June 16, 1925. 1,542,638

C. D. PETTIS

CASTING MOLD

Filed May 12, 1923 5 Sheets-Sheet 1

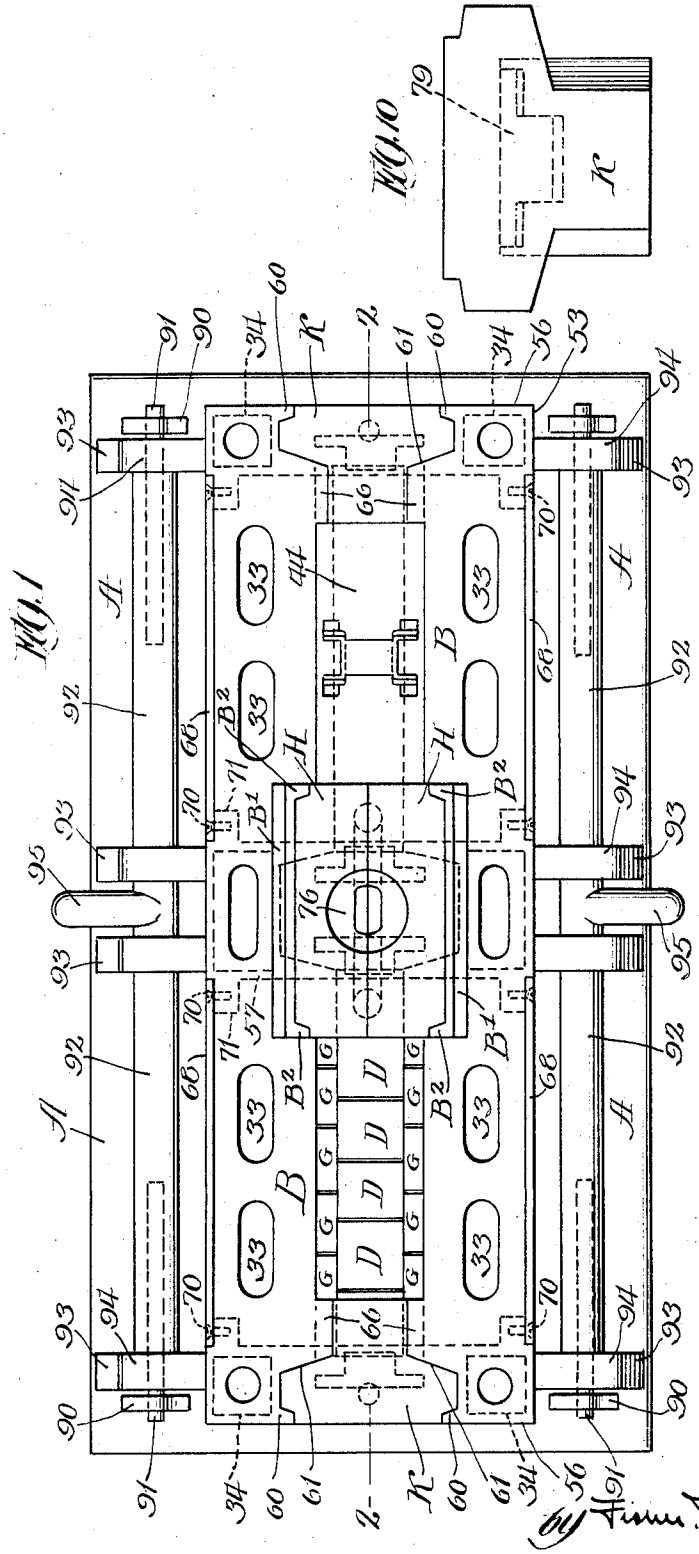

Fig. 1

Fig. 10

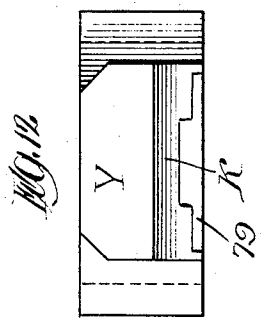

Fig. 12

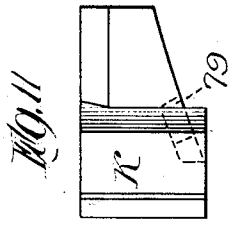

Fig. 11

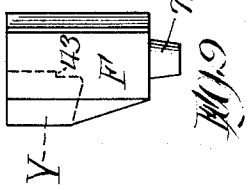

Fig. 9

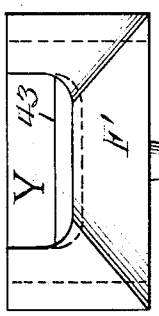

Fig. 7

