

(No Model.)

B. F. KELSEY & F. E. DUNHAM.
DIE.

No. 567,030.

Patented Sept. 1, 1896.

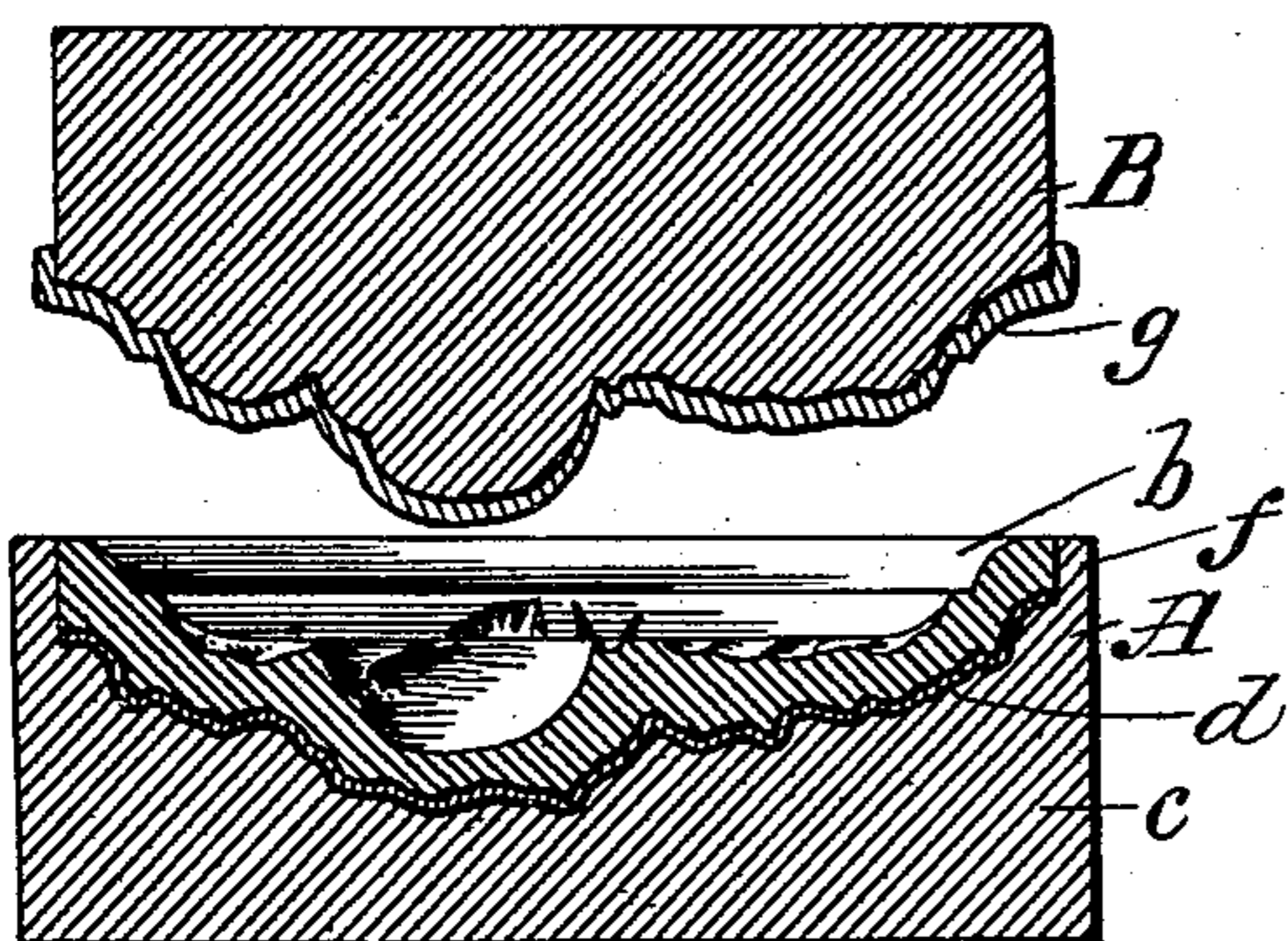


Fig. 1.

