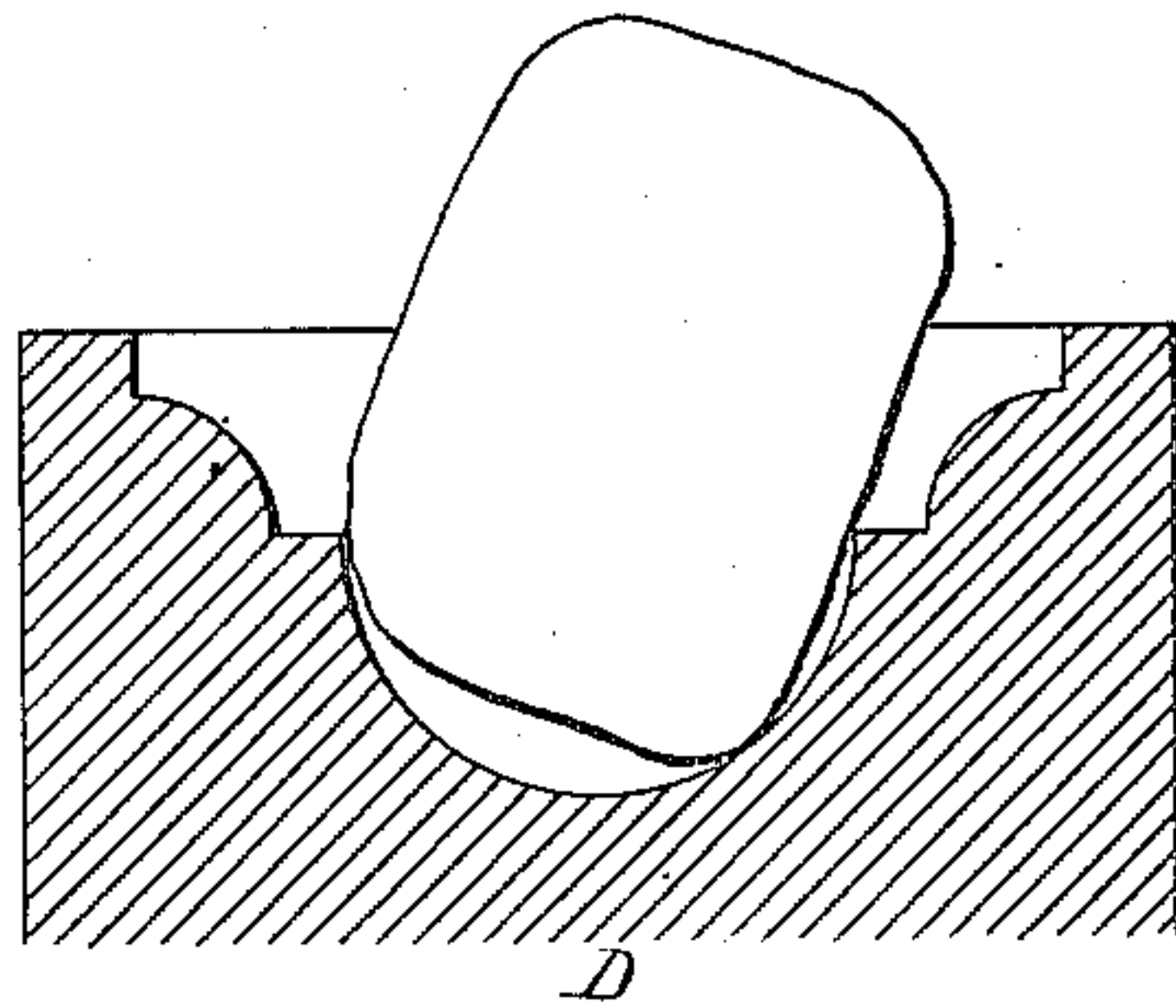
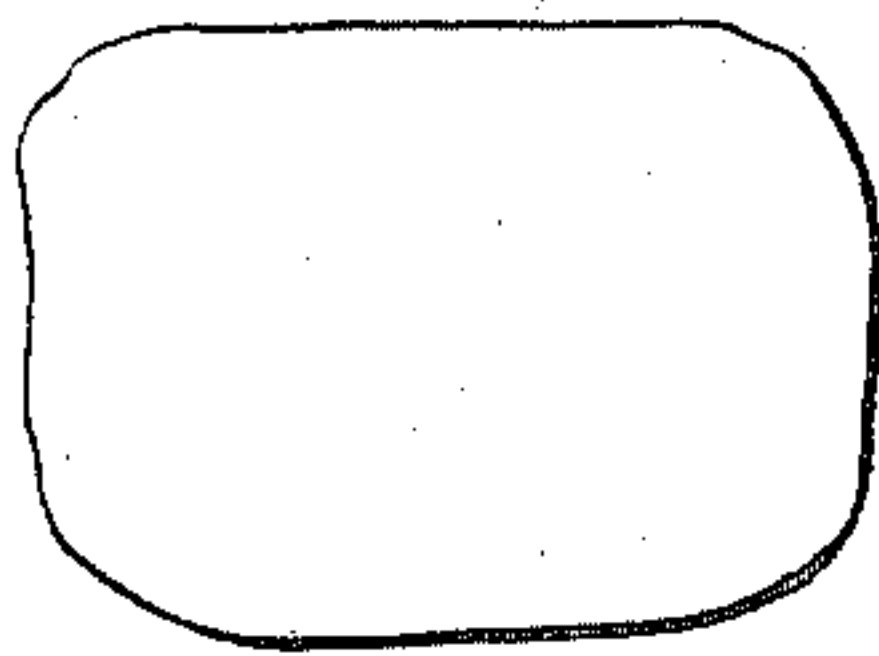
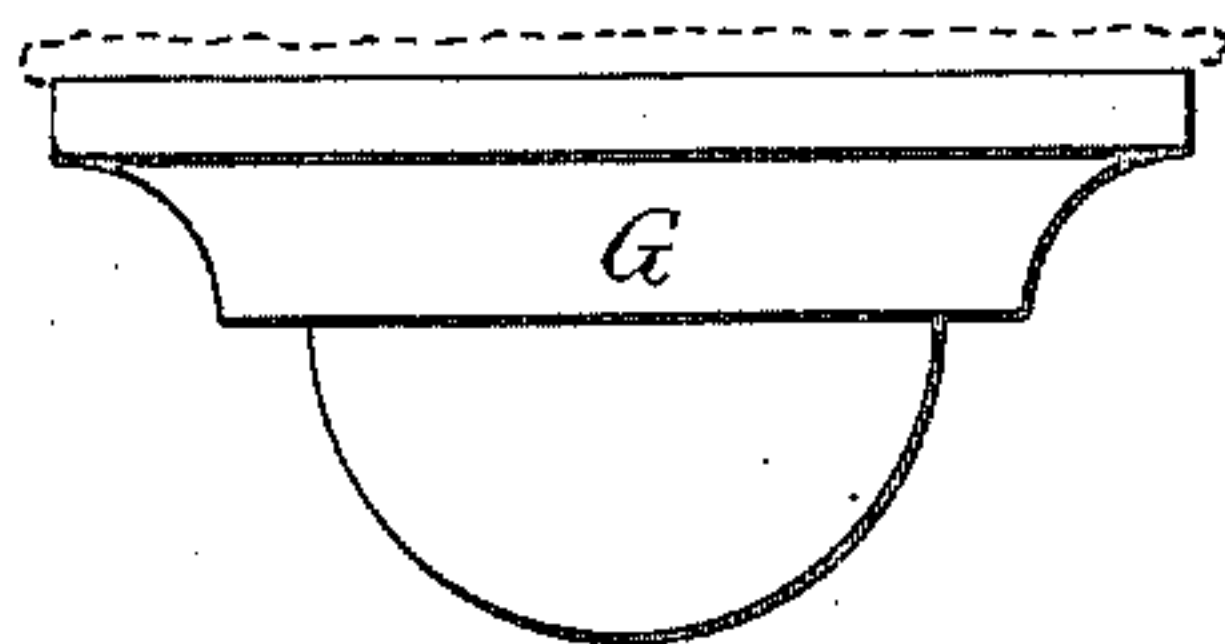