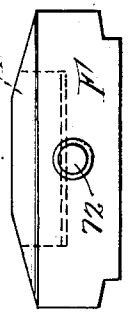

Fig. 6

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June 16, 1925. 1,542,638

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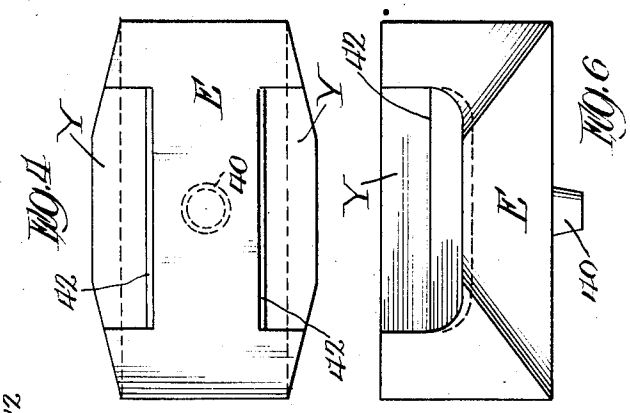
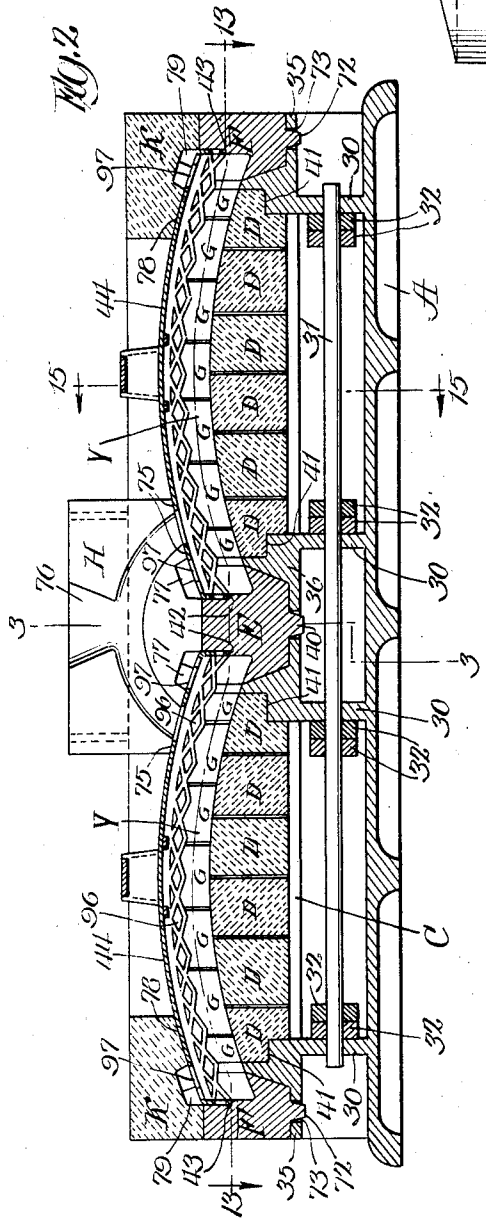
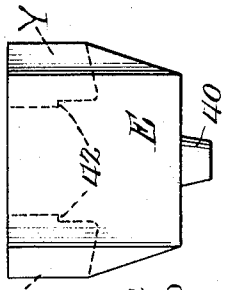
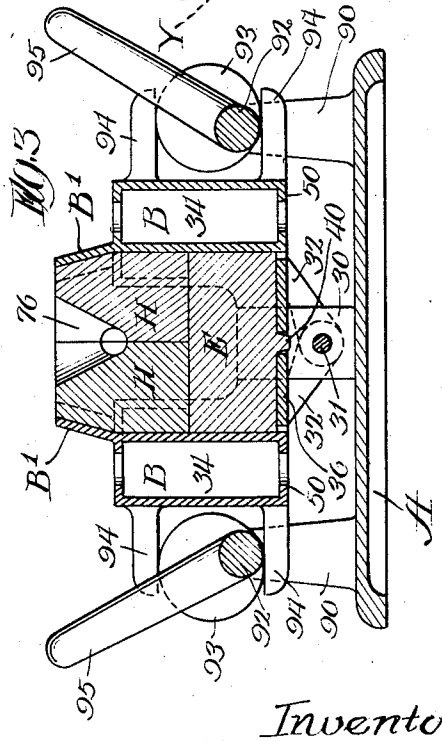
CASTING MOLD

