G. H. FORSYTH.

METHOD AND APPARATUS FOR FORMING METALLIC SHEETS AND THE LIKE.

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Fig. 1

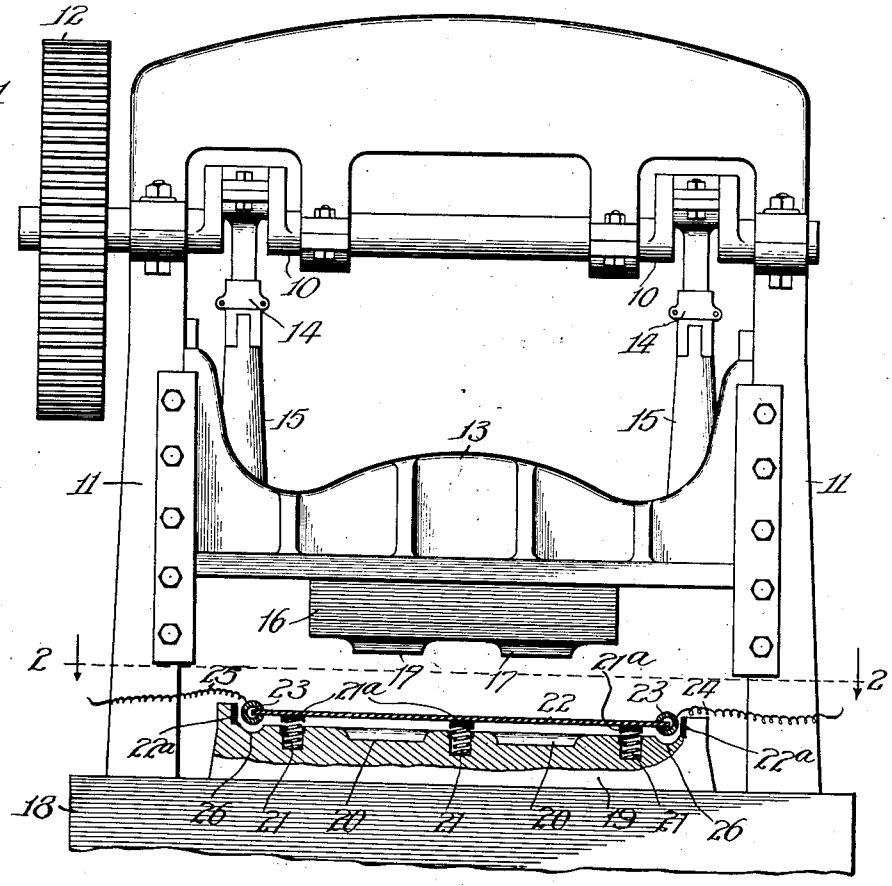
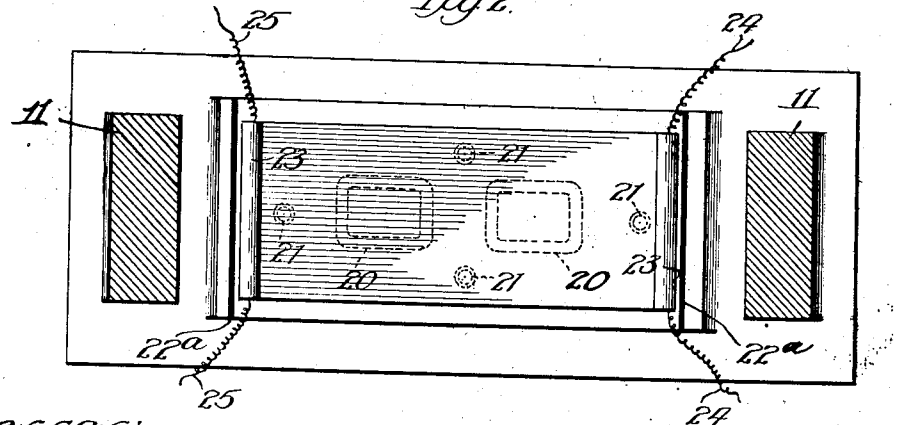


Fig 2.



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METHOD AND APPARATUS FOR FORMING METALLIC SHEETS AND THE LIKE.

1,112,779. Specification of Letters Patent. Patented Oct. 6, 1914.

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To all whom it may concern:

Be it known that I, GEORGE H. FORSYTH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods and Apparatus for Forming Metallic Sheets and the like, of which the following is a specification.

My invention relates to apparatus for and method of forming thin metallic sheets which are to be worked when hot.

Heretofore great difficulty has been attained in the proper handling of the thin metallic sheets, wire, and the like on which mechanical work of forming or stamping, and the like, is to be performed while the sheet is in a heated state. In the first place it is very difficult to heat a large sheet so that the temperature will be uniform throughout the entire body of the metal. A further feature which introduces even greater difficulties, however, resides in the transfer from the heating furnace to the machine or apparatus where the work is to be performed. When the sheet is thin it cools very rapidly in the air with the result that when it reaches the machine the temperature is too low.

