J. SOSS.

METHOD OF AND APPARATUS FOR MAKING DIE CASTINGS.

APPLICATION FILED JAN. 21, 1920.

1,378,984. Patented May 24, 1921.

2 SHEETS—SHEET 1.

FIG. 1.

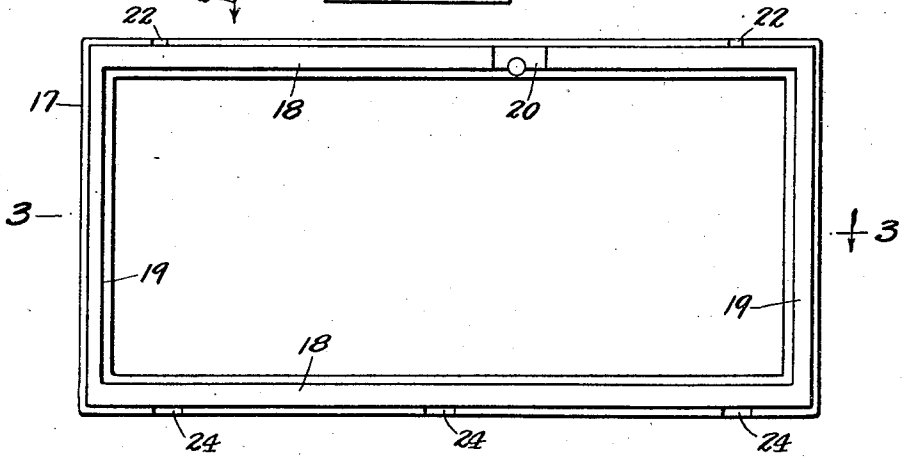


FIG. 2.

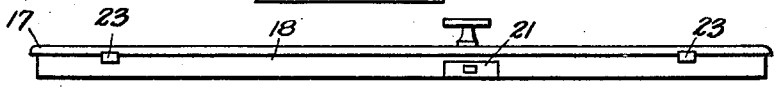


FIG. 3.



FIG. 4.

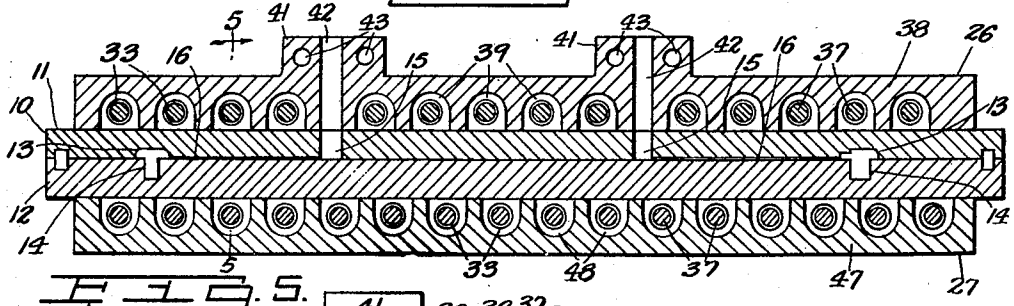
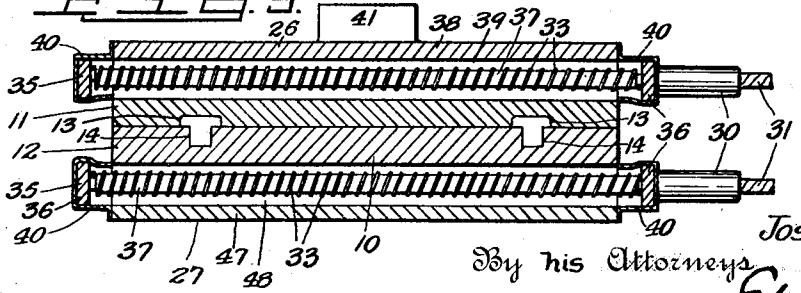


FIG. 5.



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2 SHEETS—SHEET 2.

Fig. 6.