Filed May 12, 1923 5 Sheets-Sheet 2









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CASTING MOLD

Filed May 12, 1923 5 Sheets-Sheet 3

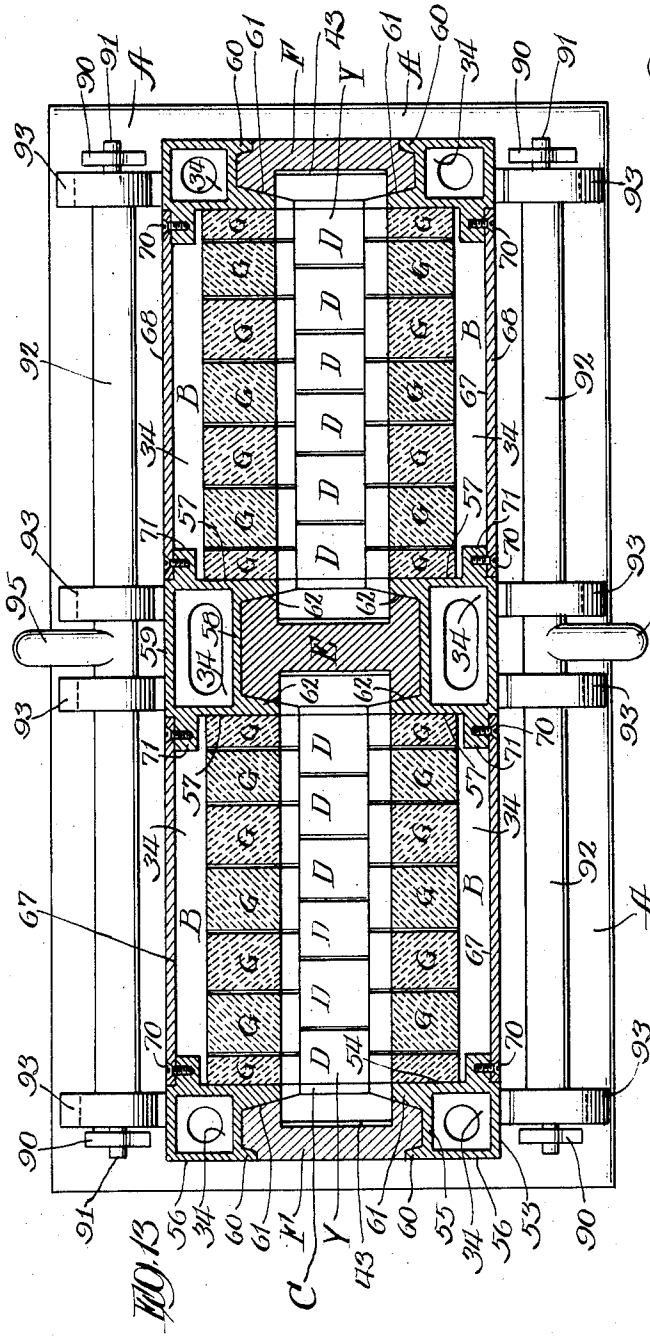

FIG. 13

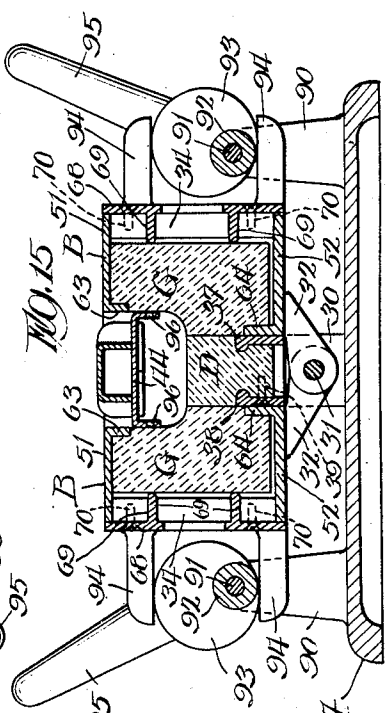

FIG. 15

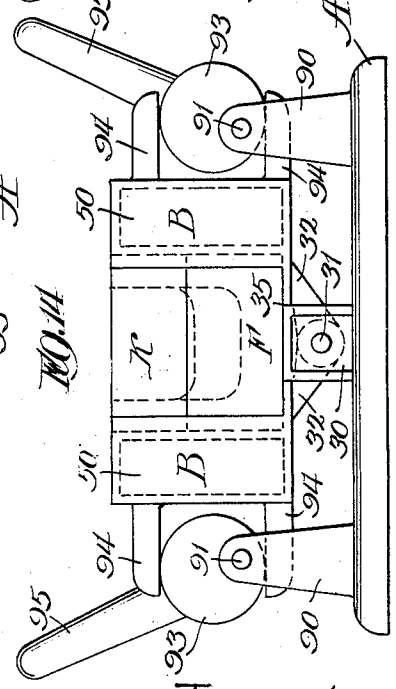