It is one of the objects of my invention to perform the heating operation while the sheet is in substantially the position in which it is to be worked, in this way avoiding any loss of heat which is incidental to the transfer of the sheet from the heating furnace. These results may be accomplished in a variety of ways, as for example, by heating the sheet by gas or other fuel on the machine where the work is to be performed. I prefer, however, to heat the sheet electrically, this being accomplished by attaching suitable electrodes to the ends of the sheet, the body of which forms a resistance and is thus heated to any desired temperature. When the proper temperature is attained, the mechanical work is immediately performed, thus enabling the operator to obtain much superior results to those obtained under the old practice. My invention may also be applied to the rolling of thin sheets and the like by heating the same electrically or otherwise just before their entrance to the rolls. These and other advantages of my invention will be more readily understood by reference to the accompanying drawings which represent a preferred embodiment of the apparatus used to carry out my improvements, and in which:

Figure 1 is a front elevation of a stamping machine showing the dies and sheet in position, and Fig. 2 is a horizontal section of the machine taken on the line 2—2 of Fig. 1.

The machine may be of any desired type in which the dies are moved with relation to each other. In the machine which I have shown the crank shaft 10, supported in the frame 11, is driven by means of the gear 12. The reciprocating die-holder 13 is operated by means of the links 14, 14 having pivotal connection with the members 15, 15 attached to the die-holder 13. Suitably connected to the die-holder 13 is the die 16 which, in this case, is a male die having the projections 17, 17. Suitably supported on the base 18 is the female die 19 having the depressions 20, 20 corresponding to the projections 17, 17 of the die 16. Located in the lower die 19 are the compression springs 21 on which the sheet 22 rests, a plate of non-conducting material 21^a preferably separating each spring from the sheet 22. The stop portions 22^a of the die 19 are also made of non-conducting material to prevent short circuiting as will be further explained below. To opposite ends of plate 22 are attached the connectors 23 which are of high electric conductivity and engage both the upper and lower surfaces of the sheet, as clearly shown in Fig. 1. To one of the connectors 23 are attached the conductors 24 leading to the positive terminal of the source of current. To the opposite connector are attached the conductors 25 leading to the negative terminal of the same source of current.

Having thus described the construction of the apparatus used in my invention its mode of operation may now be readily understood. When it is desired to stamp the sheet 22, it is first placed in position resting on the springs 21, and the connectors 23 are attached to the ends of the sheet. The circuit, of which the conductors 24 and 25 form a part, is then closed by means of a suitable switch and the current flows through the body of the sheet 22, thereby causing the same to be heated. The amout of current may be regulated as desired according to the size of the sheet and the temperature which is to be obtained. When

the proper temperature is reached, and preferably while the sheet is maintained in the heating circuit, the machine is operated and the die 16 is forced downwardly, thereby first moving the sheet down and compressing the springs 21 and then suitably forming the sheet by coördinating action of the dies 16 and 19. Suitable depressions 26 may be formed in the die 19 for the accommodation of the connectors 23. It will thus be evident that the stamping operation is performed at the exact temperature as desired, and very superior results are thus obtained.

It will be evident to those skilled in the art that many changes could be made in the detailed apparatus for and method of carrying out my invention without departing from the spirit and scope thereof.

What I claim is:—

1. In an apparatus for forming sheets and the like, the combination of means for heating the sheet, resilient means for supporting said sheet, and means for first compressing said resilient means and then forming said sheet without removal from said apparatus, substantially as described.

2. In an apparatus for forming sheets and the like, the combination of electrical means for heating the sheet, resilient means for supporting said sheet, and means for first compressing said resilient means and then forming said sheet without removal from said apparatus, substantially as described.

3. In an apparatus for forming metallic sheets and the like, the combination of forming dies, and means to include the sheet while in operative position with reference to the dies in an electric heating circuit independent of said dies, substantially as described.

4. In an apparatus for forming metallic sheets and the like, the combination of forming dies, means to support the sheet in operative relation to but out of electrical contact with the dies, and a pair of heating electrodes arranged to be connected to the extremities of the sheet, substantially as described.

5. The method of forming sheets and the like which consists in heating said sheets on resilient supports in a forming apparatus, and forming said sheets substantially without removal from said apparatus, substantially as described.

6. The method of forming a metallic sheet or the like which consists in heating said sheet on a resilient support in a forming machine by means of an electric current, and subjecting said sheet to mechanical work on compression of said resilient means and without removal from said machine, substantially as described.

7. The method of forming a metallic sheet or the like between dies which consists in heating said sheet on a support out of contact with said dies, and bringing said dies into contact with said sheet without removal of the sheet from the heating means, substantially as described.

8. The method of forming a metallic sheet or the like between dies which consists in electrically heating said sheet out of contact with said dies and bringing said dies into contact with said sheet without removal of the sheet from said heating means, substantially as described.

9. The method of forming a metallic sheet or the like, which consists in inserting the sheet in an electric heating circuit independent of the forming dies, and bringing said dies into pressure contact with the sheet while the latter is included in the heating circuit, substantially as described.

10. The method of forming a metallic sheet or the like, which consists in supporting said sheet independently of the forming dies and while so supported applying the electrodes of a heating circuit to the sheet extremities, and then bringing the dies into pressure contact with the sheet while so heated, substantially as described.

11. The method of forming a metallic sheet or the like, which consists in applying the positive and negative terminals of an electric heating circuit to the opposite edges of the sheet, passing a heating current therethrough, and then while heated bringing the forming dies into pressure contact with the sheet whereby to form the same, substantially as described.

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