Oct. 26, 1943. H. J. KALAJIAN 2,332,856

MOLDING DIE FOR BALANCE WEIGHTS

Filed Jan. 30, 1941

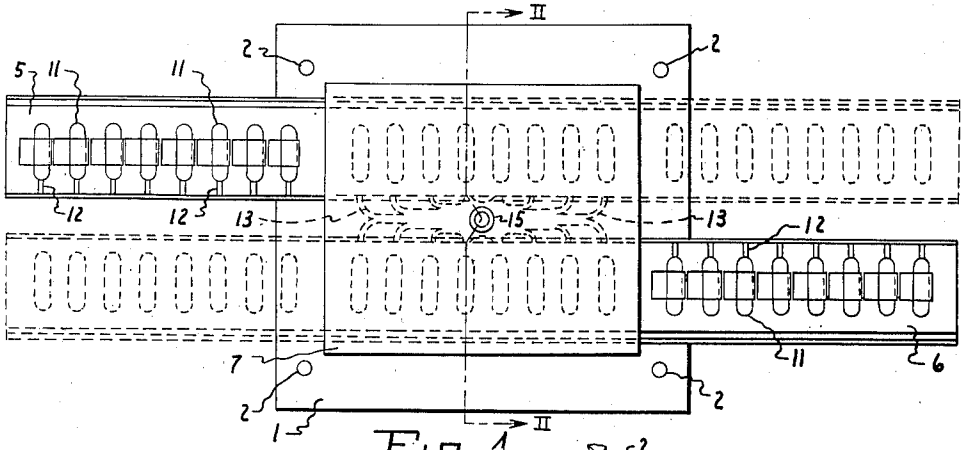


Fig. 1.

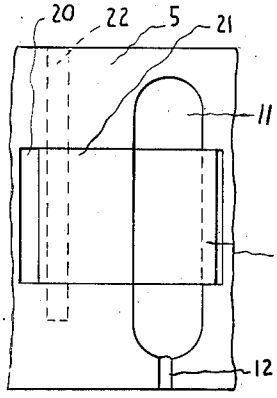


Fig. 4.

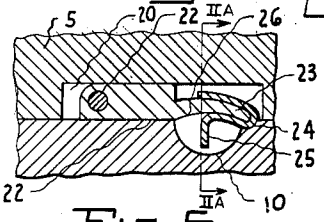


Fig. 5.

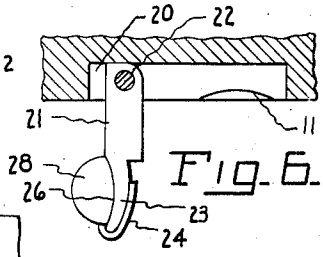


Fig. 6.

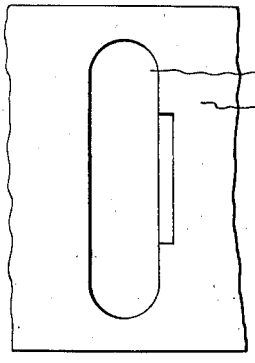


Fig. 3.

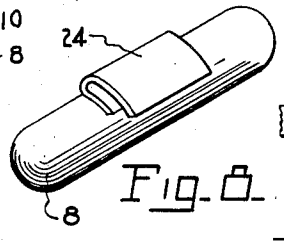


Fig. 8.

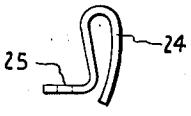


Fig. 7.

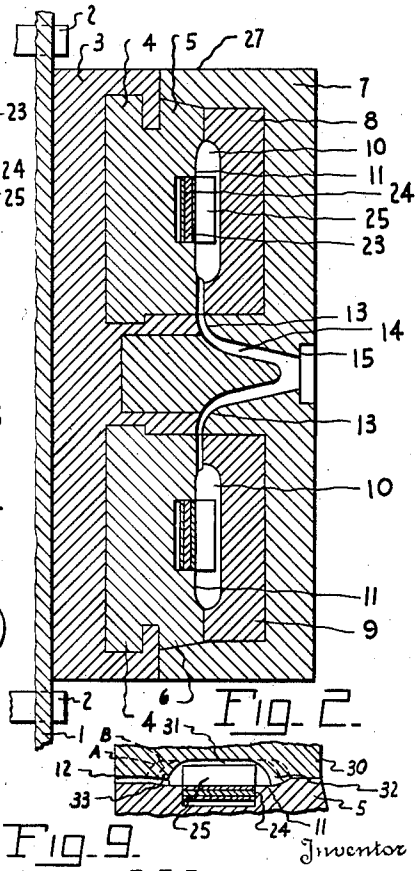


Fig. 2.

