No. 893,701. PATENTED JULY 21, 1908.

G. H. BENJAMIN.

MACHINE FOR EXTRUDING METALS.

APPLICATION FILED JUNE 9, 1906.

2 SHEETS—SHEET 1.

FIG. 1.

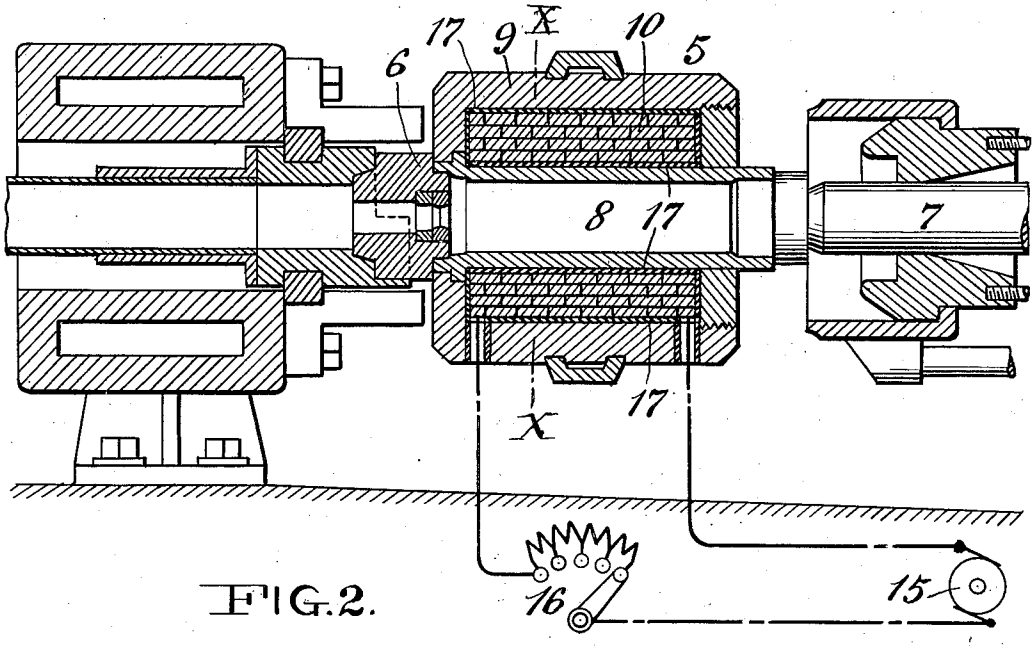


FIG. 2.

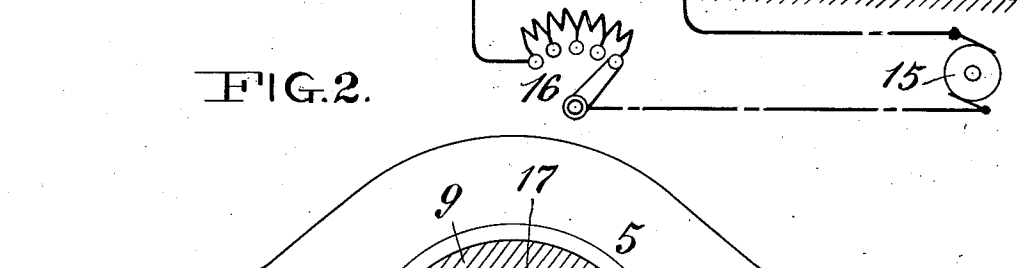
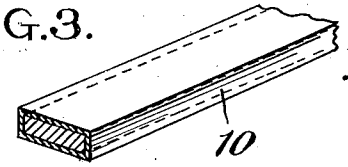


FIG. 3.



WITNESSES:

Frank O'Connor

Frederick A. Blount

INVENTOR

Geo. H. Benjamin

No. 893,701. PATENTED JULY 21, 1908.

G. H. BENJAMIN.

MACHINE FOR EXTRUDING METALS.

APPLICATION FILED JUNE 9, 1906.

2 SHEETS—SHEET 2.

FIG. 4.