FIG. 7.



WITNESSES

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JAMES SPRUCE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE SCOVILL MANUFACTURING COMPANY, OF SAME PLACE.

FORMING ARTICLES OF BRASS.

SPECIFICATION forming part of Letters Patent No. 241,084, dated May 3, 1881.

Application filed June 9, 1880. (No model.)

To all whom it may concern:

Be it known that I, JAMES SPRUCE, a citizen of the United States, residing in Waterbury, in the county of New Haven and State of Connecticut, have invented an Improvement in Forming Objects of Brass, of which the following is a specification.

My invention consists of a process, described hereinafter, of producing solid compacted objects of brass with or without highly finished or planished surfaces.

Solid brass objects of the class to which my invention relates have heretofore been made mainly in two ways, one mode—that of casting and afterward finishing or partly finishing—being practiced in the production of an almost endless variety of objects, among which may be mentioned the faucet-plug shown in Figure 1, the thumb-nut shown in Fig. 2, and the thumb-screw, Fig. 3, in the accompanying drawings. The other plan is the reduction by cutting-tools of crude bars or blocks of brass to the desired forms—such, for instance, as the ornamental knob *a*, Fig. 4, formed by turning a crude bar, *B*, of brass—small round articles of different forms being frequently made in this manner, while other objects are made by planing, milling, slotting, and drilling, as the desired form of the article to be produced may suggest.

