(No Model.)

S. J. ADAMS.

FORMING CORES.

No. 272,612. Patented Feb. 20, 1883.

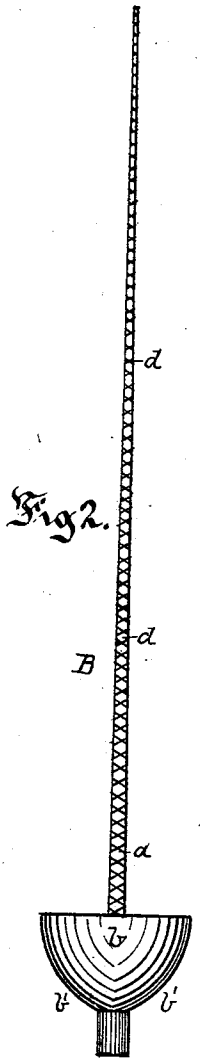


Fig 2.

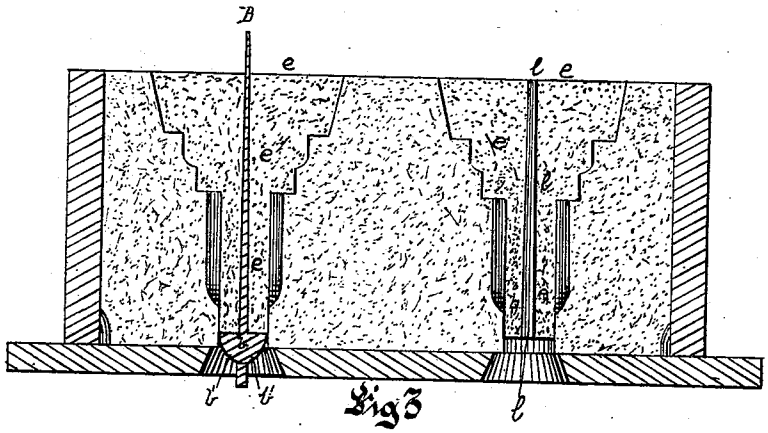


Fig 3

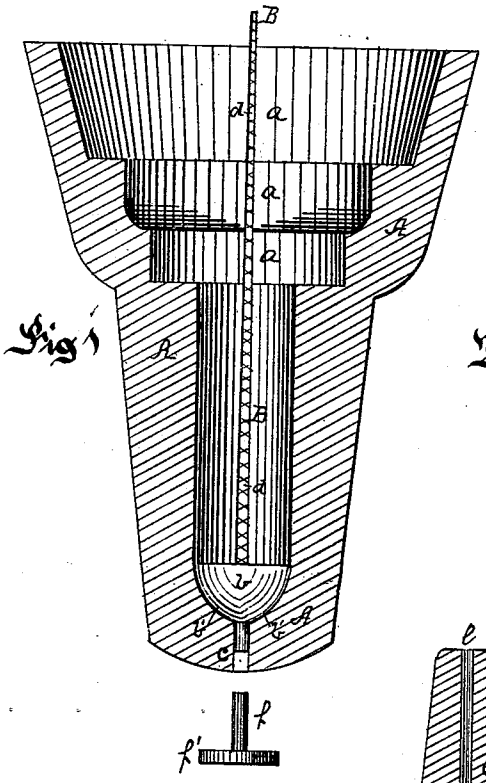


Fig 1

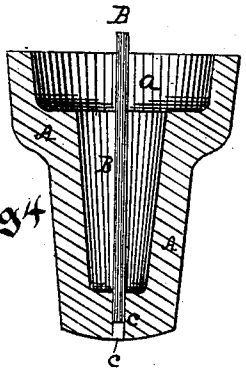


Fig 4

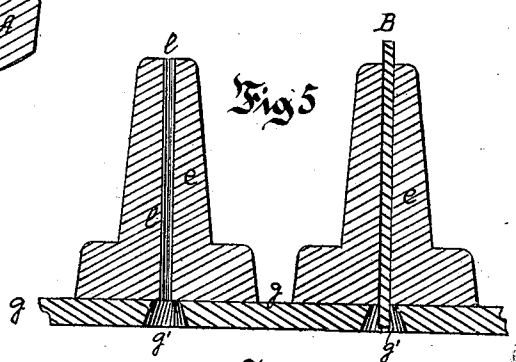


Fig 5

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UNITED STATES PATENT OFFICE.

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FORMING CORES.

SPECIFICATION forming part of Letters Patent No. 272,612, dated February 20, 1883.

Application filed November 14, 1882. (No model.)

