No. 633,114. Patented Sept. 19, 1899.

W. M. BERRY.

MACHINE FOR CONTRACTING SHEET METAL ARTICLES AROUND HARD METAL DIES.

(Application filed July 25, 1898.)

(No Model.)

Fig. 1.

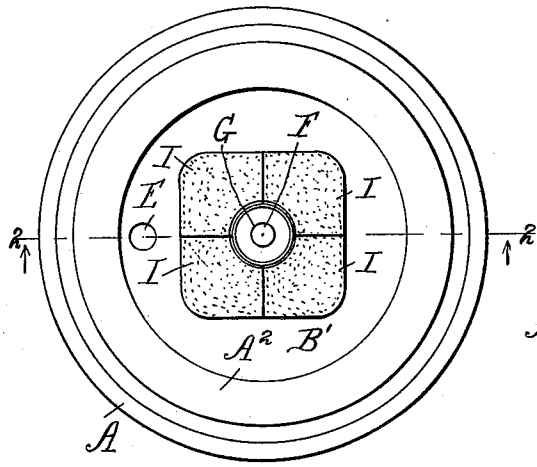


Fig. 3.

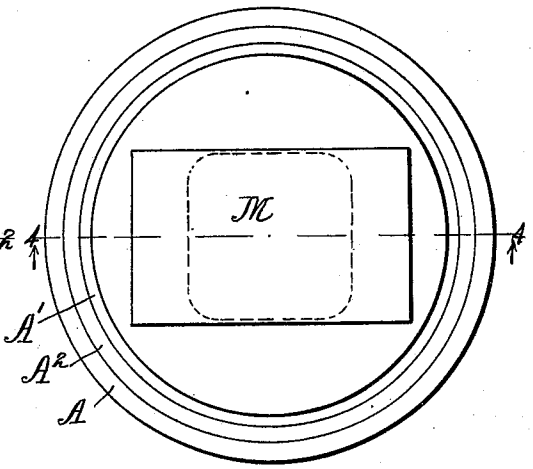


Fig. 4.

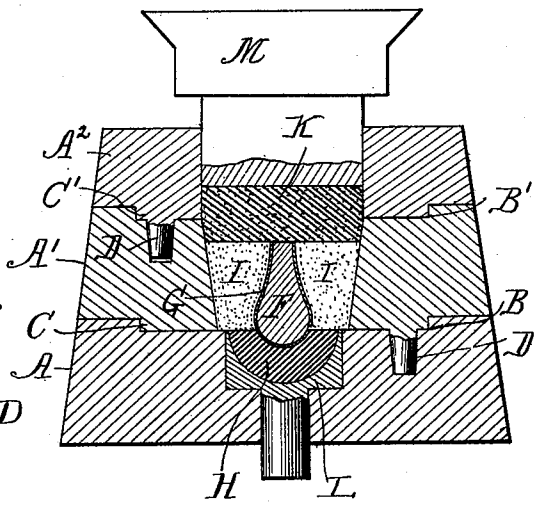
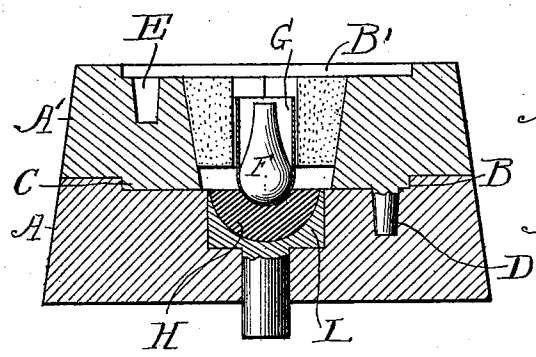


Fig. 2.



Witnesses.
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by Brown & Darby Atty's

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WALTER M. BERRY, OF CHICAGO, ILLINOIS.

MACHINE FOR CONTRACTING SHEET-METAL ARTICLES AROUND HARD-METAL DIES.

SPECIFICATION forming part of Letters Patent No. 633,114, dated September 19, 1899.

Application filed July 25, 1898. Serial No. 686,784. (No model.)

To all whom it may concern:

Be it known that I, WALTER M. BERRY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Machine for Contracting Sheet-Metal Articles Around Hard-Metal Dies, of which the following is a specification.

This invention relates to a machine for contracting sheet-metal articles around hard-metal dies.

The invention consists in substantially the construction hereinafter described, and more particularly pointed out in the claims.

Like letters refer to the same parts in the several figures of the drawings, in which—

Figure 1 illustrates a plan view of the machine with the plunger and uppermost section removed. Fig. 2 illustrates a vertical central section of the same. Fig. 3 illustrates a plan or top view of the complete machine, and Fig. 4 illustrates a central vertical section of the same.

The object of the apparatus is to contract sheet-metal articles or shells around hard-metal dies without seams or buckles.