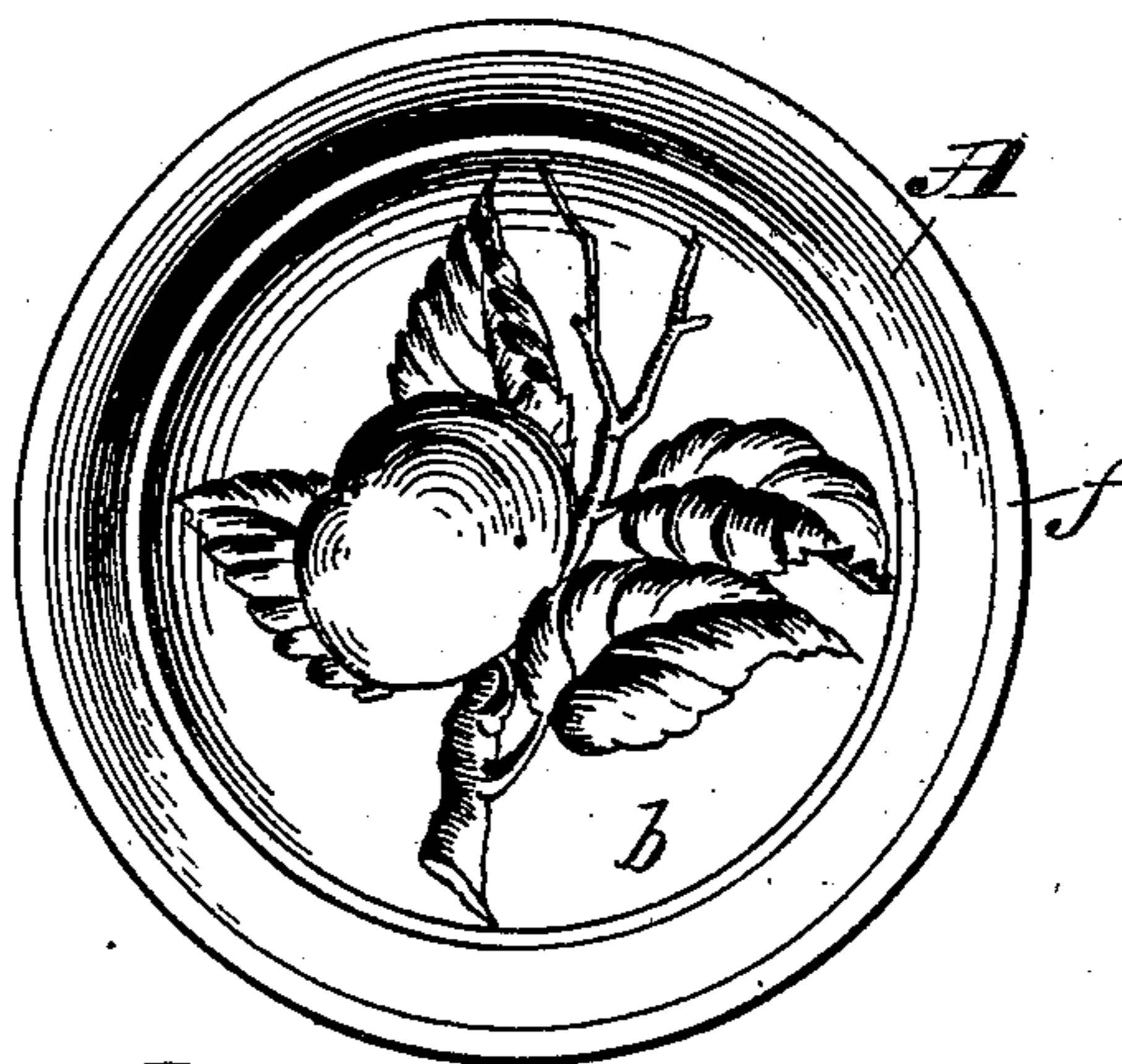


Fig. 2.