Fig. 9.

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MOLDING DIE FOR BALANCE WEIGHTS

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Application January 30, 1941, Serial No. 376,609

10 Claims. (Cl. 22—116)

The present invention relates to die casting and more particularly to a sectional die, particularly adapted for producing spring clip wheel balancing weights.

Spring clip wheel balancing weights of the character comprising a weighted body portion and a spring clip about which the body portion is molded present a manufacturing difficulty in the difficulty of quickly arranging casting molds in combination with the spring clips about anchoring feet of which the weighted body portions are cast. According to the present invention, the weighted body portions are die cast about the anchoring feet of the spring clip. The die casting is expedited by providing one of the sections of a sectional die with a plurality of pivoted flanges over which the spring clips are sprung. When the spring clips are arranged on such flanges, and the die sections are disposed together, casting metal is forced into the mold under pressure. The die sections may then be separated and the pivoted flanges swung outwardly with respect to their associated sections to permit removal of the spring clips and the balance weights cast thereon.

An object of the invention is to provide a structure by means of which a plurality of balance weights may be die cast at the same time.

Another object of the invention is to provide a structure wherein a spring clip for balance weights may be supported with respect to a die section with anchoring foot portions projecting into molding cavities.

Still another object of the invention is to provide a structure wherein there are facing die sections, one of which may be moved laterally with respect to the others to permit simultaneous casting of one group of balance weights and the affixing of spring clips in association with the die section for the casting of a subsequent group of balance weights.

These and other objects residing in the arrangement, combination and construction of the parts will be apparent from the following specification when taken with the accompanying drawing, in which

Fig. 1 is a side elevation disclosing my invention but omitting any suitable support for the front die section,

Fig. 2 is a section on the line II—II of Fig. 1, a detail of the section being shown by the line IIA—IIA of Fig. 5,

Fig. 3 is an enlarged elevation of one of the molding cavity forming recesses in the front die section,

Fig. 4 is an enlarged elevation of one of the molding cavity forming recesses of a rear die section showing the spring clip retaining flange association therewith,

Fig. 5 is an enlarged vertical section through cooperating front and rear die sections showing the manner in which the spring clip supporting flange projects the anchoring foot of the spring clip into the molding cavity,

Fig. 6 discloses a balance weight on its supporting flange after it has been cast about the anchoring foot of the spring clip and immediately prior to being removed from its flange,

Fig. 7 is an end elevation of a spring clip by itself,

Fig. 8 is a perspective view of a finished balancing weight cast about its spring clip, and

Fig. 9 is a section corresponding to a portion of Fig. 2 disclosing another feature of the invention.

Referring particularly to the drawings which disclose die casting apparatus for forming wheel balancing weights, but omit the molten metal delivery nozzle and associated structure which may be of any suitable character, the reference character 1 indicates a support guided for sliding movement on rods 2. The support 1 has connected thereto a base 3 in which are guided by ways 4 rear die sections 5 and 6. Suitably supported by means not shown, with respect to the base 3, but independently thereof is a front plate 7 in which are supported front die sections 8 and 9. As shown paricularly in Fig. 2, the front die sections 8 and 9 co-act with the rear die sections 5 and 6 respectively providing a pair of sectional casting dies.

The front dies 8 and 9 are each provided with a plurality of recesses 10 shown particularly in dotted outline in Fig. 1 and in Figs. 2 and 3. Opposing the recesses 10 and in the rear die sections 5 and 6 are a plurality of recesses 11 which are shown particularly in Figs. 1, 2 and 4. Communicating with each of the recesses 11 are runners 12 which in turn communicate with runners 13 shown in dotted outline in Fig. 1 which are in the base 3. The runners 13 are connected to a sprue opening 14 shown particularly in Fig. 2. The sprue opening 14 is provided with a molten metal delivery nozzle receiving seat 15 against which the metal delivery nozzle is urged in a conventional manner.

