J. L. WARE.

PROCESS OF CASTING.

APPLICATION FILED JUNE 20, 1919.

1,343,017. Patented June 8, 1920.

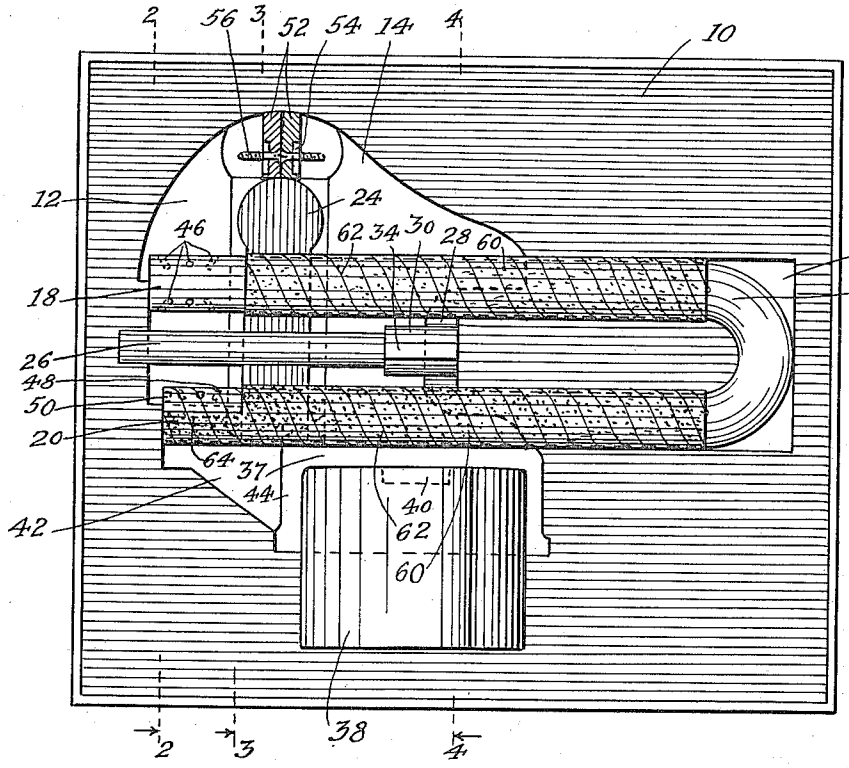


Fig. 1

Fig. 2

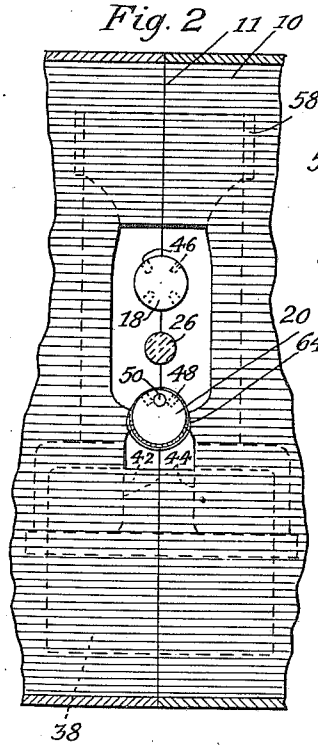


Fig. 3

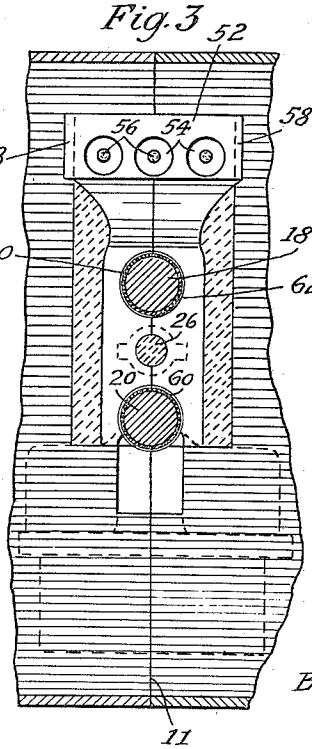
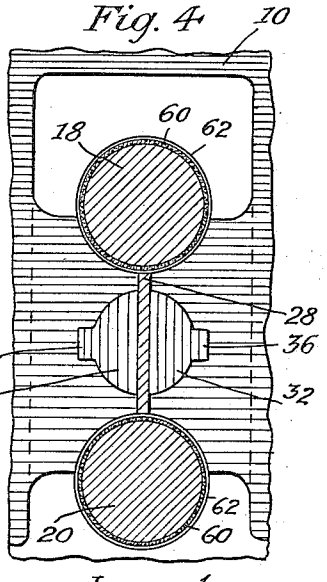


Fig. 4



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UNITED STATES PATENT OFFICE.

