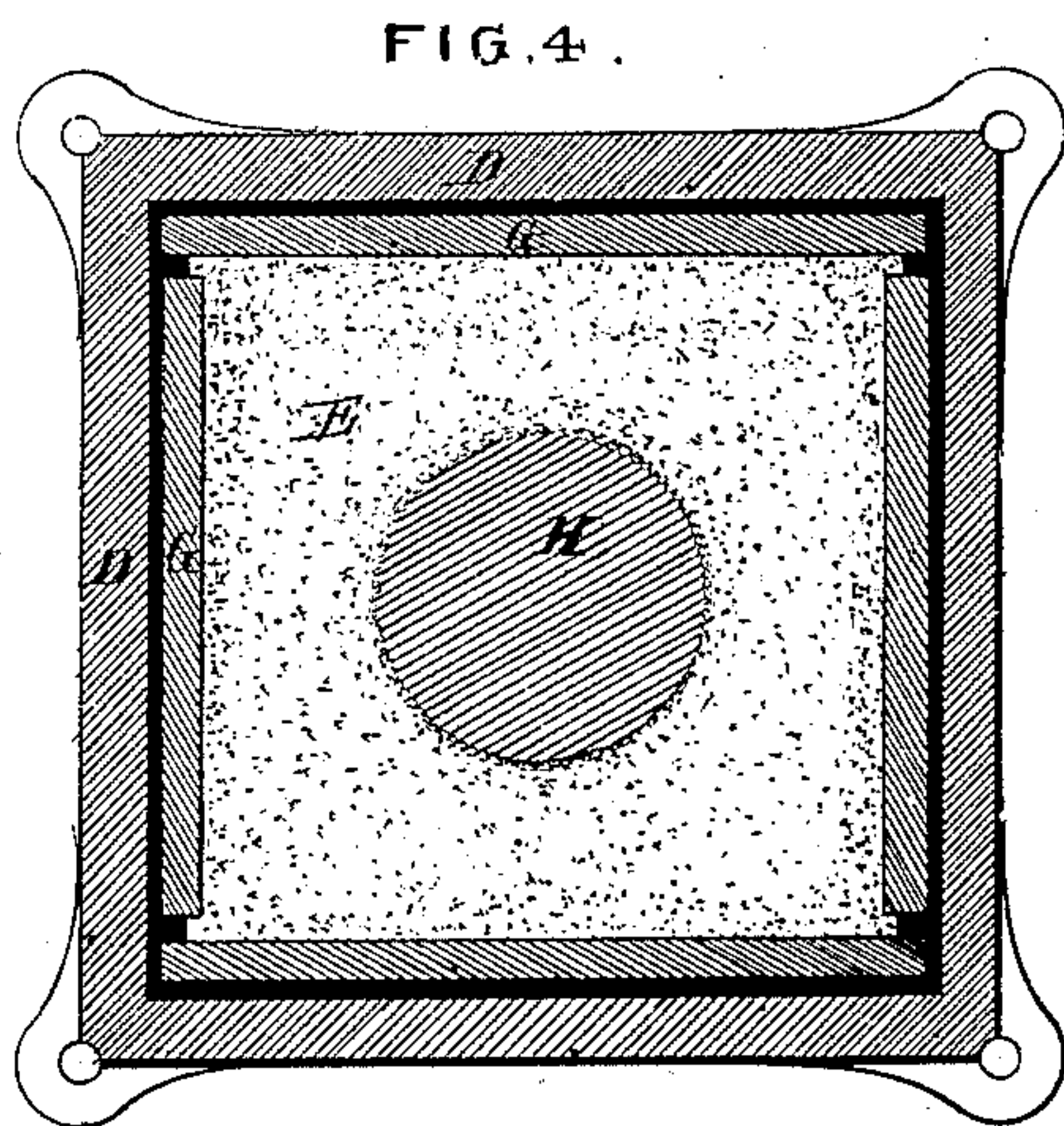