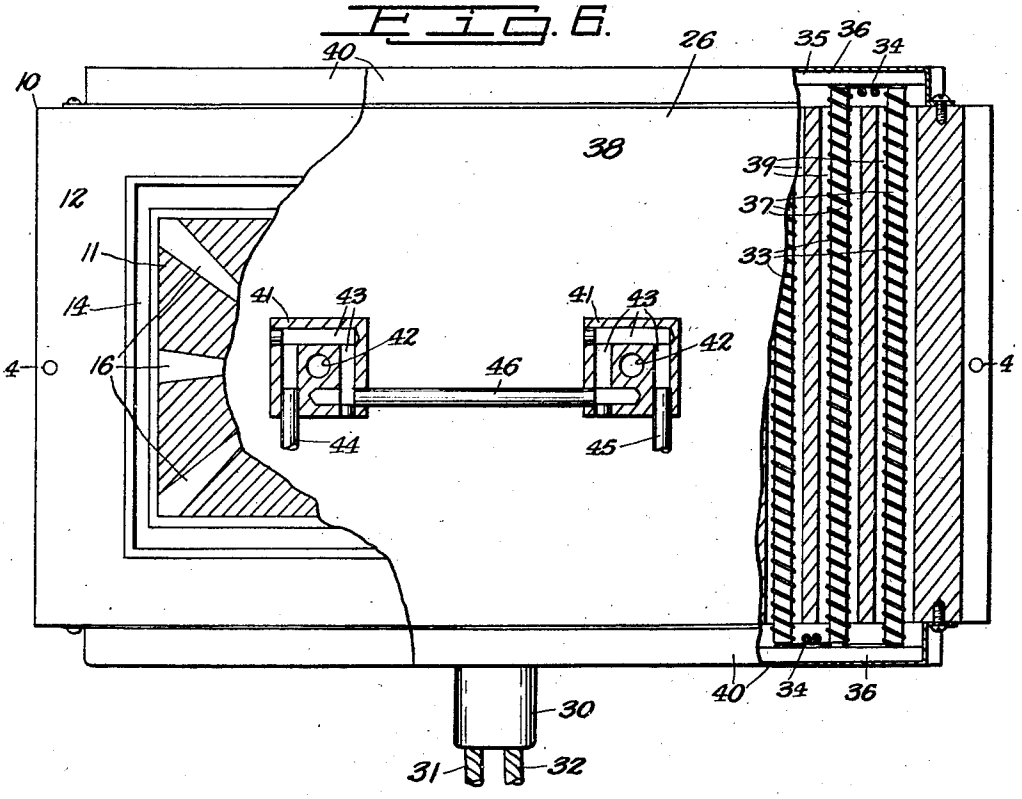
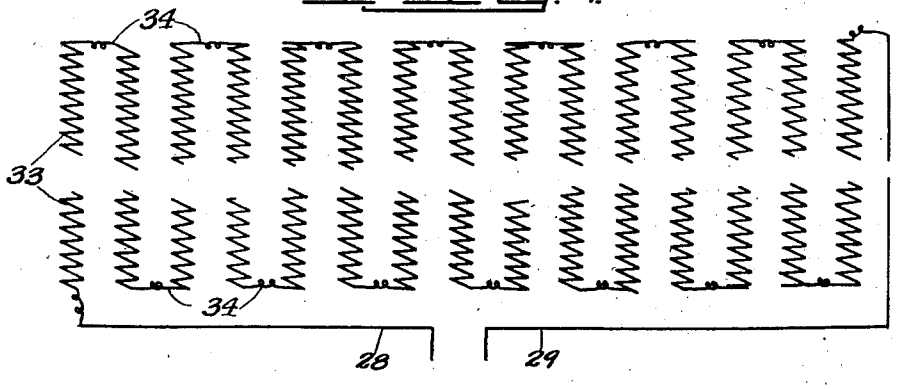


Fig. 7.



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR MAKING DIE-CASTINGS.

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Application filed January 21, 1920. Serial No. 353,038.