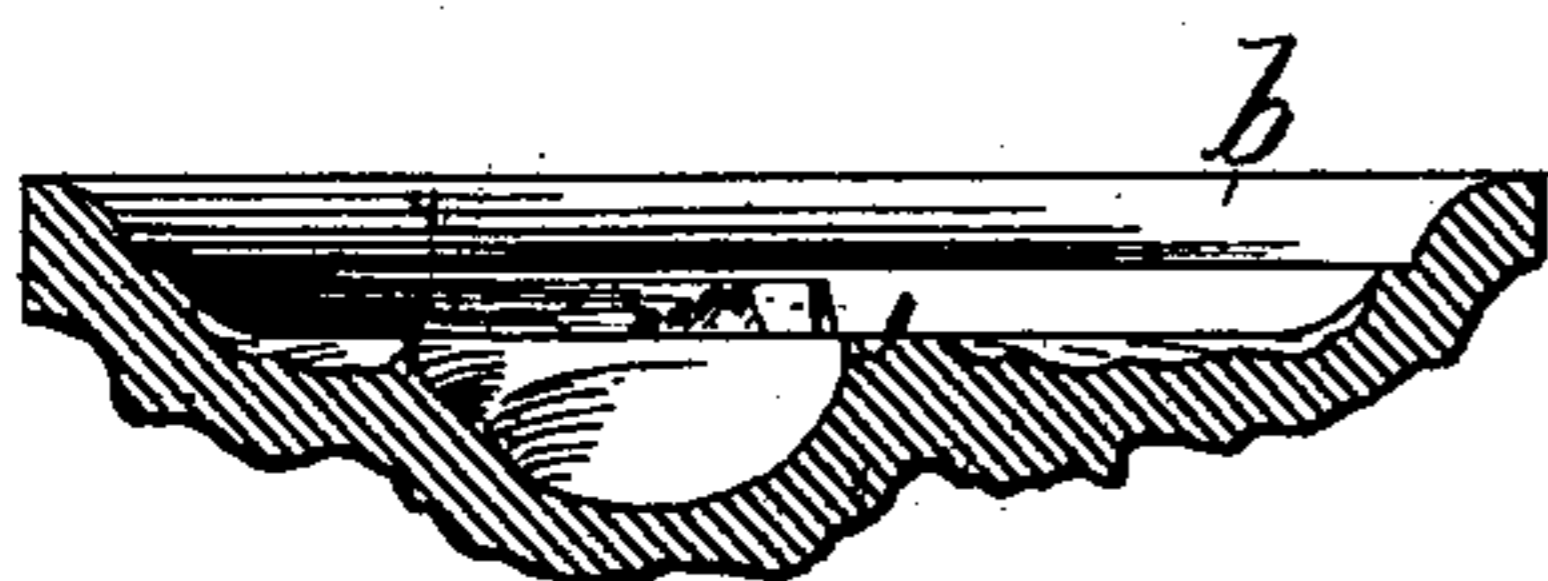


Fig. 3.