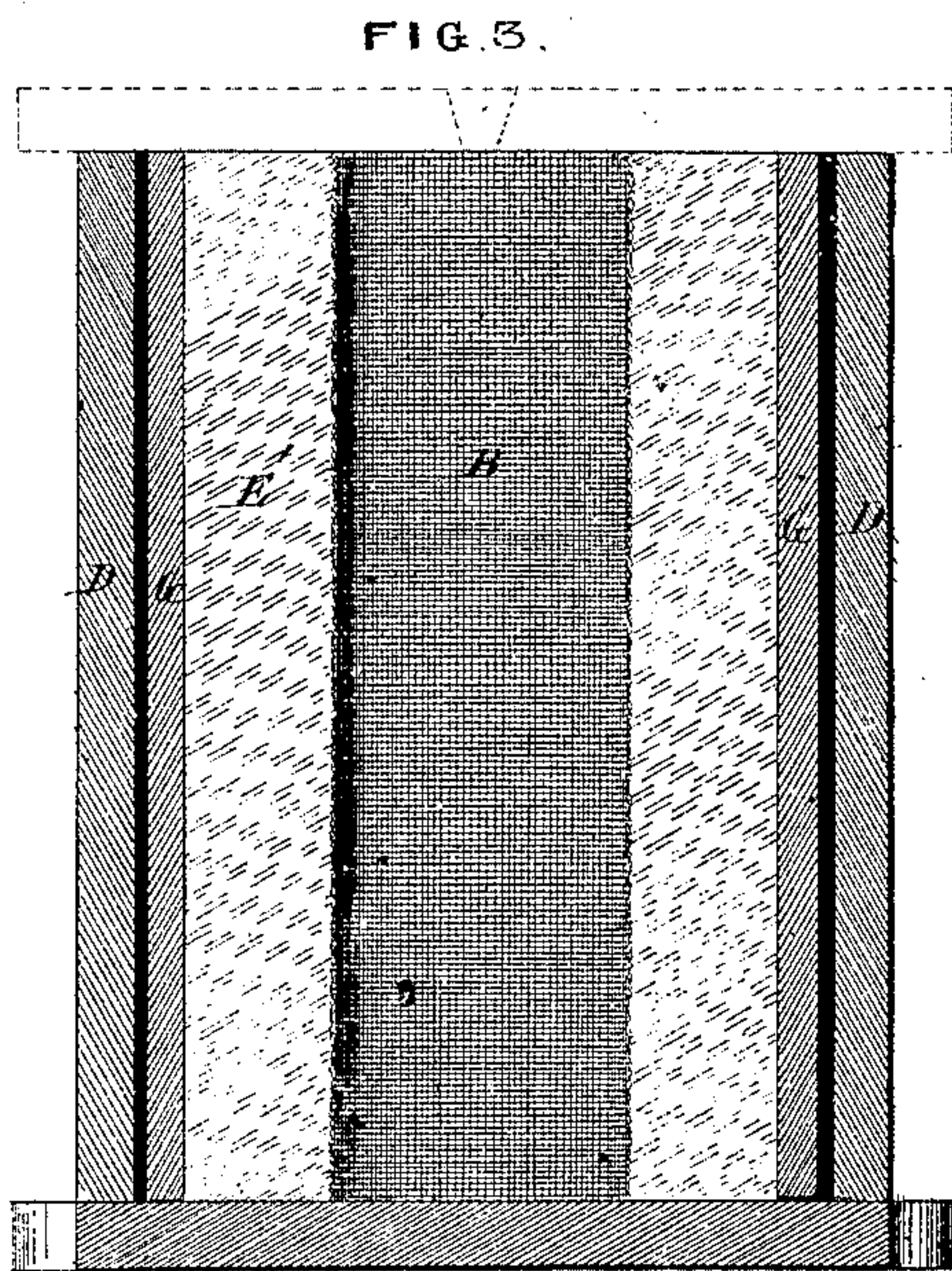