To all whom it may concern:

Be it known that I, JOSEPH SOSS, a citizen of the United States, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Methods of and Apparatus for Making Die-Castings, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to the making of die castings of various kinds and classes and particularly large castings of this class, and the object of the invention is to provide an electric heating element or elements which are employed in connection with the dies or molds for the purpose of heating such dies or molds, or keeping the same at an even degree of heat when the same are in use; a further object of the invention being to provide electric heating elements of the class specified which are independent of the dies or molds and which may be moved toward and from the same; a still further object being to provide means for cooling certain portions of the apparatus to prevent the overheating thereof; and with these and other objects in view the invention consists in an apparatus of the class and for the purpose specified, which is constructed and operated as hereinafter described and claimed as well as an improved method of making castings of the class described.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is an inside plan view of the framework of a motor vehicle door die-cast by my improved apparatus;

Fig. 2 a view looking in the direction of the arrow 2 of Fig. 1 and showing part of the fixtures or hardware connected therewith;

Fig. 3 a partial section on the line 3—3 of Fig. 1;

Fig. 4 a central longitudinal section through a suitable die and the heating elements in connection therewith, said section being on the line 4—4 of Fig. 6;

Fig. 5 a partial section on the line 5—5 of Fig. 4;

Fig. 6 a plan view of the construction shown in Figs. 4 and 5 with parts of the construction broken away and in section; and,

Fig. 7 a diagrammatic view of the wiring of one of the electric heating units which I employ.

In Figs. 4, 5 and 6 of the drawing, I have shown at 10 a die composed of separate top and bottom parts 11, and 12. This die may be of any particular form or construction but for the purpose of illustrating one use of my invention, I have shown a die, the separate parts of which are fashioned to cast the framework of a door structure, and in the drawing the part 11 of the die is cut out as shown at 13 to form the outer face portion of the door framework, and the part 12 is cut as shown at 14 to form the inner face portion of the framework. The top part 11 of the die is also provided at predetermined points with apertures 15, which open upwardly and outwardly through said part of the die and through which the molten metal is passed in the operation of forming a casting, and the inner face of said part is also provided with a plurality of shallow grooves 16, which communicate with the cut-out portions 13 and 14 in both parts of the die and with the apertures 15, and these grooves form the usual gates common in dies of this class, and any number of these gates may be employed, and in Figs. 6, three of these gates are shown at one side of the apparatus.

The above die construction, as previously stated, is merely set out for the purpose of illustrating one use of my improved apparatus, and one way of carrying my improved method into effect, and a finished product or door framework is shown at 17 in Figs. 1 to 3 inclusive. This framework consists of side rail members 18 and end rail members 19, all of which are approximately T-shaped in form in cross section. One of the side frame members is recessed as shown at 20 to receive the usual lock construction indicated at 21 in Fig. 2 and recessed adjacent to the ends thereof as shown at 22 to receive resilient bumpers 23, and the other side member of the framework is provided with a plurality of spaced recesses 24 which are adapted to receive hinges usually employed in articles of this class. The outer face portion of both of the side members 18 and one of the end members 19 are recessed as shown at 25 to receive a sheet metal facing for the bottom portion of the door, but this

sheet as well as the other parts of the completed door are not shown for the reason that they form no part of this invention.

In practice, I provide an electric heating element, or a plurality of such elements and, in the construction shown, I have illustrated at 26 and 27 two of said elements, the element 26 operating in connection with the part 11 of the die, while the element 27 operates in connection with the part 12 of said die. The heating elements 26 and 27 are provided with an electric heating unit, one of which is diagrammatically illustrated in Fig. 7. These units consist of main circuit wires 28 and 29 placed in communication with a source of electrical supply by means of suitable plugs 30 having wires 31 and 32, two of which are shown in Fig. 5, and one of which is shown in Fig. 6, and connected with the wires 28 and 29 are a plurality of heat radiating coils 33 of the usual or any desired construction and composed of any suitable material. These coils, as will be seen, are spaced apart and are joined at their ends as shown at 34 to form a continuous circuit therebetween and the wires 28 and 29.