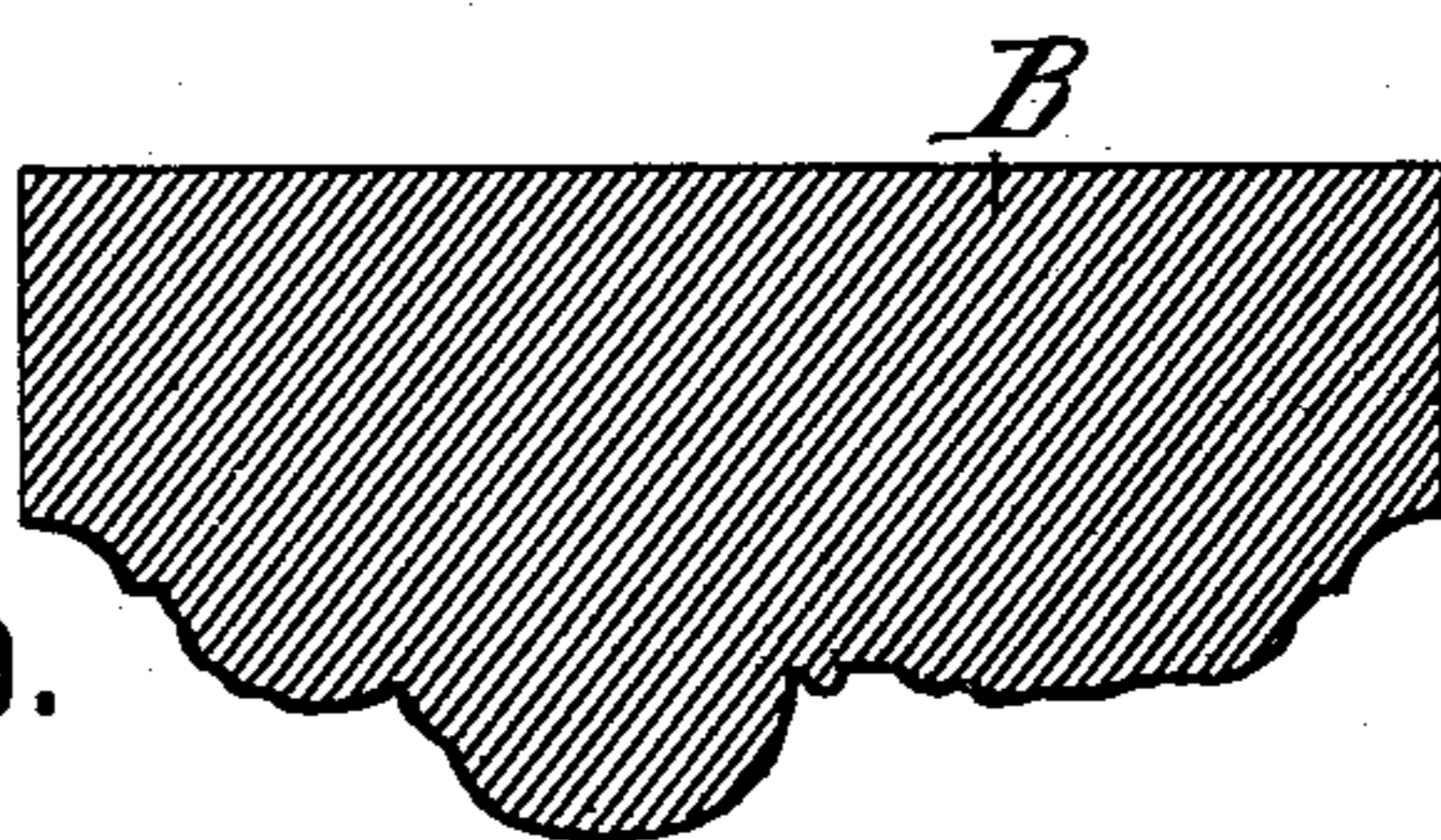


Fig. 6.