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PROCESS OF CASTING.

1,343,017. Specification of Letters Patent. Patented June 8, 1920.

Application filed June 20, 1919. Serial No. 305,589.

To all whom it may concern:

Be it known that I, JOSEPH L. WARE, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Processes of Casting, of which the following is a specification.

My invention relates to a process of casting, and an object is to provide an improved method of manufacturing metal articles having relatively movable parts. The process which constitutes the subject-matter of this application is in the nature of an improvement on the process disclosed and claimed in my prior Patent No. 745,746, granted December 1, 1903, and while intended more particularly for the manufacture of vises, the features of this improvement may be used in the manufacture of various metal articles which have relatively movable parts. An object in particular is to provide a process of this kind in the performance of which a member which is to form part of the article is covered with asbestos and placed in a mold, the remaining portion of the mold being then filled with molten metal whereby the article is completed by casting. In carrying out the process of my patent above referred to, a member designated therein as a steel arm was covered with a thin coating of glue and sand to protect the steel arm from direct contact with the molten metal in the mold. While this prevented the steel arm and the casting from becoming welded together, they fitted so tightly that it was necessary to work the steel arm back and forth in the casting for a considerable period of time before it worked with sufficient ease to render the device serviceable. I have found that by surrounding the steel arm with a comparatively thin covering of asbestos that after the article is taken out of the mold the asbestos can be removed without difficulty and the steel arm or the yoke, which I preferably use when the article is a vise, will then readily slide in the casting, but without any undue amount of looseness. It is obvious that the same result may be accomplished in the casting of various articles which are to have movable parts. In the process disclosed in my prior patent above referred to, core plates were placed in the mold to form spaces in the jaws within which the steel face plates for the gripping portion of the jaws were subsequently secured. In my improved process as applied to vises the use of core plates is dispensed with and the face plates are placed in the mold, where they become anchored to the jaw members during the casting of the latter. I do not in this process application claim the particular features of construction of any specific article of manufacture, but a vise, which is preferably cast in accordance with the process herein disclosed is claimed in an application filed on the same date herewith.

The full objects and advantages of my invention will appear in connection with the detailed description thereof and the novel features embodied in my inventive idea will be particularly pointed out in the claims.

Referring to the accompanying drawings, which illustrate the application of my invention in one form,—

Figure 1 is a plan view of a mold showing the arrangement of the elements placed therein after the pattern has been removed and prior to the casting operation. Fig. 2 is a section on the line 2—2 of Fig. 1. Fig. 3 is a section on the line 3—3 of Fig. 1. Fig. 4 is a section on the line 4—4 of Fig. 1 drawn on an enlarged scale.

In the drawings 10 designates the sand in which is formed the mold for casting a vise. The mold is formed by means of a two-part pattern, as usual, the parting in the mold being designated by the character 11. The pattern forms the cavities 12 and 14 in which the movable and fixed jaw members respectively are cast. The pattern also forms a core print into which after removal of the pattern, is placed the steel yoke 16 which constitutes part of the vise. A portion of the core print is so formed as to provide cavities which will snugly receive the two arms or branches 18 and 20 of the yoke, while the rear portion of the core print forms a cavity 22 which receives the curved portion of the yoke. The cavity 22 does not need to be shaped to conform to the curvature of the yoke since molten metal is prevented from reaching this cavity. The production of the pattern is thus rendered easier since this portion thereof does not have to be shaped to correspond with the curvature of the yoke. A core 24 is placed in the mold in order that a space may be left between the jaws of the vise, and this core is provided with a hole to receive the