The heating elements 26 and 27 are provided with frames 35, preferably composed of porcelain or similar non-conducting material, and also of high heat resisting material. These frames consist of parallel side members 36 joined by transverse and rod-like members 37 upon which the coils 33 are wound as is clearly illustrated in Figs. 4, 5 and 6 of the drawing.

The heating element 26 also consists of a plate member 38, which is approximately rectangular in form and of sufficient dimensions to cover the greater surface of the part 11 of the die, and this plate member is provided on its inner face with a plurality of transverse and arc-shaped grooves 39 which open outwardly through said inner face as clearly shown in Fig. 4, and in which the transverse rod-like members 37 of the frame 35 are mounted. This mounting is such that the coils 33 on the transverse members 37 will not touch any part of the plate member 38. The transverse members 37 extend at the opposite sides of the plate member 38 and the parallel frame members 36 thereof are supported in suitable casings 40 secured to the opposite sides of the plate member 38.

The heating element 26 is provided on its outer face with two projecting portions 41 which, in the construction shown, are rectangular in form and centrally of these portions the plate member 38 is provided with apertures 42 which open outwardly through said plate member and said extensions and are in line with the apertures 15 in the top part 11 of the die, as is clearly shown in Fig. 4. The extensions 41 are provided around the apertures 42 thereof with ports or passages 43 through which water may be circulated for the purpose of cooling the part of the heating element 26 through which the molten metal is passed. In carrying this into effect I connect an intake water pipe with one of the extensions 41 and an exhaust pipe 45 with the other extension; these pipes communicate with the ports or passages 43, and the extensions 41 or the ports or passages 43 thereof are placed in communication by a pipe 46.

The heating element 27 is also provided with a plate member 47, the inner face of which is provided with a plurality of arc-shaped apertures 48 which open outwardly through said face and in which the frame 35 of said heating unit, or the transverse members 37 thereof are mounted in the same manner as the mounting of the frame 35 in the plate member 38.

It will be seen that the heating elements 26 and 27 with the electric heating units thereof, and the frames 35 are independent of the die 10, or the separate parts of said die, and there is no electrical connection with said die. In the use of the apparatus and after the separate parts of the die have been placed and secured together in the usual or any desired manner, the heating elements 26 and 27 are brought into contact with the separate parts of the die in the manner illustrated in Figs. 4 and 5 by any suitable mechanism which may be employed. These heating elements, and especially the heating element 26, are held firmly in contact with the die and prior to the pouring or forcing of the molten metal into the die in the usual manner, the electric circuit in the heating units is closed by the placement of the plugs 30 in position, and the heat of the coils 33 will act upon the separate parts of the die to heat said die to the desired degree, after which the molten metal is passed or forced into the apertures 42 and 15 and through the gates 16 to the cut-out portions 13 and 14 of the die. By heating the die, or the separate parts thereof, prior to the formation of a casting, as above set out, the chilling of the molten metal is obviated and thus the production of faulty or useless castings is obviated.

It has been found by long experience in this art that in making small castings, or comparatively small castings, the heat radiating through the parts of the die or mold employed in the operation of pouring or forcing molten metal thereinto would be sufficient to keep such dies or molds at the proper temperature but in making other or large castings, the heat from the molten metal will not be sufficient to properly heat the dies until a comparatively large quantity of useless castings have been made, and in some cases it is impossible to rely on this means, and in any event a great loss of time, labor and material is experienced. With my

improved method, however, it will be seen that by employing electric heating apparatus in connection with dies or molds of the class specified and by having such elements independent of the dies or molds, the same may be quickly and evenly heated throughout whenever desired, thus materially affecting the cost of production, the labor employed as well as producing more accurate work or articles and eliminating the production of faulty products. It must also be borne in mind that if at any time should the die, or the separate parts thereof, become heated beyond a predetermined temperature, the current may be shut-off automatically or otherwise by suitable apparatus well known in this art thus keeping the die at the desired temperature at all times and by providing the water cooling feature herein set out, that part of the die and the heating element through which the molten metal passes may be kept to the required or desired temperature and the overheating of such parts at this point or points obviated.