As shown particularly in Fig 1, the rear die sections 5 and 6 are provided with two groups of recesses 11. One group of recesses 11 of each of the rear die sections 5 and 6 is in molding cavity

forming relation with the recesses 10 in the front dies 8 and 9 respectively, while the second group of recesses 11 in the rear die sections 5 and 6 is disposed at one side of the front plate 7 carrying the front die sections 8 and 9.

Each of the recesses 11 is intersected by a flange receiving recess 20 shown particularly in Figs. 4, 5 and 6. Within each recess 20 is disposed a flange 21 pivoted about a pin 22. Each flange 21 is provided at the outer end thereof with a portion 23 for receiving a spring clip 24. Each portion 23 is shaped like a wheel rim flange on which the spring clips 24 will ultimately be used when they have balance weights cast thereon and have widths equal to those of the spring clips 24. The spring clips 24 are each provided with an anchoring foot 25, particularly as shown in Figs. 5 and 7, about which its balancing weight is to be cast. When a flange 21 is disposed in its recess 20, a spring clip 24 on the portion 23 thereof is so arranged as to project the anchoring foot 25 into the cavity formed by the recesses 10 and 11 of the front and rear die sections respectively. Furthermore, as shown in Figs. 5 and 6, the portions 23 for receiving the spring clips 24 are provided with recesses 26 which are in alignment with the recesses 11 with which they are associated and form continuations thereof.

In operation, with the rear die sections 5 and 6 positioned as shown in Fig. 1, and the support 1 carrying with it the base 3 and the rear die sections 5 and 6 moved to the left as viewed in Fig. 2 with respect the front die sections 8 and 9, to open the die, the flanges 21 associated with each of the laterally disposed recesses 11 are swung outwardly to the position shown in Fig. 6 and the spring clips 24 are assembled thereon. When the spring clips 24 have been assembled on the flange 21, the flanges 21 are swung into their recesses 20, thus projecting the anchoring feet 25, as disclosed in Fig. 5. The rear die section 5 is then moved to the right as viewed in Fig. 1 and the rear die section 6 is moved to the left as viewed in Fig. 1 until the portion of the rear die sections 5 and 6 just previously in association with the front die sections 8 and 9 have been moved to the dotted line positions, as shown in Fig. 1. It will be understood that suitable stops may be provided for limiting the movement of the die sections 5 and 6 in either direction. With the rear die sections 5 and 6 thus positioned in the recesses 11 having associated therewith the spring clips 24 will be in alignment with the recesses 10 of the front die sections 8 and 9. The die is then closed by moving the support 1 and together with it the base 3 and rear die sections 5 and 6 into the relative position with respect to the front die sections 8 and 9 as shown in Fig. 2. The recesses 10 and 11 will now be in cavity forming relation. It will be observed from inspection of Fig. 2 that the front plate 7 is provided with inclined guiding portions 27 for facilitating the movement of the rear die sections 5 and 6 into cooperative relation with the front die sections 8 and 9.

As soon as the respective front and rear die sections have been moved together to bring the recesses 10 and 11 into cavity forming relation, with the anchoring feet 25 of the spring clips 24 projecting into the cavities thus formed, the metal delivery nozzle bearing against the seat 15 may deliver molten metal to the sprue opening 14 from which the molten metal is conducted to the runners 13 and 12 to the cavities formed by the recesses 10 and 11. At the same time the flanges 21 of the recesses 11 which have just moved to one side of the front die sections 8 and 9 may be swung outwardly, the balance weights 28 cast on the spring clips 24 positioned thereon as shown in Fig. 6 may be removed, and new spring clips 24 may be positioned on the portions 23 of the flanges 21 for the next casting operation. The die is then opened by moving the support 1 and together with it the base 3 and the rear die sections 5 and 6 along the rods 2 from cooperating relation with the front die sections 8 and 9. The die should be designed in a conventional manner to cause the sprue to fall away when the die is opened. As soon as the die has been opened, the rear die sections 5 and 6 are longitudinally moved in opposite directions to dispose the flanges 21 having the balance weights supported therefrom laterally of the front die sections 8 and 9 as described and to move the opposite ends of the rear die sections 5 and 6 into alignment with the front die sections 8 and 9.