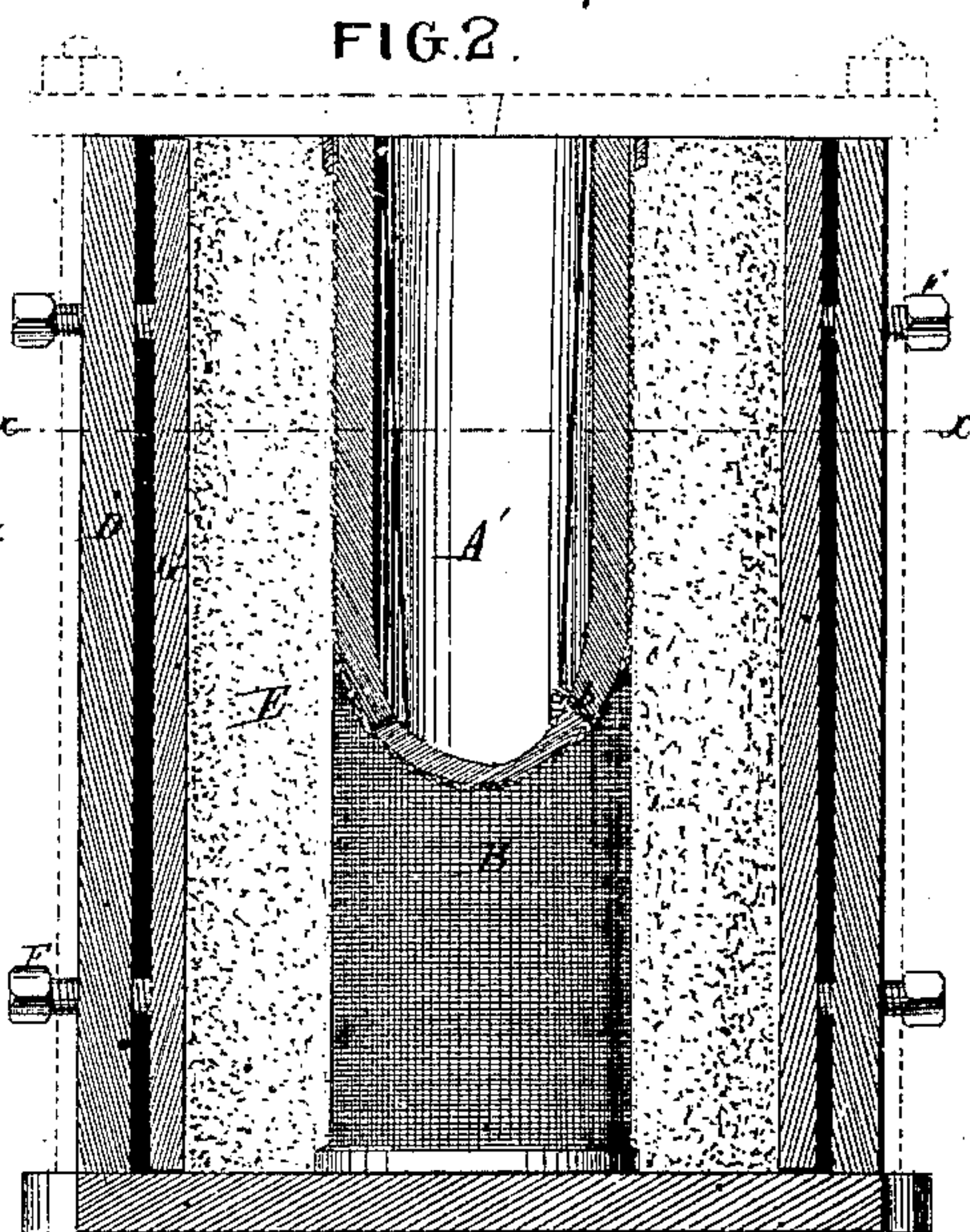