FIG. 14

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June 16, 1925. 1,542,638

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CASTING MOLD

Filed May 12, 1923 5 Sheets-Sheet 4

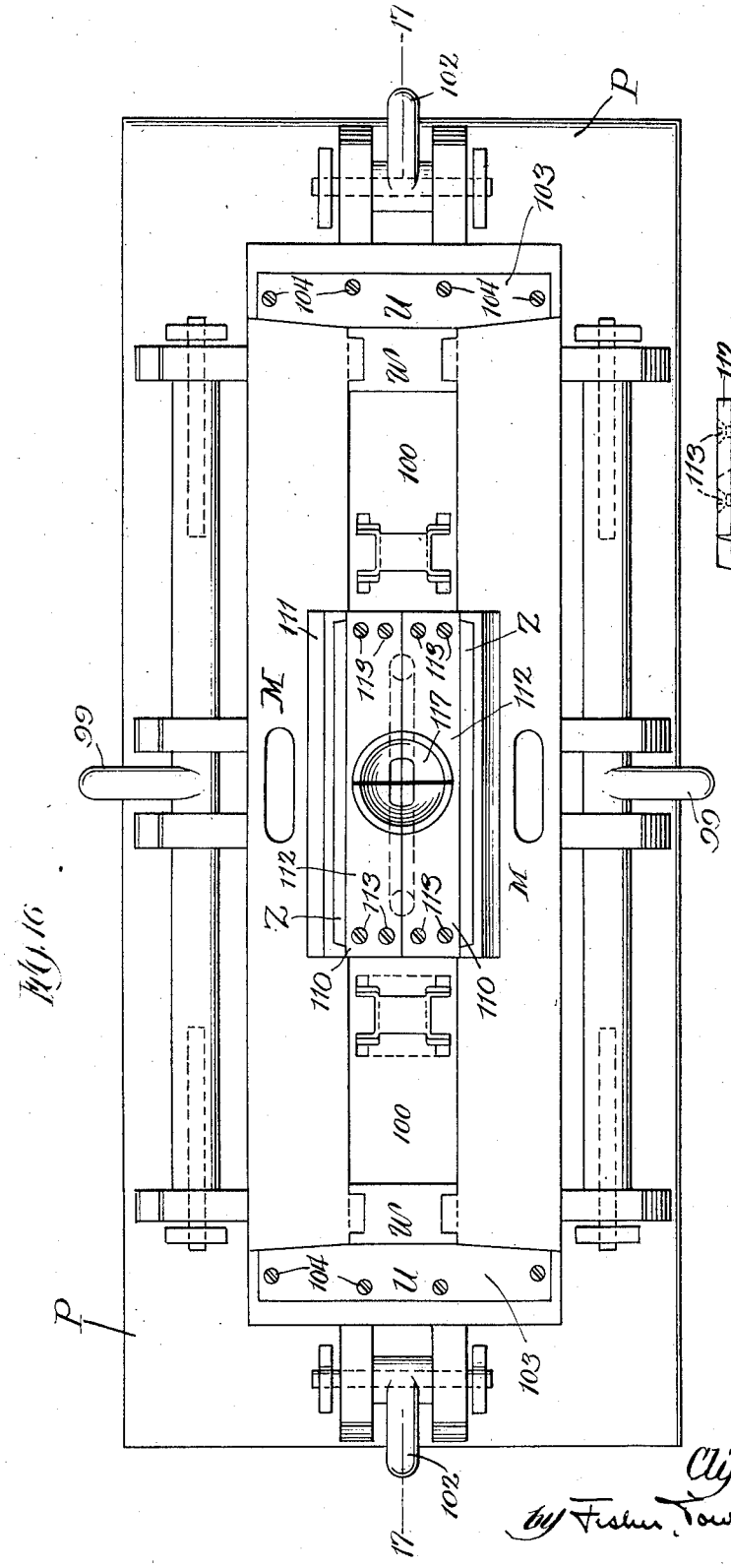

Fig. 16.

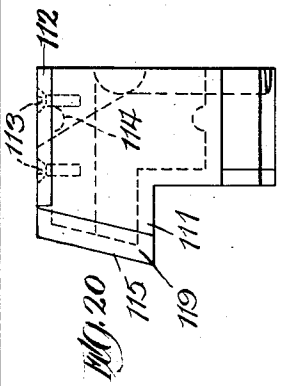

Fig. 20.