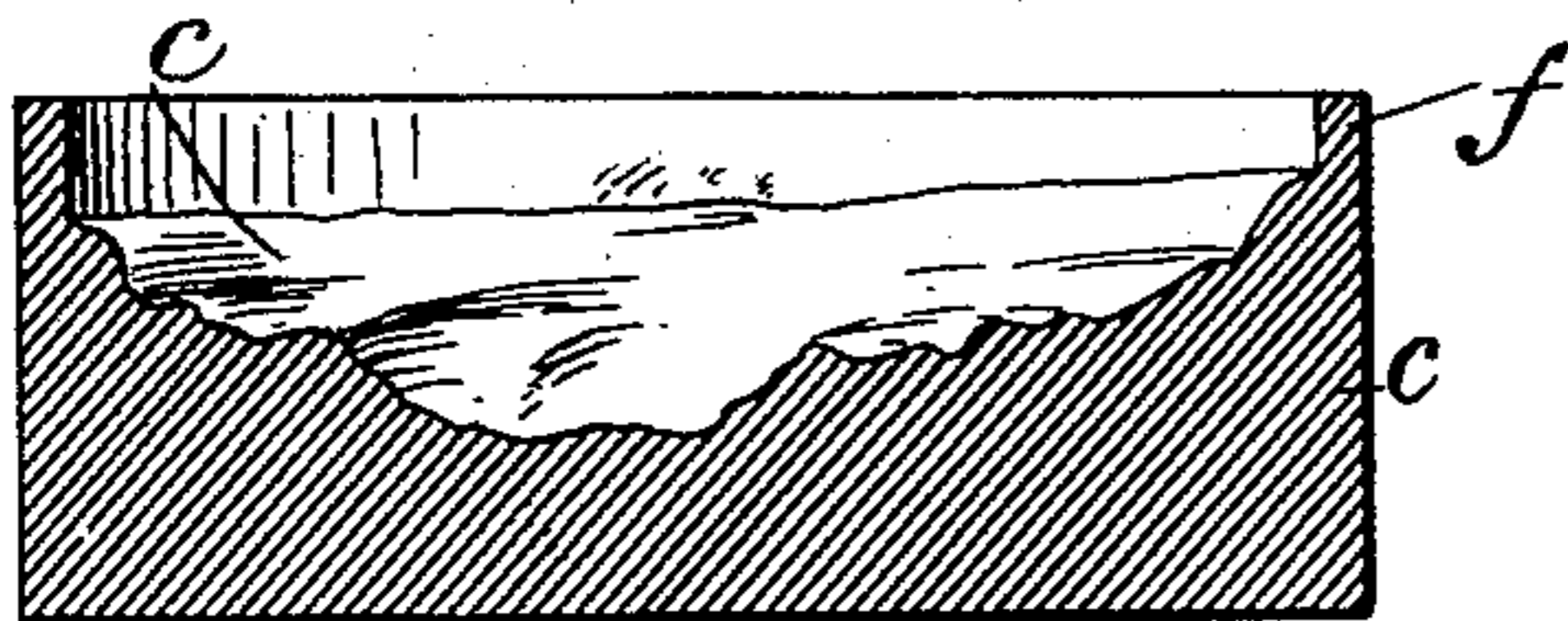


Fig. 4.