In Fig. 9 another feature of the invention is disclosed. The rear die section 5 is as disclosed in Figs. 1, 2, 4, 5 and 6. The front die section 30 corresponds to the front die section 8 and cooperates with the rear die section 5 in a base 3 and front plate 7 as above described.

The rear die section 5 is provided with a plurality of cavities 11 and each is provided with a pivoted flange 21 for supporting spring clips 24 as above described. The front die section 30 is provided with a plurality of recesses 31, which cooperate with the recesses 11 to provide molding cavities. The difference between the structure disclosed in Fig. 9 and that disclosed in the other figures of the drawings is the provision of male portions 32 and 33 adjacent the ends of the recesses 31 for filling in the ends of the recesses 11 and thus for foreshortening the molding cavities formed by the recesses 11 and 31. It is to be understood that by providing a series of front die portions 30 having male portions 32 and 33 of different sizes, but all cooperating with the same rear die section 5, there may be provided molding cavities formed by the recesses 11 and 31 of different sizes, depending upon the sizes of male portions 32 and 33 on the front die section 30 which is used. Examples of front die portions 30 for providing different sized molding cavities are indicated by the dotted outline in Fig. 9 wherein the dotted outline A represents the outline of the recess 10 of the front die section 8 and the dotted outline B represents the outline of a recess 31 for providing an intermediate size molding cavity. As shown in the drawing the male portion 33 adjacent the gate 12 may be provided with a channel for extending the gate 12 to the foreshortened molding cavity.

From the foregoing specification, it will be apparent that I have provided a die casting apparatus for casting wheel balance weights about anchoring feet of spring clips therefor. It will be understood, however, that the invention is not limited to the die casting of balance weights on spring clips, but may apply to the casting of any object about any insert. Furthermore, while the embodiment of the invention disclosed provides for the simultaneous casting of a plurality of objects, it will be apparent that the invention is equally applicable to the casting of a single object at a time.

Having thus described my invention, what I desire to secure by Letters Patent and claim is:

1. A mold for molding a balance weight about

the anchoring foot of a spring clip therefor comprising two separable parts, one part having a flange swingably supported therein over which a spring clip having an anchoring foot may be sprung, said parts having opposed contacting faces, said faces having opposed recesses defining a molding cavity for receiving molten metal to be molded, said flange being so arranged as to project said anchoring foot into said cavity while said recesses are in cavity forming relation, and being arranged to be movable outwardly upon separation of said parts following molding to permit said clip together with a balance weight molded thereon to be removed therefrom, and means to admit molten metal to the molding cavity.

2. A mold for molding a balance weight about the anchoring foot of a spring clip therefor, comprising two separable parts, said parts having opposed contacting faces, said faces having opposed recesses defining a molding cavity for receiving molten metal to be molded, a flange receiving recess in the face of one of said parts, said recess intersecting the one of said first named recesses in said last named part, a flange pivoted in said flange receiving recess, said flange having a portion having a recess therein in alignment with the recess in said last named part, said flange being arranged to have sprung over said named portion thereof a spring clip having an anchoring foot, said flange being arranged so as to project said anchoring foot into said cavity while said recesses are in cavity forming relation, said flange also being arranged to be swingable outwardly upon separation of said parts following molding to permit said clip together with the balance weight molded thereon to be removed therefrom, and means to admit molten metal to the molding cavity.

3. A mold for molding a balance weight about the anchoring foot of a spring clip therefor, comprising two separate parts, said parts having opposed contacting faces, a flange recessed into one of said faces, said flange being pivotally supported and swingable outwardly with respect to the face in which it is recessed, said faces having opposed recesses defining a molding cavity for receiving molten metal to be molded, said flange being arranged to receive thereon a spring clip having an anchoring foot, said flange being arranged to project the anchoring foot of the spring clip thereon into the cavity defined by said opposed recesses when said separable parts are disposed to place said recesses in cavity forming relation, whereby, said flange, when said separable parts are separated, may be swung outwardly to receive a spring clip and may be swung inwardly into the face in which it is supported and following molding may be swung outwardly to remove the spring clip and balance weight molded thereon, and means to admit molten metal to the molding cavity.