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CASTING MOLD

Filed May 12, 1923 5 Sheets-Sheet 5

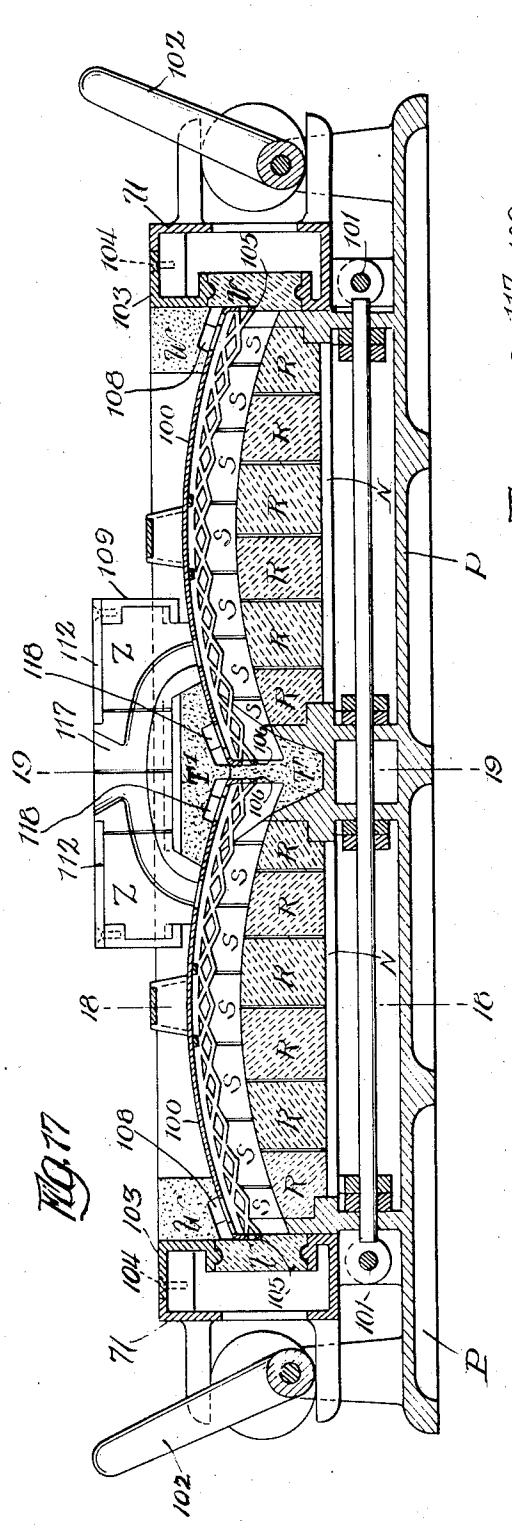

FIG. 17

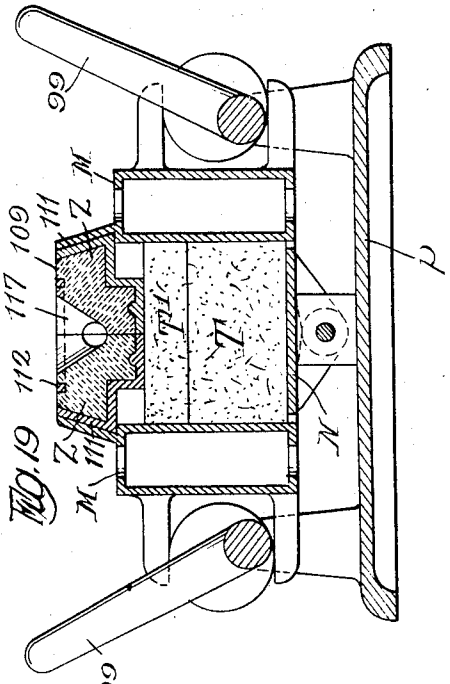

FIG. 19

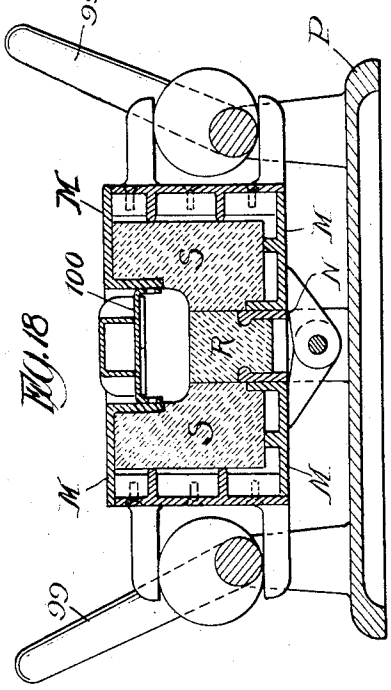

FIG. 18

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Patented June 16, 1925. 1,542,638

UNITED STATES PATENT OFFICE.

CLIFTON D. PETTIS, OF NEW YORK, N. Y.

CASTING MOLD.

Application filed May 12, 1923. Serial No. 638,638.

To all whom it may concern:

Be it known that I, CLIFTON D. PETTIS, a citizen of the United States, residing in New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Casting Molds, of which the following is a specification.

This invention relates to molds for the casting of metal but more particularly to that class of casting molds designed to be repeatedly used in the casting operation and commonly designated "permanent molds."

The primary object of the present invention is to provide a mold which is capable of producing more than one casting simultaneously.

Further objects of my invention are to provide a multiple mold which is simple and durable in construction and may be quickly and easily operated, to provide a permanent mold of the multiple type which will permit expansion of the molding receptacle, to provide a novel and convenient form of pouring gate for a multiple mold, and in general to provide a new and improved mold construction.

Many of the parts of the mold forming the subject matter of the present application are shown and described in detail in my copending application, Serial No. 637,165, filed May 7th, 1923, for casting molds, and reference may be had thereto for a more complete description.

The many other objects and advantages of my invention will be better understood by reference to the following specification when considered in connection with the accompanying drawings illustrating certain selected embodiments thereof, in which:—

Fig. 1 is a top plan view of a mold incorporating the principles of my invention.

Fig. 2 is a vertical section on the line 2—2 of Fig. 1.

Fig. 3 is a transverse vertical section on the line 3—3 of Fig. 2.

Figs. 4 to 12 inclusive are detail views of the chill blocks.

Fig. 13 is a sectional view on the line 13—13 of Fig. 2.

Fig. 14 is an end view.

Fig. 15 is a section on the line 15—15 of Fig. 2.

Fig. 16 is a top plan view of a modified form of mold embodying the principles of my invention.

Fig. 17 is a vertical longitudinal section on the line 17—17 of Fig. 16.

Fig. 18 is a transverse vertical section on the line 18—18 of Fig. 17.

Fig. 19 is a transverse vertical section on the line 19—19 of Fig. 17, and

Fig. 20 is an end elevation of one section of the pouring gate shown in Fig. 17.