It will be readily understood that while I have shown a particular form and class of article cast by a particular form and construction of die or mold, my invention is not limited to these details as any form of die or mold may be employed and any form of article or product produced, the invention consisting in the specific method herein set out of producing die-castings and the apparatus for carrying such method into effect, and various changes in and modifications of the invention as herein described may be made, within the scope of the appended claims, without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The herein described method of making die-castings which consists in providing a suitable die and heating said die by an electrical heating element which is independent and movable toward and from said die and adapted to operate in connection therewith, passing the molten metal through said element to said die and cooling that portion of the heating element through which the molten metal passes.

2. The herein described method of making die-castings which consists in providing a die composed of separate parts, heating the separate parts of the die by electric heating elements which are independent of and movable toward and from the separate parts of said die and adapted to operate in connection therewith, passing the molten metal through one of the heating elements to the said die and cooling that portion of said heating element through which the molten metal passes.

3. An apparatus of the class described comprising a suitable die, an electric heating element independent of and movable toward and from the said die and adapted when in juxtaposition thereto to heat said die to a predetermined degree.

4. An apparatus of the class described comprising a suitable die, an electric heating element independent of and movable toward and from the said die and adapted when in juxtaposition thereto to heat said die to a predetermined degree, and means for passing molten metal through said heating element to said die.

5. An apparatus of the class described comprising a suitable die, an electric heating element independent of said die and adapted to be placed in juxtaposition thereto and to heat said die to a predetermined degree, means for passing molten metal through said heating element to said die, and means for cooling that portion of said heating element through which the molten metal passes.

6. An apparatus of the class described comprising a die composed of separate parts, electric heating elements independent of and movable toward and from the separate parts of the die and adapted when in juxtaposition to the separate parts thereof to independently heat said parts to a predetermined degree.

7. An apparatus of the class described comprising a die composed of separate parts, electric heating elements independent of and movable toward and from the separate parts of the die and adapted when in juxtaposition to the separate parts thereof to independently heat said parts to a predetermined degree, and means for passing molten metal through one of said heating elements to said die.

8. An apparatus of the class described comprising a die composed of separate parts, electric heating elements independent of the die and adapted to be placed in juxtaposition to the separate parts thereof and to heat said parts to a predetermined degree, means for passing molten metal through one of said heating elements to said die, and means for cooling that portion of said heating element through which the molten metal passes.

9. The combination with a die or mold of means for electrically heating the same, comprising a plate member and an electric heating unit mounted in said plate member and insulated therefrom.

10. The combination with a die or mold of means for electrically heating the same, comprising a plate member, an electric heating unit mounted in said plate member, said heating unit comprising a plurality of heat radiating coils, and means for mounting said heating unit in said plate member and insulating it therefrom.

11. The combination with a die or mold of means for electrically heating the same, com-

prising a plate member, one face of said plate member being provided with a plurality of spaced grooves, an electric heating unit comprising a plurality of heat radiating coils, and means for mounting said heating unit in connection with said plate member and insulating it therefrom and with the coils thereof within the grooves of said plate member.

12. An apparatus of the class described comprising a suitable die, an electric heating element independent of said die and adapted to be placed in juxtaposition thereto and to heat said die to a predetermined degree, said heating element comprising a plate member one face of which is provided with a plurality of spaced grooves, an electric heating unit comprising a plurality of heat radiating coils, means for mounting said heating unit in connection with said plate member and insulating it therefrom and with the coils thereof within the grooves of said plate member, means for passing molten metals through said plate member to said die, and means for cooling that portion of said plate member through which the molten metal passes.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 17th day of January, 1920.

JOSEPH SOSS.

Witnesses:
C. E. MULREANY,
H. E. THOMPSON.