T. F. BAILY.

APPARATUS FOR METAL WORKING.

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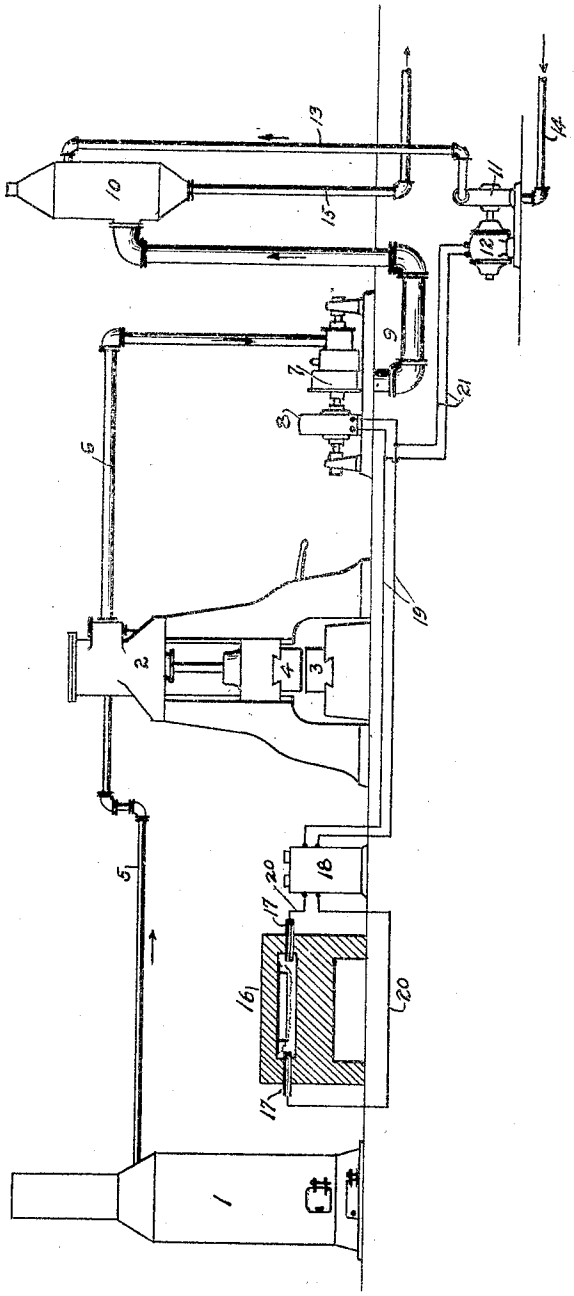

Witnesses

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APPARATUS FOR METAL WORKING.

960,772. Specification of Letters Patent. Patented June 7, 1910.

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To all whom it may concern:

Be it known that I, THADDEUS F. BAILY, a citizen of the United States, residing at Alliance, in the county of Stark and State of Ohio, have invented new and useful Improvements in Apparatus for Metal Working, of which the following is a specification.

This invention relates to the working of metal, wherein a steam actuated device is used to form the metal in a heated condition and the exhaust from the said device is utilized in the production of a current of electricity which is applied to the heating of the said metal to the necessary forming temperature.

The objects of my improvement are to generally improve the art of metal working, to simplify the apparatus used in the said art, and more especially to economize the energy expended in the working of metal and to facilitate the economical and speedy production of the output.

I attain these objects by the construction illustrated in the accompanying drawing, in which the figure is a view in elevation, and partly in section showing a steam boiler, a steam actuated hammer, a direct connected exhaust steam turbine and electric generator, an electric controller, an electric furnace as well as a condenser and related parts, together with the necessary electrical and other connections.

In the drawing similar numerals of reference indicate similar parts.

The boiler 1 may be of any construction desired, the object of said boiler being to produce steam under pressure for the working of the metal. The details of construction of said boiler are immaterial so far as the present invention is concerned and also the method of heating employed in said boiler is immaterial, the most economical method of heating in accordance with the location of the device being preferred.

The numeral 2 indicates generally a steam actuated hammer of any suitable or well known construction, the said hammer being adapted to form the metal upon the anvil 3 by the ram 4.

The numeral 5 indicates a suitable pipe for conducting steam from the boiler 1 to the hammer 2.