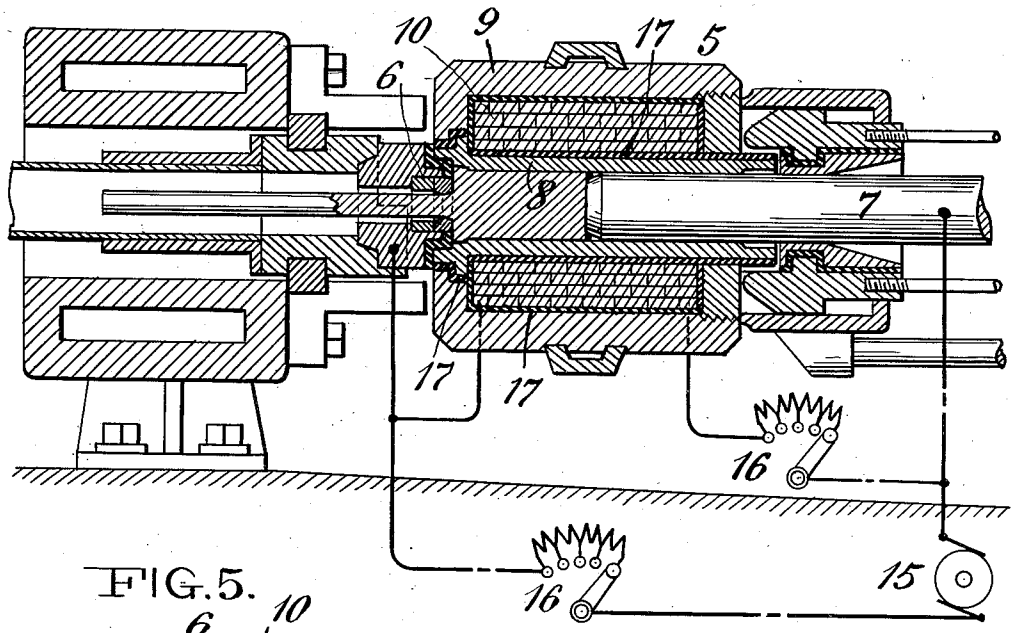


FIG. 5.

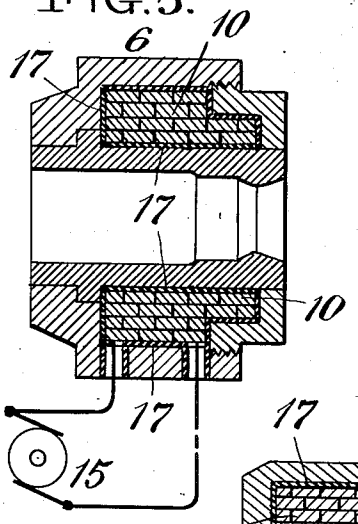


FIG. 6.

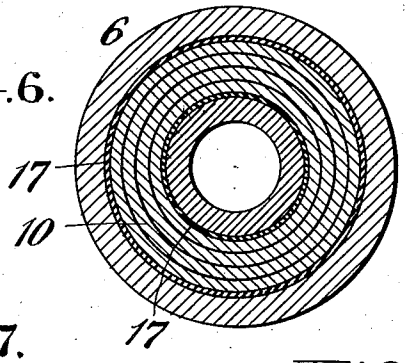


FIG. 7.

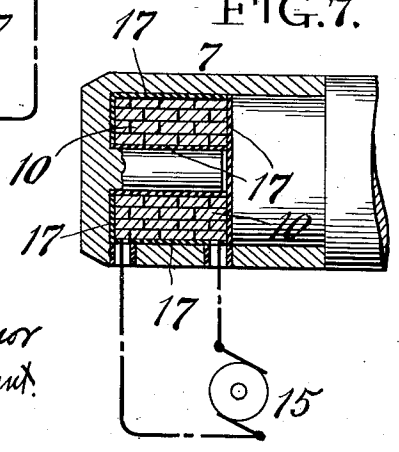
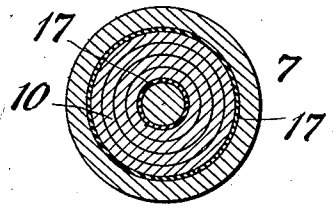


FIG. 8.



WITNESSES:

Frank O'Connor

Frederick A. Blount

INVENTOR

Geo. H. Benjamin

UNITED STATES PATENT OFFICE.

GEORGE HILLARD BENJAMIN, OF NEW YORK, N. Y., ASSIGNOR TO THE COE BRASS MANUFACTURING COMPANY, A CORPORATION OF CONNECTICUT.

MACHINE FOR EXTRUDING METALS.

No. 893,701. Specification of Letters Patent. Patented July 21, 1908.

Application filed June 9, 1906. Serial No. 321,048.

To all whom it may concern:

Be it known that I, GEORGE HILLARD BENJAMIN, a citizen of the United States, residing at the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Extruding Metals, of which the following is a specification.

My invention relates to a machine for extruding metals and consists in the means employed for heating the container, the die, the plunger, and the billet during the act of extrusion.