Brass is rendered malleable and ductile by rolling, and multitudes of different objects are made from sheet-brass by spinning, by striking up with the aid of dies and counter-dies, in which the operation of bending is involved, and by drawing, as in making wire and tubes. Objects of solid brass are also made, or in part made, by bending ductile brass, as in forming the eyes of brass hinges; but all this is apart from my invention, which relates to the production of solid objects heretofore made mainly in the manner first explained.

Ductile brass can be reduced, while cold, to a limited extent by hammering, and solid pieces of brass can be indented or embossed while cold—as, for instance, by an operation analogous to that of coining. It has also been long known that cast-brass can be reduced, while heated, by forging, providing that stated proportions of metals enter into the composition of the alloy; but the forging of heated cast-

brass has never become a standard operation in the working of metals. The forging to which I have last referred is not the shaping or reduction of the alloy by dies, but by the hammering of the heated alloy on an anvil, so that it is exposed and unconfined at all points, excepting where it rests on the anvil and where it is struck at intervals by the hammer, and hence is permitted to expand laterally under impact.

I am not aware that prior to my invention solid articles of brass have been formed under heat and impact by the aid of dies or by what is technically termed “drop-forging” or “die-forging.” As an instance of what I have accomplished in this way, I may refer to the views Figs. 5 and 6, the former representing a crude piece of cast-brass composed of copper and zinc in the proportions, by weight, of three of copper and two of zinc—a proportion which I have found to be the best for die-forging.

In Fig. 6, *D* is a die placed on a suitable base or anvil in the position shown. The piece of cast-brass, Fig. 5, was heated until it was of a cherry-red color, and while in this condition was placed on the die, Fig. 6, and received two or three blows from the flat hammer of a drop-press, when the brass was reduced to a shape corresponding exactly with that of the recess in the die, the product *G* (shown in Fig. 7) being of the exact dimensions and shape shown in that figure, and the surface, wherever it had been struck by the die, being comparatively smooth and having the appearance of being condensed and compacted.

While crude cast-brass may be thus formed under heat and impact by the aid of dies, I prefer to first subject the cast ingot to a rolling process while it is hot, so as to impart to it a fibrous texture before it is heated and subjected to the above die-forging operation, for I have found that brass, after it has been thus rolled while hot, yields more readily, when again heated, if additional heat be necessary, to the action of the die than the crude cast-brass treated in the manner described above. By “rolling” I do not mean any extended reduction of the cast-brass, for if the ingot be passed two or three times between the rolls while heated it will be sufficient.

It will be understood that in the majority of

cases two dies will be necessary—that is, a die on the anvil for forming one part of the object and a die on the drop-hammer for forming the other part of the object; and dies made separable in three or more parts may occasionally be required, as the character of the object may suggest.

I believe I have been the first to discover that solid brass objects could be thus formed—that is to say, that the integrity of the brass would be preserved during the action of the dies, although the metal is not at liberty to yield laterally, as in forging on an anvil by striking it with the hammer, the heated brass having, during the action of the die, no liberty to expand beyond the limits of the recesses of the die. In other words, the process by which I produce the solid compacted articles of brass, which constitutes the main subject of my invention, may be described as that of crushing the alloy, under heat and impact, into a die or dies which restrict the metal laterally.

An important feature of my invention is the producing of solid objects of brass having polished, finished, and planished surfaces. After the brass object has been formed it is dipped into a pickling-bath of acid and water or other cleansing-bath, and then subjected to the action of the dies, or rather to separate finishing-dies, when one or more blows will suffice to impart such a surface to the brass that there will be little or no necessity for any polishing of its surface.

In forming many objects two or three sets of dies may be necessary—the first for partly forming the object, the second for reducing it still more to the desired shape, and so on.

It may be remarked, in conclusion, that the solid compacted objects of brass which constitute the main feature of my invention are distinguishable by those skilled in brass-working, partly by the character of the surface and partly by the appearance of the edges and corners of the objects, from solid brass articles formed by cutting-tools.

I claim as my invention—

1. The mode herein described of producing solid articles of brass, the said mode consisting in first rolling cast-brass while it is hot and then subjecting the rolled metal, while heated, to the operation of die-forging, as set forth.

2. The process described of first die-forging brass under heat and impact, then subjecting the forged objects to a pickling or cleansing operation, and finally subjecting them to the finishing and planishing action of dies, all substantially as set forth.

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

JAMES SPRUCE.

Witnesses :

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