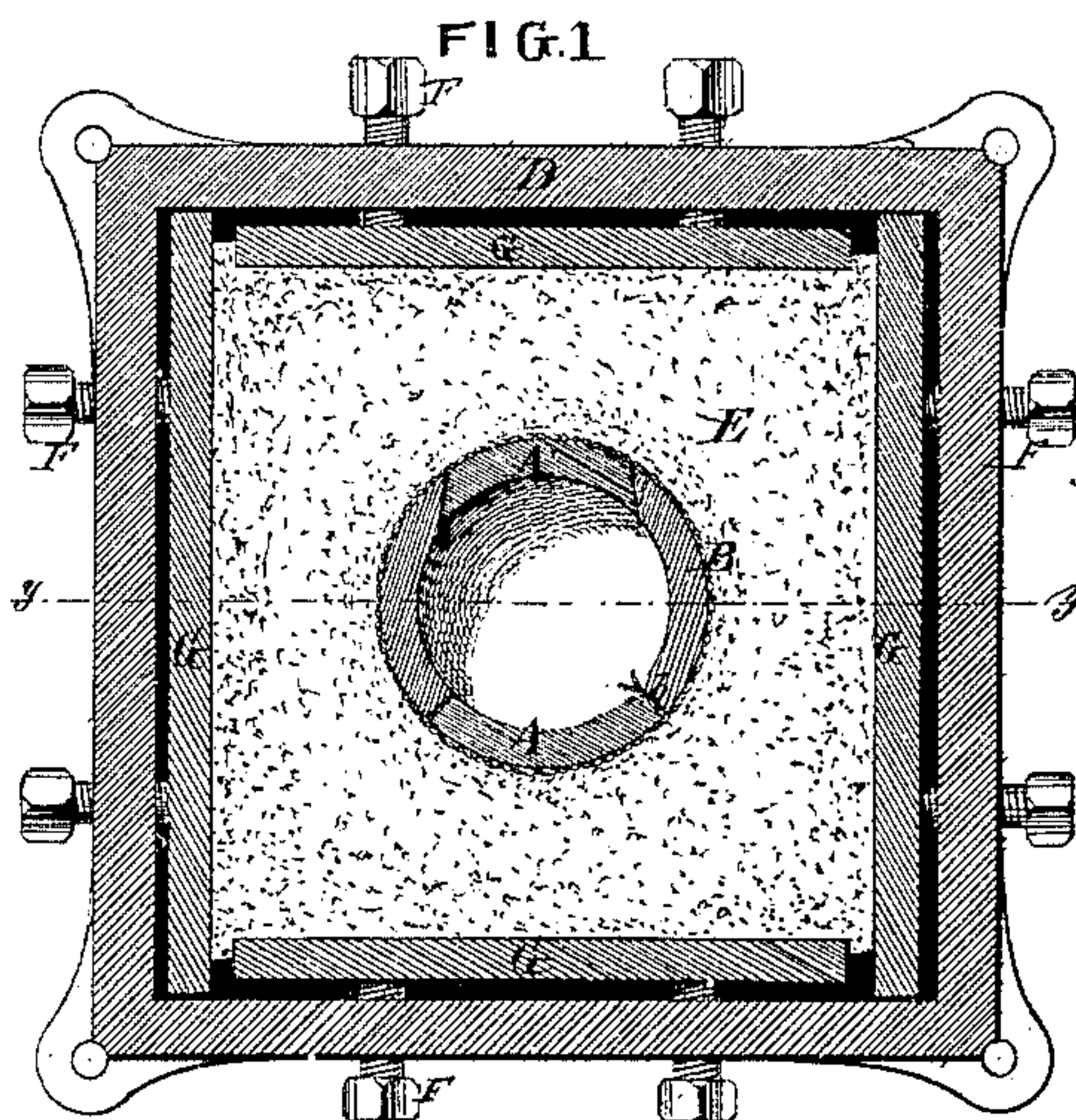