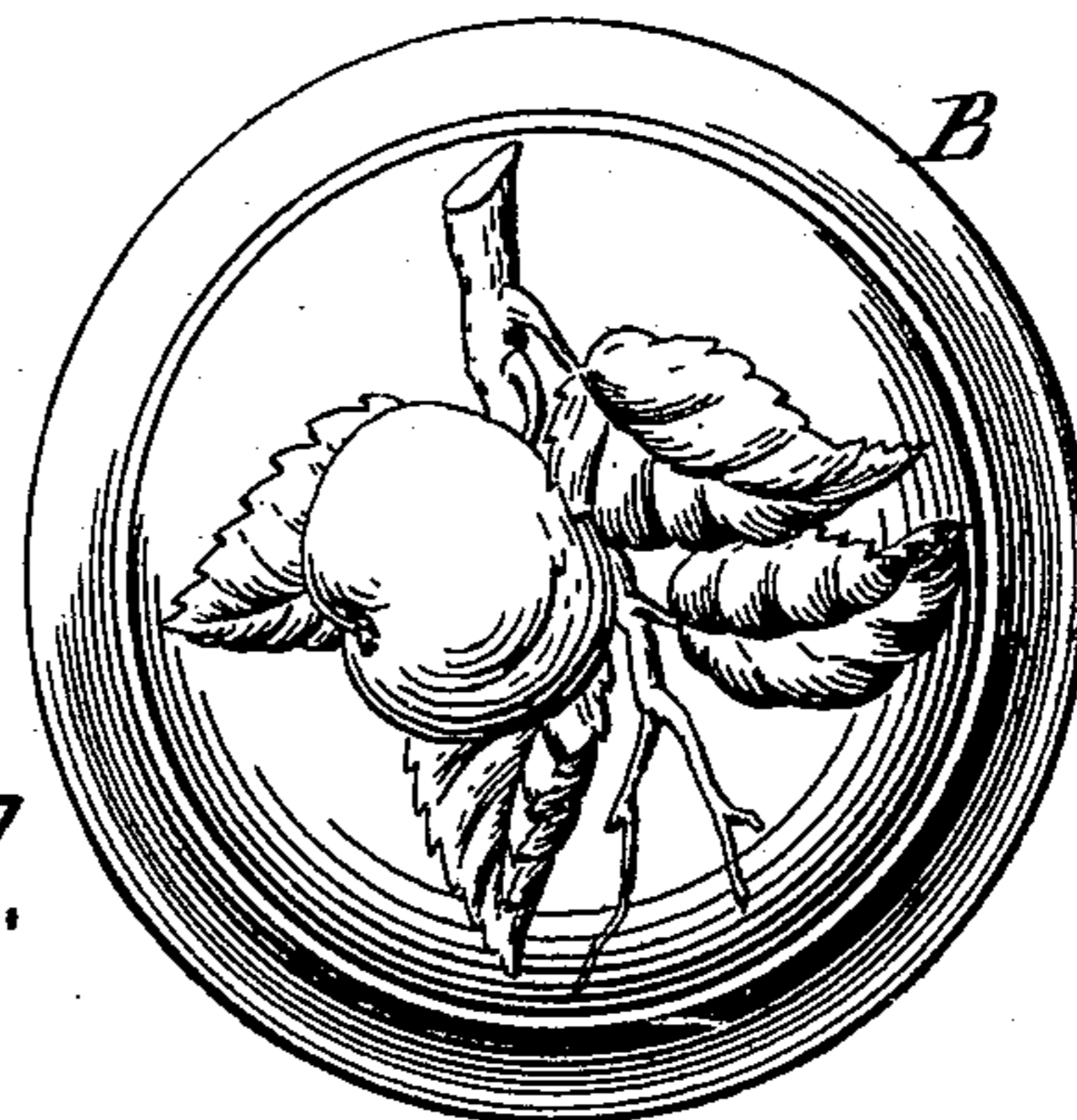


Fig. 7.



Fig. 5.

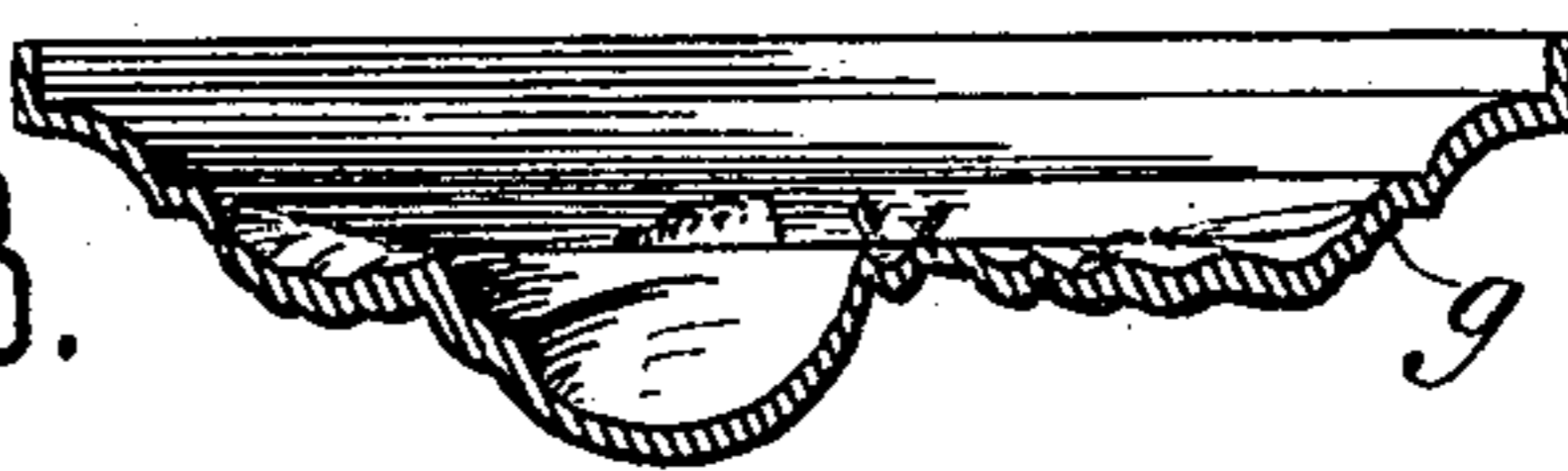


Fig. 8.

WITNESSES,

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UNITED STATES PATENT OFFICE.