4. In a multi-part casting mold, a base, a rear portion axially movable with respect to said base, a front portion associated with said base, a recess in each of said front and rear portions, said recesses being so arranged as to provide a molding cavity when said rear portion is suitably axially positioned, for receiving molten metal to be cast, said rear portion being arranged to be moved with respect to said base to one side of said front portion prior to and subsequent to molding to have placed in the recess therein a member about which the molten metal is to be cast, and to have the casting removed therefrom, respectively, and means to admit molten metal to the molding cavity.

5. In a multi-part casting mold, a base, a rear portion axially movable with respect to said base, a front portion associated with said base, a recess in said front and rear portions, said recesses being so arranged as to provide a molding cavity when said rear portion is suitably axially positioned, for receiving molten metal to be cast, a flange secured to said rear portion over which a spring clip having an anchoring foot may be sprung, said flange being so arranged as to project said anchoring foot into said cavity while said recesses are in cavity forming relation, said rear portion being arranged to be moved with respect to said base to one side of said front portion prior to and subsequently to molding to have secured to said flange the spring clip about the foot of which molten metal is to be cast and to have the casting removed from said flange, respectively, and means to admit molten metal to the molding cavity.

6. In a sectional casting mold, a rear section, a front section associated with said rear section, said front and rear sections having opposed faces, said sections being arranged so that they are movable in a direction normal to each other to separate said faces, said faces having opposed recesses defining a molding cavity for receiving molten metal to be cast, means supported with respect to said rear section for supporting and projecting into said cavity an insert about which the molten metal is to be cast, said rear section having a lateral projection, said lateral projection having therein a recess and insert supporting means duplicating the first named recess and insert supporting means, said rear section being laterally movable with respect to said front section to place said second named recess and insert supporting means in said rear section into operative association with the recess in said front section, whereby while molten metal is being cast in the cavity formed by one of the recesses in said rear section and the recess in said front section, a previously formed casting and the insert about which the casting is formed may be removed from said insert supporting means, and another insert associated with the insert supporting means preparatory to associating the last named insert and insert supporting means with said recess in said front section following the completion of said casting, and means to admit molten metal to the molding cavity.

7. In a sectional casting mold, a base, a rear section axially slidable in said base, a front section, said sections having opposed faces, said sections being arranged so that they are movable in a direction normal to each other to separate said faces, a recess in each of said front and rear sections, said recesses being arranged to provide a molding cavity when said rear section is suitably axially positioned for receiving molten metal to be cast, said rear section having a laterally extending portion in which is disposed a recess which is a duplicate of the first named recess in said rear section, whereby by axially sliding said rear section with respect to said front section either one of said recesses in said rear section may be disposed in cavity forming relation with said recess in said front section, and an insert supporting means arranged with respect to each of the molding cavities formed by the recesses in said front and rear sections for projecting inserts into the molding cavities, and means to admit molten metal to the molding cavities.

8. The invention as defined in claim 6 wherein there are provided duplicate front and rear sections, said front sections being rigidly secured together and said rear sections being independently slidable laterally, and the means for admitting molten metal to the molding cavity includes a common sprue opening, whereby the rear section may be laterally moved in opposite directions to permit simultaneous casting, and removal of previously formed castings from the insert supporting means.

9. In a multi-part casting mold, a rear portion, a front portion associated with said rear portion, a recess in each of said front and rear portions, said recesses being so arranged as to provide a molding cavity when said front and rear portions are associated together for receiving molten metal to be cast, said front portion having adjacent at least one end of the recess thereof, a male member projecting into the recess of said rear portion for foreshortening the effective length and rendering inoperative the complementary end portion thereof.

10. The method of molding devices of the character described of different sizes which comprises providing a base die having a recess therein, and a plurality of auxiliary dies each having a recess therein of a different size for cooperating with said base die to provide a molding cavity and further providing said auxiliary dies with male portions at at least one end of each of their recesses respectively for filling and rendering inoperative the complementary portion of the recess in the base die not opposing the auxiliary die recess and using a different auxiliary die for association with said base die each time a different size device of the character described is to be molded.

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