J. J. C. SMITH.  
DIE FOR TAKING IMPRESSIONS FROM CLOTH, &c.  
No. 113,699. Patented Apr. 11, 1871.



WITNESSES.

*Wm. H. Breton*  
*Walter Allen*

INVENTOR.

*J. J. C. Smith*  
*Wm. H. Breton*  
*Walter Allen*



# United States Patent Office.

JOHN JOSEPH CHARLES SMITH, OF SOMERVILLE, ASSIGNOR TO METALLIC ART WORKS, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 113,699, dated April 11, 1871.

## IMPROVEMENT IN DIES FOR TAKING IMPRESSIONS FROM CLOTH, &c.

The Schedule referred to in these Letters Patent and making part of the same.

I, JOHN JOSEPH CHARLES SMITH, of Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful method of producing Dies for taking *fac-simile* impressions of cloth or other material, of which the following is a specification.

### *Nature and Objects of the Invention.*

My invention consists in a method of producing either positive or negative impressions of woven fabrics or other articles on rollers or other dies which may be of material sufficiently hard to render the said dies durable and adapt them for long-continued use.

Owing to the difficulty or impossibility of producing by processes heretofore known perfect impressions of woven fabrics and other perishable or combustible materials in dies of hard metal, it has been the practice to produce such impressions by the electrotype process in copper or other soft metal. Dies or rollers thus made, while they may produce a few reversed or negative copies of the thing to be imitated, are quickly destroyed in use, and hence the operation is very costly and laborious.

To overcome this difficulty I form rollers or dies of other form, of a hard metal or alloy, cast under pressure, as hereinafter described.

The fine mold necessary to produce a delicate and perfect surface on the casting I make by the process patented by me on the 29th day of December, 1868, and described in reissued Letters Patent No. 3,409, dated April 27, 1869. By my present invention I am enabled to make in such mold a perfect impression of linen, muslin, cloth, or such like woven fabrics or other fragile or perishable material, the impression in said mold being a negative of the thing to be imitated if the die cast in such mold is to produce a negative impression; but if it be desired to produce positive imitations then the mold in which the dies are cast is itself made with a positive impression, so that the dies will be negative.

To obtain a perfect cast of the mold I employ the casting apparatus of Michael Smith, patented October 22, 1867, and described in reissued Letters Patent No. 3,449, dated May 18, 1869.

### *Description of the Accompanying Drawing.*

Figure 1 is a horizontal or transverse section (at  $x$ , fig. 2) of a flask illustrating a mode of taking an impression of a piece of cloth or other fabric.

Figure 2 is a vertical or longitudinal section of the same at  $y$ , fig. 1, the sectional roller and the cloth which covers it being shown partly in elevation.

Figure 3 is a vertical section of a flask or mold-box after the sectional core has been removed.

Figure 4 is a horizontal section, showing the mold formed upon a negative pattern, as hereinafter explained.

### *General Description.*

To form a mold in which to cast a roller which will produce perfect negative copies of a woven fabric I take a smooth hollow cylinder, A, figs. 1 and 2, made of metal in three, four, or more parts or sections so as to constitute a removable core.

One of these sections, A', is tapered both longitudinally and radially to adapt the core to be readily withdrawn from a matrix which may be formed around it.

Around this core I wrap or place smoothly the cloth B which is to be imitated, its edges  $b$  being received in one of the joints of the cylindrical core so as to leave a perfectly smooth surface on the outside.

The sectional core is then firmly secured together with rings or hoops C.

This done the cloth is covered with fine slush or clay paste, and the pattern thus formed and coated is placed centrally within an iron flask, D, which is then filled uniformly with moist clay-powder E, and the latter is compressed around the pattern by means of screws F and followers G, as described in my reissued patent No. 3,409, or in any other suitable manner.