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SPECIFICATION forming part of Letters Patent No. 567,030, dated September 1, 1896.

Application filed January 13, 1896. Serial No. 575,379. (No model.)

To all whom it may concern:

Be it known that we, BENJAMIN F. KELSEY and FREDRICK E. DUNHAM, citizens of the United States, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Dies, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section of an electrotype-die constructed in accordance with our invention and used for producing ornamental designs on britannia and other soft metals, the "force" or upper portion of the die being shown slightly raised above the matrix or lower portion. Fig. 2 is a plan of the matrix or lower portion of the die shown in Fig. 1. Fig. 3 is a vertical section of the electrotype-face of the die before being mounted on a hard-metal back or base. Fig. 4 is a vertical section of the cast-iron back or base having an intaglio counterpart of the rough back or undersurface of the electrotype-bases shown in Fig. 3. Fig. 5 is a vertical section of the sheet-metal packing which is interposed between the under surface of the electrotype-face and the hard-metal back or base shown in Fig. 4, said packing being shown as it appears after having been subjected to heavy pressure between the under surface of said electrotype and its hard-metal back or base. Fig. 6 is a vertical section of the cast-iron force shown in Fig. 1 before having the soft-metal facing applied thereto, said force having a cameo counterpart of the electrotype-die shown in Figs. 2 and 3. Fig. 7 is a plan of the cameo face of the cast-iron force shown in Fig. 6. Fig. 8 is a vertical section of the soft-metal facing which is applied to the force to form the working surface of the same.

In the manufacture of electrotype-dies used for producing ornamental designs upon britannia and other soft metals it is customary to make the electrotype of sufficient thickness to admit of its rough back or under side being turned or planed off to give it a smooth

surface, which is afterward fitted with great nicety into a cavity in a cast-iron or other hard-metal back or base, the edges of which entirely inclose the electrotype and are flush with the edges of its upper surface, said back enabling the electrotype to withstand the heavy pressure to which it is subjected without spreading or changing its shape. To produce an electrotype of sufficient thickness to enable its back to be turned or planed off smooth requires several months' time on account of the slow deposition of the copper in the bath, thus causing delay and inconvenience, besides increasing the expense of making the die.

Our invention has for its object to avoid the necessity of making a thick electrotype and turning or planing off the back of the same; and it consists in an electrotype-die having a sheet or layer of soft metal interposed between the rough or uneven under surface of the electrotype and a hard-metal back or base having an intaglio counterpart of said rough or uneven under surface, whereby the breaking or spreading of the electrotype is avoided and much better results produced, especially with dies having high relief or deep depressions, as hereinafter more fully set forth.

The second part of our invention relates to the force or portion of the die by which the soft metal to be ornamented is pressed into the matrix. This force has heretofore been composed entirely of steel or other hard metal and required to be very carefully made to nicely fit the interior of the die in order to get a sharp and smooth impression without cutting through the metal being embossed.

The second part of our invention consists in a force composed of hard cast metal having a counterpart of the die and provided with a working face of soft metal, also the exact counterpart of the die or matrix used therewith, as hereinafter fully described and specifically claimed.

In the said drawings, A represents the matrix or lower portion of an electrotype-die for producing ornamental designs on britan-