The machine is especially adapted to contract gold shells or casings around hard-metal cores—such, for instance, as teeth, watch-stems, &c. Gold, as is well known, has great adaptability for expansion; but the converse is not true, for it is very difficult to contract gold by ordinary methods without seams or buckles; but by the use of this apparatus such result may be efficiently accomplished.

As a part of this apparatus or machine there is employed an exterior body or casing built up of a number of detachable horizontal sections made of hard metal or other suitable hard material. In the drawings there is illustrated an arrangement which has been found convenient in practice consisting of an outer body or casing composed of a lower, an upper, and an intermediate section, which are respectively designated by the letters A, A′, and A^2. These sections may be detachably secured together in any desired manner; but a convenient manner of effecting this result is well shown in Fig. 4 as consisting in forming a circular recess or depression in the top of each subjacent section and a corresponding projection or shoulder in the bottom of each overlying section. The depressions thus formed are designated in the drawings, reading from the bottom section, as B B′, and the projections, commencing with the bottom one, are designated, respectively, as C C′. These projections or shoulders engaging with the depressions prevent lateral displacement of the sections; but in addition to this there is provided for each adjacent pair of sections a tenon and mortise, which provide against relative rotation of adjacent sections. The tenons are designated by the letter D and the mortises by the letter E in the drawings. Within these detachable sections of the outer casing or body there is placed the die and its counterparts. Of course the die varies in shape to conform with the article desired to be produced and is made of some hard metal. In the drawings the die is designated by the letter F and is shown as surrounded by a sheet-metal shell, which is designated by the letter G. The counterpart or counter-die is made up of a number of sections which surround the bottom, sides, and top of the die and the sheet-metal shell which is to be formed thereon. This counter-die is composed of a soft metal capable of being compressed so as to make its inner surface conform in shape to the die and press and contract the sheet-metal shell into the shape required around the die. In practice lead has been found to be a material well adapted for the purpose, and six sections or pieces have been found convenient for effecting the best results. An arrangement of these pieces which has been found advantageous is shown in the drawings and comprises six pieces—viz., a bottom piece of the counter-die, (lettered H,) four vertically-arranged angular side pieces, (lettered I,) and a top piece, (lettered K.) The bottom part of the counter-die (designated by the letter H) may be conveniently arranged to rest in or be held by a hard-metal removing-piece L, the body of which is seated in a countersunk recess in the top of the lowermost section of the outer casing and which has a stem projecting through such section of the outer casing and beyond the bottom of the same, as shown in the drawings.

The die, the shell to be contracted or formed, the counter-die composed of the various parts above mentioned, and the remover are

placed in position, as shown in Fig. 2 of the drawings. Then the top piece of the counter-die is placed over said die and shell, and a plunger M is placed in position over this top part of the counter-die, it being supported laterally by the top section A^2 of the outer casing, as shown in Fig. 4 of the drawings. Great pressure is then applied to the plunger, which results in the counter-die being forced down and causing the shell of gold or other material which is desired to be formed to be contracted around the die in the manner indicated in Fig. 4 of the drawings. The plunger is then removed and the projecting stem of the remover L is tapped by a hammer or some other suitable instrument, and the sections of the counter-die thereby loosened, when they may be separated and the article which has been formed may be easily removed.

The hard-metal die F, heretofore described, is of course made of Mellott's metal or some other fusible alloy, and after the machine has contracted the article around such die and the article and die have been removed the die is melted, so as to remove it from the interior of the article. The fusible alloy must of course be of a character which will melt at a temperature much lower than that of the article formed, so that it will not alloy said article. This practice of melting the die from the article is well known and forms no part of the present invention.

It is obvious that many modifications may be made in the details of construction above described without departing from the principle of the invention.

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

1. In an apparatus for contracting sheet metal, the combination with an exterior casing composed of sections, of a die, and a counter-die composed of sections formed of compressible material and arranged in a cavity within the outer casing and around the die and shell to be formed, and underneath the same, and a plunger arranged above the die and counter-die and closely fitting the cavity above the same; substantially as and for the purpose set forth.

2. In an apparatus for contracting sheet metal, the combination with the main body composed of several sections of hard material detachably secured together, and provided with a central cavity or chamber, of a die of hard metal, a counter-die composed of a number of sections of lead surrounding the die and shell to be formed, both at the sides and underneath the same, and a plunger arranged to fit the cavity or chamber above the counter-die, and adapted to compress said counter-die and shell and thus contract the latter around the die into the desired shape; substantially as and for the purpose set forth.

3. In an apparatus for contracting sheet metal, the combination with the main body composed of a number of sections of hard material detachably connected together, and provided with a central cavity or chamber, of a die of hard metal, a counter-die composed of several sections of soft metal, arranged underneath and around the sides of the die and shell to be formed, a plunger adapted to fit the recess or chamber above the counter-die and die, and a remover adapted to a recess below such counter-die and die, and having a projecting stem extending outside of the main body of the apparatus; substantially as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 22d day of July, 1898, in the presence of the subscribing witnesses.

WALTER M. BERRY.

Witnesses:

FRANK T. BROWN,

SAML. H. HAUPMAN.