The wedge-shaped section A of the core is then withdrawn, and the other sections are carefully withdrawn one by one, leaving the cloth in position within the mold adhering to the clay.

When the clay mold has been dried in the air it is placed in the furnace and burned, the result of which is to consume and destroy the cloth and leave in the mold a fine and perfect impression of the same, which is not broken or disturbed in the slightest degree.

When the clay mold is burned it is hard and may be filled with metal under pressure by the method already referred to, and thereby I produce a roller or die the surface of which is an accurate, delicate, and perfect imitation of the fabric on which the mold was formed.

If it is desired to cast this die hollow, as is usually the case with a cylindrical die or roller, in order that it may be mounted on a steel mandrel for use, a common core is inserted within the mold in the usual way.

The compression of the metal in the act of casting may be effected in the manner set forth in my reissued patent No. 3,409, but I prefer to employ the patent casting apparatus of Michael Smith, hereinbefore referred to.

An excellent material for dies produced by my process consists of a composition of copper and tin.



mixed in the proportion of one pound of copper to four or four and a half ounces of tin. This forms an alloy almost as hard as tempered steel. I do not, however, intend to confine myself to this or any particular metal or alloy, but propose to use any which may be found well adapted for the purpose in view.

Flat dies, with an impression of linen or other cloth or material, are readily made by my process, as it is only necessary to lay the material to be copied on a metal plate of the required shape, apply the clay slush, and then press the moist clay-powder onto this pattern within a suitable mold-box or flask, after which the metal plate is removed without the cloth or other material, (unless it be important to preserve the latter,) and the mold is then dried and burned, after which it is ready for casting, as before described.

It will be apparent that the surface of a roller or other die cast in the manner above described—that is to say, in a mold from which the pattern-cloth or other material has been burned out or removed—will be a positive copy of the said pattern, and hence the impressions produced by such die will be negative imitations thereof. This is the character of the impression commonly made (in imitation of linen) on paper employed in the manufacture of paper collars, and for some purposes it is sufficiently accurate.

When it is desired to construct dies which will produce absolute or positive imitations of the cloth or other pattern, I proceed as follows:

The linen or other pattern B to be imitated is placed upon the sectional core A, as in the first instance. This is then placed in a suitable box and plaster of Paris is cast around it, care being taken to avoid bubbles or imperfections.

When the plaster is set the core A is removed in sections, leaving the cloth in the plaster mold.

This stage of the process is illustrated in fig. 3—E' being the plaster and B the cloth within it.

When the plaster is sufficiently dry it is placed in the casting apparatus above referred to, and filled under pressure with soft solder or other fusible alloy, this being cast directly on the linen, which will not burn owing to the low temperature of the soft metal.

A negative casting is thus produced in soft metal, and the cloth being removed from it said casting is used as a pattern for forming a mold.

In fig. 4 H may represent the negative pattern of soft metal and E the moist clay-powder compressed around it.

A mold is thus produced in which to cast under pressure a roller or other die of hard metal, which will thus be a *fac simile* of the negative pattern H, and having a negative impression of the linen or cloth will produce on paper positive impressions or imitations thereof.

The effect thus produced is much more pleasing and satisfactory than the production of negative impressions or imitations.

#### Claims.

I claim as my invention—

1. The method and process, substantially as described, for constructing molds for the casting of rollers or other dies, having *fac-simile* impressions, either positive or negative, of linen, cloth, or other material.
2. A die of cylindrical or other form cast under pressure, by a process substantially as herein described, producing on its surface an accurate positive or negative impression of linen, cloth, or other material, and adapting it to produce accurate imitations of such material.

JOHN JOS. CHAS. SMITH.

Witnesses:

GEO. N. MARCH,  
H. W. KITTRIDGE.