Referring to the drawings, and particularly to Figs. 1 to 15 inclusive, my improved mold is mounted upon a suitable base A of cast metal and comprises a plurality of separable sections or members forming a flask or holder, each member carrying a corresponding part of the molding receptacle. To this end the base A is provided with upstanding lugs 30 substantially centrally located, through which lugs passes a pivot rod 31, this rod passing also through lugs 32 depending from the side members B, B of the mold. A stationary bottom member C is mounted on the lugs 30 between the side members B, B.

In the present embodiment of my invention each of the members B and C includes a metal casting or flask section, the outer walls of the members B being preferably perforated, as at 33, to provide ventilation. Chambers, as 34, are provided in these members to permit free circulation of air about the molding receptacle, to be presently described.

The walls of the molding receptacle, with the exception of portions of the top, comprise a plurality of blocks arranged in groups or sections, each section being carried by the corresponding flask section. At the portions of the receptacle where it is desired to chill the casting, these blocks are preferably of metal. The remaining blocks are preferably formed of some highly refractory material such as carborundum, that may be readily molded into the desired form. It will be readily evident that all blocks would preferably be of refractory material when no chilling of the casting is required. The blocks are assembled in the several sections or members composing the flask preferably with sufficient spacing between the blocks of a section to permit expansion but insufficient to allow the molten metal to flow into the interstices. The sectional construc-

tion also permits of contraction when the blocks are composed of a refractory material which contracts when heated.

The holder or flask of the base section C in the present embodiment comprises end supports 35 on the end lugs 30 and a central support 36 formed on and connecting the center lugs 30. The end supports 35 are each connected to the central support 36 by a plate 37. Refractory blocks D are mounted in this flask section and held in place by key or guard plates 38 which are attached to the boxes by means of screws 39 or other suitable means. A chill block E is seated in the central support 36 and this block forms the dividing wall between the casting chambers Y, Y. A lug 40 on the bottom of this block E enters a central socket in the bottom of the support 36 to firmly position the block within the support. The blocks D may be said to be divided into two groups, one group forming the bottom wall of each of the casting chambers Y, Y. The end blocks in each group are cut away, as at 41, to fit corresponding shoulders formed on the supports. In each of the supports 35 is mounted a chill block F which forms the outer end of one of the molding receptacles. The blocks E and F are respectively provided with shoulders 42 and 43 to support the ends of steel brake shoe shells 44 to be incorporated in the brake shoe castings.

The side members B, B of the mold comprise cast metal flask sections 50 within which are mounted the corresponding sections of the molding receptacle. Each side member has continuous top wall 51 and bottom wall 52, with vertical end walls 53, 54, 55 and 56, also central vertical walls 57, 58 and 59. Projecting from the end walls 55 and integral therewith are wedge shaped ribs 60 and taper sections 61. These taper sections 61 contact with similar tapering walls of the chill blocks F and K. Projecting from the center section wall 58 are taper sections 62 likewise contacting with similar tapering walls of the chill blocks H. The side members B have integral flanges 63 and 64 projecting respectively from the top wall 51 and the bottom wall 52 which serve to retain the blocks G in position and protect these blocks. The flanges 63 also provide metal bearing surfaces for the continuous metal sides of the steel brake shoe shells 44 and effectively confine the molten metal within the receptacle and in the shells. Triangular ribs 66 are located near the ends of the members B to aid in positioning and holding down the end chill blocks K. The rear wall of each of the members B is provided with openings, as at 67, to permit the blocks G to be inserted. These blocks are held in position by key or guard plates 68 which are provided with ribs 69 to contact with the outer face of the blocks. The key plates are secured to the flask sections by screws 70 or other suitable means. The flanges 64 contact with plates 37 and 38 on the bottom member C. The screws 70 enter the thickened portions 71 of the walls 57.

The block E is shown in detail in Figs. 4 to 6 inclusive, Fig. 4 being a top plan view, Fig. 5, a side elevation, and Fig. 6 an end elevation. One of the blocks F is shown in detail in Figs. 7 to 9, Fig. 7 being an end elevation, Fig. 8, a bottom plan view, and Fig. 9, a side elevation. This block F is provided with a depending lug 72 which fits within a corresponding socket 73 in the bottom section C to cause these blocks to be accurately positioned in this section. The end blocks K are shown in detail in Figs. 10 to 12 inclusive in which Fig. 10 is a top plan view, Fig. 11, a side elevation and Fig. 12, an inner end view.

The chill blocks H, H rest on the center block E and are held in position thereon by the taper sections 62 already described. These blocks are also held in position by upstanding plates B′ which have wedge-shaped ribs B^2, both intrgral with members B, B. The steel brake shoe shells 44 support the outer or overhanging portions 75 of these blocks. These blocks H form the pouring gate for both molding receptacles and are similar in construction except that their form is reversed. The pouring passage is provided by channeling the opposing inner faces of the blocks, as at 76. End lug cavities 77 are provided in these blocks.

The chill blocks K rest on the corresponding blocks F at the ends of the mold and the overhanging portion 78 of each of these blocks is supported by the steel brake shoe shell 44. An end lug cavity 79 is formed in each of these blocks.