nia and other soft metals, and B is the force or upper portion of the die, by which the soft metal to be ornamented is pressed into the matrix. The method of making the matrix is as follows: We first make in the usual manner an electrotpe-die *b* of moderate thickness only, and then take a plaster cast of the rough back or under side of the same, which presents numerous rough lumps and inequalities, as shown in Fig. 3. The plaster cast so made is then used as a pattern to produce a cast-iron back or base *c*, Figs. 1 and 4, having an intaglio counterpart of the rough bottom or undersurface of the said electrotpe *b*. A sheet of soft metal *d* is then placed on the top of the cast-iron back or base *c*, after which the electrotpe *b* is brought down thereupon and by means of a powerful press forced into the cast-iron back or base *c*, carrying with it the interposed soft-metal plate *d*, which is thus caused to fill every space, line, and cavity, however minute, in the surfaces of the cast-iron back, and the electrotpe with which its opposite sides are brought into contact by the action of the press, care being taken to properly place the electrotpe so that the inequalities on its bottom will exactly register with the intaglio counterpart in the base *c*. The soft metal *d* thus forms a solid packing, which under the pressure exerted by the press, as described, adapts itself to the slight differences in shape between the hard-metal back and the bottom of the electrotpe, whereby the face of the latter is supported or backed at every point. We are thus enabled to entirely dispense with the turning or planing off of the rough unfinished bottom of the electrotpe, which can consequently be made very much thinner than heretofore, with a corresponding reduction in the expense and time required for its production, while the solidity with which the electrotpe is backed at every point by the soft metal effectually prevents the breaking or spreading of its working face which would take place if the electrotpe was used alone or was backed only by hard metal as heretofore. Our improved construction also enables us to successfully produce electrotpe-dies for irregular pieces having designs in high relief and with deep depressions. The base *c* is provided around its outer edges with a lip or flange *f*, as shown in Figs. 1, 2, and 4, which incloses the outer edges of the soft-metal packing *d* and electrotpe *b* and lies flush with the top of the latter, thereby preventing any spreading or change of form of the electrotpe-face of the die under any pressure to which it may be subjected.

The force B is made in the following manner: After the matrix or lower portion of the die has been produced a plaster cast is taken of the same having a reverse or counterpart of the design. This plaster cast is then used as a pattern by which to make the cast-iron force B, (shown in Fig. 6,) having a reverse or counterpart of the matrix. This

counterpart, although it fits the matrix, has nevertheless all the roughness and imperfections found in cast metal, and if used in this form would be liable to produce the same roughness on the surface of the metal to be ornamented. We therefore provide the force B with a working face *g*, Figs. 1 and 8, of soft metal, which is effected by roughly shaping a piece of soft metal and fitting it to the force, which, together with the soft metal, is carried down by the press into the matrix, taking the exact form of the latter, care being taken in bringing down the cast-iron force to see that it registers with the matrix beneath. In practice it is found that the irregularities in the surface of the cast metal will cause the soft-metal face to adhere to and be securely held in place upon the force, as desired, but if not sufficiently rough suitable undercuts or indentations may be made with a suitable tool before the soft metal is applied. By thus constructing a force having a soft-metal working face the exact counterpart of the matrix a much clearer or sharper impression of the die upon the article to be ornamented is obtained than has hitherto been possible and without any liability of cutting through or injuring the metal being embossed.

We do not wish to limit ourselves to the employment of a force constructed, as described, with an electrotpe die or matrix, as it is obvious that it may be employed with equally good results in connection with a hand-cut die or one produced in any desired manner.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. An electrotpe-die, comprising an electrotpe-face, a hard cast-metal back or base having an intaglio counterpart of the rough unfinished back of said electrotpe, and a sheet or piece of soft metal interposed between said electrotpe and hard-metal back and forcibly compressed between the same, substantially as described.

2. An electrotpe-die composed of an electrotpe-face, a hard cast-metal back or base having an intaglio counterpart of the rough unfinished back of said electrotpe, and a sheet or layer of soft metal interposed between said electrotpe and hard-metal back and forcibly compressed between the same, said cast-metal back having a lip or flange around its edge within which the edges of the soft metal and electrotpe are confined substantially as described.

3. A "die force" or punch composed of hard cast metal having a counterpart of the die and provided with a working face of soft metal the exact counterpart of the die, and produced by pressing said soft metal into the die with the force, whereby it is caused to adhere to the latter, substantially as described.

4. A die, comprising a matrix composed of an electrotpe-face, a hard cast-metal back or base having an intaglio counterpart of the

rough unfinished back of said electrotpe, and
a piece or sheet of soft metal interposed be-
tween said electrotpe and hard-metal back,
and a force composed of cast metal having a
5 counterpart of the matrix and a working face
of soft metal produced by pressing said soft
metal into the matrix with the said cast-metal
force, substantially as described.

Witness our hands this 31st day of Decem-
ber, A. D. 1895.

BENJAMIN F. KELSEY.
FREDRICK E. DUNHAM.

In presence of—

P. E. TESCHEMACHER,
WM. A. CUPPERS, Jr.