The exhaust steam from the hammer 2 is conducted through the pipe 6 to an exhaust steam turbine generally indicated by the numeral 7. The said steam turbine is directly connected to an electric generator generally indicated by the numeral 8. From the turbine 7 the pipe 9 conducts the exhaust to the condenser 10 which is supplied with the necessary cold water by means of the rotary pump 11 operated by the electric motor 12, the said pump 11 being connected by means of a pipe 13 with the condenser 10 and the pipe 14 being connected with an appropriate supply of said water and being adapted to conduct the same to the pump 11.

The numeral 15 indicates the drainage pipe adapted to conduct the water from the condenser 10.

The numeral 16 indicates generally an electric furnace provided with the electrodes 17 and other necessary parts, the details of construction of said furnace being in nowise claimed in the present application.

The numeral 18 indicates a controller adapted to regulate the current supplied to the furnace 16 as hereinafter more fully described.

The conductors 19 connect the generator 8 with the controller 18, while the conductors 20 complete the circuit from said controller 18 through the furnace 16. The conductors 21 electrically connect the motor 12 with the conductors 19 for the purpose of supplying necessary current to the motor 12 to operate the said motor 12 and pump 11.

It should be stated that the controller 18 is by no means an essential part of the present invention as the conductors 19 and 20 might well be arranged continuous without the interposition of the said controller, although the said controller is preferably provided for the purpose of regulating the current supplied to the electrodes 17 and thereby controlling the temperature produced in said furnace.

Apparatus having been provided and arranged as described the operation of the same is as follows. The steam generated in the boiler 1 passes through the pipe 5 in the direction indicated by the arrow into the steam hammer 2 where it is used to operate said hammer. The exhaust from the hammer 2 passes through the pipe 6 to the turbine 7 where it operates said turbine, thus driving the generator 8. Exhausting from the turbine 7 the steam passes through the pipe 9 into the condenser 10 where it is con-

densed by means of the cold water supplied to said condenser through the pipe 13 by the pump 11. The electric current generated in the generator 8 is conducted through the conductors 19 and 20, the controller 18 being interposed in the circuit if desired to the furnace 16 where the said current is used to heat the metal. It is intended that the heated metal be taken from the furnace 16 and formed upon the hammer 2 in the usual manner.

The economy of the above described improvement will be readily apparent. Heretofore it has been necessary to draw upon several independent sources of energy in the working of metal and much of the energy expended has not been used in the actual working of the said metal but has been entirely lost by reason of the lack of economical arrangement and wasteful expenditure of energy. In the present invention the boiler 1 serves as a general producer of energy for the entire process and the unexpended energy of the exhaust steam from the hammer 2 is carefully conserved and applied to the carrying out of the process in question.

It should be noted that I do not desire to be limited to the use of a steam actuated hammer as it is evident that other steam actuated metal forming devices might be substituted for the said hammer with substantially the same result in the saving of energy and economy in the working of heated metals. It should also be noted that other means than the motor 12 and pump 11 may be employed for supplying water to the condenser 10 and even though the said motor 12 be employed it is not essential to the spirit of the present invention that the said motor be supplied from the current produced by the generator 8. The condenser 10 and immediately related parts are not claimed in the present invention and are not essential to the working of the apparatus herein described but are only used as being the preferable and more economical arrangement.

Throughout the above specification it will be noted that the terms "metal working" and "working of metal" are intended to mean not only the shaping of said metal by means of the steam actuated hammer but also the heating of the said metal, or in other words the said terms are intended to include the entire process so far as the operation of the mechanical and electric devices described are concerned.

I claim:

1. In apparatus for metal working the combination of a steam boiler, a steam actuated metal forming device, an exhaust steam turbine and direct connected generator, a controller and an electric furnace, means for conducting steam from said boiler to said steam actuated device, means for conducting the exhaust steam from said steam actuated device to said exhaust steam turbine, electrical connection between said electric generator and said controller and electrical connection between said controller and said furnace.

2. In apparatus for metal working the combination of a steam boiler, a steam actuated metal forming device, an exhaust steam turbine, an electric generator operated by said turbine, an electric furnace, means for conducting steam from said boiler, to said steam actuated device, means for conducting the exhaust steam from said steam actuated device to said exhaust steam turbine and electrical connection between said electric generator and said furnace.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

THADDEUS F. BAILY.

Witnesses:

J. S. MILLER,

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