My improvement may be applied to any form of extruding machine. I have shown it as applied to a machine of the type disclosed in U. S. Patent No. 819,261, granted to W. A. Wood, May 1, 1906.

The purpose of my invention is to provide means for maintaining the initial temperature of the billet during the act of extrusion.

It is a well known fact that certain metals and metallic alloys can only be extruded when at certain temperatures. It is, therefore, important to provide means for maintaining the initial temperatures of such bodies while in the container and during the act of extrusion.

Generally speaking, I obtain the object of my invention by electrically heating the container, the die, the plunger, and the metal under extrusion, or any one or more of such parts.

The accompanying drawings will serve to illustrate my invention.

Figure 1—is a longitudinal section of a container and adjacent portions of an extrusion machine; Fig. 2—is a transverse section on the line X, X, of Fig. 1; Fig. 3 is a view in perspective of the wire tape and its envelop used in winding the container, the die, and the ram; Fig. 4—is a view similar to Fig. 1, showing the heating means for the container and the billet connected in multiple with a source of current supply; Fig. 5—is a longitudinal section of a die and its heating means; Fig. 6—is a transverse section of Fig. 5; Fig. 7—is a longitudinal section of the end of the ram and its heating means; Fig. 8—is a transverse section of Fig. 7.

In the drawings: 5 is the container, 6, the die, 7, the ram. The container is shown as formed of the interior cylinder 8, an exterior cylindrical casing 9, and intermediate layers of metallic tape, 10, such as shown in Fig. 3. The interior and exterior cylinders of the container, the die, and the ram may be made of metal, glass or other substance which may be heated to a high temperature and yet have sufficient strength to prevent their distortion during the extrusion operation. The tape may be of iron, copper or an alloy of metals. The ends of the tape are carried out of the container and connected to the terminals of an electric generator, 15. 16 indicates a rheostat. The construction of the container is followed in the construction of the die shown in Fig. 5, and also in that of the plunger, Fig. 7. In all of these parts the wire or tape employed should be insulated with some material which will resist high temperature.

In order to heat the billet, the plunger and die are connected to the respective terminals of the generator 15. The interior cylinder 8 of the container in such case is insulated with suitable insulating material, 17, from the outer containing cylinder 5.

The operation of my improved apparatus will be readily understood. When current is transmitted through the tape 10, assuming the resistance of the tape to be such as to impede the current, heat is generated and this heat will serve to prevent the absorption of heat by the container, the die, or the plunger from the billet which is to be extruded. The temperature of the billet, will, therefore, be maintained. When current is sent through the billet in sufficient quantity, it will be heated.

I wish to have it understood that I do not limit myself in any wise to the features of construction employed for heating the parts mentioned, as any apparatus which will uniformly heat the parts with which the billet to be extruded comes in contact, to temperature equal to that of the initial temperature of the billet, will be within the intent of my invention.

Having thus described my invention, I claim:

1. In combination with an extrusion machine, of means separate from the billet to be extruded for heating all the parts of said machine which contact with the heated billet to a temperature equal to or above that of the initial temperature of the billet to be extruded.

2. In an extrusion machine and in combination with the die, of locally positioned means for heating the die to the initial temperature of the billet to be extruded.

3. In an extrusion machine and in combination with the ram, of locally positioned means for heating the ram to the initial temperature of the billet to be extruded.

4. In an extrusion machine and in combination with the die and plunger, of a source of electric energy, and connections leading respectively to the die and to the plunger to provide for the passage of an electric current from end to end through the billet for heating the billet to be extruded during the act of extrusion.

5. In an extrusion machine, the combination of the container, the die, the ram, and locally positioned means for each part for heating such parts during the act of extrusion of the billet.

6. In an extrusion machine, the combination of a wire-wound container, a source of electric current, electric connections for connecting said container with said source together with means for controlling the current transmitted through the wire of the container.

7. A machine for extruding copper billets provided with means separate from the billet to be extruded for heating all the coöperating parts of the machine which contact with the billet to the initial temperature of the billet to be extruded.

8. An extruding machine provided with means separate from the billet to be extruded for heating such parts of the machine as come in contact with the billet to be extruded to the temperature of such billet.

9. A machine for extruding copper billets provided with means separate from the billet to be extruded for heating all the coöperating parts which come in physical contact with the billet to be extruded to a temperature above that of the billet to be extruded.

In testimony whereof, I affix my signature, in the presence of two witnesses.

GEORGE HILLARD BENJAMIN.

Witnesses:
FRANK O'CONNOR,
M. G. CRAWFORD.