Upstanding lugs 90 are provided on the base A on each side of the mold and pivot rods 91 are supported in these lugs. Upon the rods 91 is mounted a sleeve 92 to which are secured a plurality of eccentrically mounted rollers or cams 93 each acting between a pair of lugs 94 projecting outwardly from the side wall of the member B. An operating lever 95 is formed on or attached to this sleeve. Lifting of the levers 95 causes the side members B to be moved to closed position. Similarly, depressing of these levers positively moves these members to open position.

In preparing the mold to receive a pouring of metal, the end blocks F and the center block E are placed in position first. The steel shells 44 are next placed on their respective seats in the blocks E and F. The blocks H and K are now placed in the mold and the side members B moved by means of the levers 95 to closed position. The walls of the side members tightly clamp the blocks E, F, H and K within the mold. The mol

ten metal is now poured into the mouth of the passage in the blocks H and enters both casting chambers through the branches of this passage communicating therewith, filling these chambers, and entering the perforations 96 in the side and end walls of the shells 44. The molten metal also passes through openings 97 in the top wall of the shell and fills the end lug cavities 77 and 79 in the blocks H and K respectively. As soon as the castings have hardened sufficiently, the side members B are moved to open position, leaving the castings resting on the bottom section of the mold with all the chills in the same position as when placed in the mold. The castings with the chill blocks are then removed from the mold and allowed to cool, another set of chill blocks being used for the next casting operation. The chill blocks readily become detached from the casting when cooled. The mold is now ready to be prepared for another pouring in the manner described.

When no chilling of the casting is required, refractory blocks of like form may be substituted for the metal chill blocks E, F, H and K and the operation would be conducted in the same manner.

In Figs. 16 to 20 inclusive, I have illustrated a modified form of my casting mold in which no chill blocks are incorporated. In this mold, side members M and an intermediate bottom member N are mounted upon a base P. The side members M are operated by levers 99 in substantially the manner described in connection with the previous embodiment. The refractory blocks R in the bottom members and S in the side members are similarly mounted and retained. Center blocks T, T′ of hard sand or other suitable refractory material are mounted in the bottom member, block T′ surmounting block T. The block T has shoulders 106 to support the inner ends of brake shoe shells 100. The block T′ contains mold cavities 118 for the end lugs. End flask members U are pivotally mounted on rods 101 and operated by levers 102 in substantially the same manner as the side members. These members U carry refractory blocks V forming the outer end sections of the molding receptacles. The blocks V are retained within the end members by key or guard plates 103 secured by screws 104 or other suitable means. These refractory blocks V are provided with shoulders 105 to support the outer ends of the steel brake shoe shells 100. Hard sand blocks W are placed upon the steel shell 100 and these blocks contain the mold cavities 108 for the end lugs of the brake shoe. These blocks W are held in place by the side members in closed position substantially as described in connection with the previous embodiment.

A metal container 109 is mounted on the mold in the same manner as the blocks H of the previous embodiment. This container is divided longitudinally at its center into sections 110, each section corresponding to one of the blocks H referred to. These sections are alike except that their form is reversed. The sections 110 each comprises a metal holder or flask 111 within which are mounted blocks Z of refractory material. These blocks are placed within the flask and secured therein by a key or guard plate 112 which is attached to the flask by screws 113 or other suitable means. This plate 112 has ribs 114 contacting with the refractory blocks. The side surface of each section is tapered as at 115, to enable the container to be held in position by the side members of the mold. The inner faces of the blocks Z are channeled to provide a pouring passage 117 through the container when the mold is assembled. This passage is divided to communicate with both casting chambers. The container sections are placed together on the mold in proper registration and the side members M are then closed, thus locking the container in position. The sections of the container are used in successive molding operations in the same manner as the blocks H of the previous embodiment.

The various sections of the flask are preferably constructed to afford ventilation in order that the refractory blocks may be cooled as rapidly as possible. Also the blocks in each group or section of the mold are preferably spaced to permit expansion during the molding operation, but these spaces should not be of sufficient width to admit the molten metal between the blocks. If the blocks are formed of some substance which contracts when heated, no such spacing is necessary but the block construction is equally advantageous as it permits of contraction without danger of rupture of the molding receptacle.

It will be obvious that my improved mold is simple and durable in construction, and efficient in operation. The mold is capable of repeated use in casting operations and the present embodiments are adapted to produce two castings at each operation. The single pouring gate for the molding receptacles is particularly advantageous.

I am aware that numerous changes may be made in the form and arrangement of parts without departing from the spirit of my invention and I consider myself entitled to make all such as fairly fall within the scope of the following claims.

I claim as my invention:

1. A multiple casting mold, comprising a plurality of bodily removable self-supporting repetition molding sections adapted to be assembled to form a plurality of per-

manent molding receptacles divided transversely by the sections, a flask holding said sections in predetermined assembled relationship to form such a plurality of molding receptacles, and a preformed self-supporting pouring gate cooperating with all of said receptacles.