arm 18, a recess to receive the arm 20 and a hole to receive a core 26, which when the molten metal is poured leaves holes through the jaw members of the vise for receiving the customary screw-threaded adjusting rod. In order to prevent the parallel arms 18 and 20 from moving toward each other during the casting operation, I prefer to place in the mold a stop or plate 28 of iron having a length equal to the distance between the arms, so that the latter are prevented from moving toward each other when subjected to the hot metal in the casting operation. Two similar core members 30 and 32, provided with ribs 34 and 36, are placed in the mold adjacent the plate 28, and these core members extend out into the mold cavity to coöperate with the core member 26 and thus form an opening having an enlarged rear portion with recesses formed by the ribs 34 and 36 in order that an internally screw-threaded sleeve having similar ribs may be secured to the stationary jaw member at this place. The pattern is shaped to form a mold cavity 37, and a core 38 placed in this cavity partly fills the same in order to form a hollow base for the vise. This core may be provided with a depression 40 to form a lug on the base. The pattern is also shaped to form a cavity 42 narrower than the cavity 37, these two cavities merging into each other at the lines 44. The cavity 32, as will be seen from Fig. 4, provides for the casting of a supporting lug for the arm 20 of the yoke, this lug being curved about the lower portion of the arm so that the latter will be slidably supported thereby after the device is cast. In order that the slidable jaw member when cast may become securely attached to the arms of the yoke, depressions 46 are provided around the circumference of the arm 18, some of these depressions extending radially and others being inclined forwardly or backwardly. Similar depressions 48 are formed in the upper surface of the arm 20. The molten metal running into these depressions causes the arms to be firmly anchored to the slidable jaw member. The lower end of this jaw member is spaced from the support 42 for the arm 20, as shown in Fig. 2. The arm 20 is a little shorter than the upper arm 18 and said lower arm is provided with a depression 50 in the front thereof into which the molten metal flows. Steel face plates 52 for constituting the gripping elements of the jaw members are placed in proper position in the mold and the outer faces of these plates are provided with recesses 54 through the centers of which extend screws 56 having their heads flush with the milled faces of the plates 52. These plates are preferably made slightly longer than the corresponding dimension of the mold cavity so as to extend into the sand at both ends as indicated at 58 and be supported in proper position. It is evident that when the metal is poured the face plates will be firmly anchored in proper position in the jaw members on account of the recesses 54 and the screws 56. The projecting ends of the face plates will be ground off during the finishing of the vise after it has been cast. In order to prevent the cast metal which forms the stationary jaw from becoming attached to the arms 18 and 20 these arms are covered with asbestos. This may be done by wrapping the arms with sheet asbestos which may be held in place by suitable means such as winding thereon a fine wire 62 before the yoke is placed in the mold. The asbestos also extends over the lower portion of the arm 20 which comes adjacent the support which is formed in the cavity 42 and which ends at the position indicated by the character 64 so as not to prevent the movable jaw from becoming anchored to the arm, while at the same time the arm is prevented from becoming attached to the support which is formed in the cavity 42. When the molten metal is poured into the mold the fine wire fuses and disappears as a separate wire. The principal portion of the vise is formed complete in the mold and after removal therefrom is finished in the usual way by grinding and is provided with the adjusting screw and with means for attaching it to a bench, the latter means being that which is shown in my application filed on the same date herewith, and previously referred to.

I claim:

1. The process of manufacturing metal articles having relatively movable parts which consists in forming a mold of the article by means of a pattern, removing said pattern, wrapping with sheet asbestos a member which is to form part of the article, securing the sheet asbestos in place upon this member, placing said covered member in the mold and filling the remaining portion of the same with molten metal.

2. The process of manufacturing metal articles having relatively movable parts which consists in forming a mold of the article by means of a pattern, removing said pattern, wrapping with sheet asbestos a member which is to form part of the article, winding fine wire upon said sheet asbestos, placing said covered member in the mold, and filling the remaining portion of the mold with molten metal.

3. The process of manufacturing vises which consists in forming a mold of the device by means of a pattern, removing said pattern, wrapping a portion of a vise arm with sheet asbestos, securing the sheet asbestos in place thereon, placing said covered arm in the mold and filling the remaining portion of the mold with molten metal to form stationary and movable jaw members

of the vise and to permanently secure said arm to said movable jaw member.

4. The process of manufacturing vises which consists in forming a mold of the vise and a core print for a vise arm by means of a pattern, removing said pattern, covering a portion of a vise arm with asbestos, placing said arm in the mold with a portion thereof lying in the cavity formed by said core print and with a portion extending across the cavity in which the jaw members of the vise are formed, placing cores in the mold to form a space between the jaw members, to form holes through the jaw members which will receive an adjusting screw and also to form a hollow base, placing face plates for the jaw members in the mold, and pouring molten metal into the unoccupied parts of the mold.

In testimony whereof I hereunto affix my signature.

JOSEPH L. WARE.