2. A multiple casting mold, comprising a plurality of bodily removable self-supporting repetition molding sections adapted to be assembled to form a plurality of permanent molding receptacles divided transversely by the sections and having one section common to all of the receptacles, a flask holding said sections in predetermined assembled relationship to form such a plurality of molding receptacles, and a preformed pouring gate cooperating with all of said receptacles.

3. A multiple casting mold, comprising a plurality of bodily separable preformed self-supporting repetition molding sections adapted to be assembled to form a plurality of permanent molding receptacles each having a plurality of transverse divisions formed by the sections, at least some of said sections being of refractory material, a flask holding said sections in predetermined assembled relationship to form such a plurality of molding receptacles, and a preformed pouring gate cooperating with all of said receptacles.

4. A multiple casting mold, comprising a plurality of bodily separable preformed self-supporting repetition molding sections adapted to be assembled to form a plurality of permanent molding receptacles each having a plurality of transverse divisions formed by the sections, at least some of said sections being of metallic construction, a flask holding said sections in predetermined assembled relationship to form such a plurality of molding receptacles, and a preformed pouring gate cooperating with all of said receptacles.

5. A multiple casting mold, comprising a plurality of bodily removable sulf-supporting sections adapted to be assembled to form a plurality of molding receptacles each having a plurality of divisions, a flask holding such sections in predetermined assembled relationship to permit relative individual movement of the sections, and a preformed pouring gate supported by said flask and cooperating with all of said receptacles.

6. A multiple casting mold, comprising a plurality of bodily removable self-supporting repetition molding sections adapted to be assembled to form a plurality of permanent molding receptacles each having a plurality of divisions, a flask holding said sections in predetermined assembled relationship free to expand individually to form a plurality of molding receptacles, said flask permitting relative movement of such sections whereby the same may expand and contract while maintaining a substantially constant over-all length of the molding receptacles, and a pouring gate cooperating with all of said receptacles.

7. A multiple casting mold, comprising a plurality of bodily removable self-supporting sections adapted to be assembled to form a plurality of permanent molding receptacles, a flask holding said sections in predetermined assembled relationship to form a plurality of molding receptacles, said flask permitting relative movement of such sections whereby the same may expand and contract while maintaining a substantially constant over-all length of the molding receptacles, and a pouring gate cooperating with all of said receptacles, said pouring gate being of sectional construction.

8. A multiple casting mold comprising a plurality of flask members certain of which are movable, molding receptacle sections of refractory material connected to certain of said sections, chill blocks cooperating with said sections to form therewith a plurality of molding receptacles, and a pouring gate comprising a plurality of blocks mounted on different flask members and adapted to be held in position on said mold by said members in closed position, said pouring gate having branch passages for the conducting of the molten metal to said receptacles.

9. A casting mold, comprising a molding receptacle and a pouring gate, said molding receptacle and said pouring gate each comprising a plurality of molding sections abutting along lines substantially normal to the longitudinal axis of the mold, the planes of division between said sections completely dividing the molding receptacle and making it discontinuous throughout its length.

10. A multiple casting mold comprising a metal holder, a plurality of molding receptacles supported in said holder, and a sectional pouring gate having a main pouring passage and branch pouring passages leading therefrom to said receptacles, each of the sections of said pouring gate comprising a plurality of blocks of refractory material.

11. A multiple casting mold comprising a metal flask, a plurality of sectional molding receptacles mounted in said flask, and a pouring gate having a main pouring passage and branch pouring passages leading therefrom to said receptacles, said pouring gate comprising a sectional metal frame or casing, and one or more blocks of refractory material mounted in each of the sections of said frame or casing.

12. A multiple casting mold comprising a sectional metal flask having certain of its sections movable, a plurality of molding re-

ceptacles supported within said flask, and a pouring gate separate from said mold and adapted to be secured therein by said movable sections in closed position, said pouring gate comprising a plurality of refractory blocks constructed and arranged to provide a main pouring passage having a branch passage leading therefrom to each of the molding receptacles.

13. A multiple casting mold for brake shoes comprising a plurality of separable flask members, molding receptacle sections mounted on each of said members, chill blocks supported by said members, and metal reinforcing backs supported by said members and co-operating with said sections and said chill blocks to form a plurality of substantially closed molding receptacles, said backs being adapted to be incorporated in the castings in their respective receptacles.

14. The combination with a casting mold, of a sectional pouring gate, each section of said gate comprising a plurality of relatively movable sections.

15. As an article of manufacture, a casting mold having a plurality of molding receptacles each constructed, at least in part, of relatively movable sections adapted to expand or contract while maintaining substantially constant over-all dimensions, and a sectional pouring gate common to all of said receptacles.

16. As an article of manufacture, a casting mold having a plurality of molding receptacles each constructed, at least in part, of relatively movable sections adapted to expand or contract while maintaing substantially constant over-all dimensions, and a sectional pouring gate common to all of said receptacles, said pouring gate forming a part of the forming wall of each of the receptacles.

17. A multiple casting mold, comprising a plurality of molding receptacles, and a pouring gate common to all of said receptacles and forming part of the forming wall thereof, said pouring gate being bodily removable from the casting mold.

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