To all whom it may concern:

Be it known that I, S. JARVIS ADAMS, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Forming Cores; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to the forming of cores for casting pipe-welding balls, wagon-boxes, and other long hollow articles formed with vertical cores; and its object is to form a more perfectly-vented core, and also to do away with the supporting rods or wires heretofore considered necessary in these cores during the casting of the articles. In the manufacture of these articles it has generally been considered necessary to support the core by means of what is termed a "core-rod," which is placed in the core-box, and around which the sand of the core is jarred or rammed when forming a core, this rod extending through and remaining in the core when drying or baking, and when placed in the mold until the casting is formed; and for this reason a large number of these core rods or wires are necessarily employed in carrying on the manufacture of these articles. As the metal will sometimes burst through the core or pass down below the core and come into contact with the core-rod, and the rod generally becomes red-hot from the heated metal, and after casting the sand is dumped or shaken out of the flasks, it is evident that the rods are generally bent out of shape and the metal adheres to the rods, so that much time and labor are expended in straightening the rods and the breaking off the metal therefrom. The ordinary way of venting these cores is either to place a vent-wire in the box before the core is made and remove it after the molding of the core, or else to insert the vent-wire after molding of the core; and it is evident that in the practical manufacture of these cores it is impossible to always insert the vent-wire centrally of the core, and it will sometimes penetrate or almost penetrate the side of the core, so that the metal in casting will enter the hole formed by the vent-wire and prevent the gases from passing out through the vent-hole at the top of the core, causing the formation of blow-holes in the casting, as well as forming imperfections on the interior of the casting made. Difficulty is also experienced on account of the base of the core coming against the base of the mold proper before entering the core-seat below the mold, and thus crushing or marring itself or the mold and causing the formation of imperfect castings. By my invention I do away with the necessity of the large number of these core-rods, and also secure a central venting of the core, so that the liability to the formation of imperfections on the interior of the castings or of blow-holes in the castings on account of the vent being closed is entirely overcome. I also provide means for guiding the core to place without injuring it or the mold.

It consists, first, in molding the core with the supporting-rod extending through it, removing the core from the core-box by this rod, and supporting it thereby, and before casting the article withdrawing the rod and so forming a vent-hole extending through the core; second, in forming the venting-rod with a serrated or roughened surface, so that the sand will adhere more easily to it, and when removed, instead of smoothing the walls of the vent-hole and closing the pores of the sand, it will roughen the vent-hole and leave its walls more open, so that the gases may pass more easily from the core into the vent-hole; third, in providing the core-supporting rod with a button formed conical or tapering from its greatest diameter downwardly, so as to protect the base of the core from injury by contact with the base of the mold and to direct the core into its seat without injuring the mold; fourth, in forming the mold with an opening extending entirely through it, and after the core is placed in the mold removing the core-rod from the opening at the base of the mold; and, finally, in other improvements in the cores and rods, hereinafter specifically set forth.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a vertical section of a core-box, showing the venting and supporting rod therein in full lines. Fig. 2 is an enlarged view of the rod. Fig. 3 is a vertical section of a mold, showing the cores therein. Fig. 4 is a vertical section of a smaller core-box; and Fig. 5 is a view of the smaller cores formed in this box, supported on a plate for drying or baking.

In the drawings, A represents the core-box, the one shown being a core-box for forming a core for pipe-welding balls, and having the cope-cavity *a* at the top. The base of the core-box may either be opened or closed, as desired, and the supporting and venting wire B is centered therein either by the button *b* at the base or by passing into a hole or seat, *c*, at the base of the core box. The core-box shown has this seat *c* extending entirely through its base. The supporting and venting rod B is formed slightly tapered, so that it can be removed more easily from the core, and its surface is formed serrated or roughened like a file, as at *d*, to enable the sand to adhere or hold to it, and to enable it, when withdrawn, to roughen the inner face of the vent-hole, as hereinafter described. The button *b* at the base of the rod is formed conical or tapering from its greatest diameter downwardly, as at *b'*, for the purpose hereinafter described. The rod B is placed in the core-box, its end extending above the box, and the sand either rammed or jarred around it to form the core *e*, and the core is removed from the core-box by means of this rod B, which extends entirely through the core. In order to remove the core, I also employ the rod *f*, which passes into the opening *c* at the base of the core-box and presses against the core-rod or the button *b* at its base. This rod *f* may either extend up from the table or may have a button, *f'*, at its base, by which the operator can hold it in pressing out the core.

In Fig. 3 is shown a mold in which these cores are used, the mold being formed with an opening in its base, as described in an application of even date herewith. Where the core-rod is removed after the core is placed in the mold this form of mold is generally employed, the core being guided into the mold in any desired way, and the button *b* at the base of the rod B supporting the core and protecting it from injury, while the curved face *b'* of the button guides the core to place without marring the sides or base of the mold. In case it is not directed in centrally of the mold proper, this curved face, instead of catching on the edge of the mold and breaking or injuring it, will guide the core into the center of the mold without breaking or marring the walls thereof. After the core is placed in the mold, by a slight pressure on the core-rod it will be loosened from the core and fall through the opening at the base of the mold and in the bottom board, leaving the core in the mold, and forming the vent-hole *l* therein. As the core-rod is slightly tapering, it can be the more easily removed, and as the face of the core-rod is roughened or irregular it is evident that instead of smoothing the sand around it it will cut it and roughen it and leave the walls of the vent-hole open, so that the gases can easily pass through the core into the vent-hole and escape. It is evident that, in vertical cores, after the core is placed in the mold the core will support itself, and does not require the supporting-rod. When the mold is closed at the base the core can be placed in it and the rod removed through the top of the core, the button *b* not being employed with the rod in this case. Where the cores are short, as in small cores, and binding material is employed with the sand, and the cores are dried or baked to harden them, it is unnecessary to employ the core-rod after the cores are placed on the drying table or plate, and in this case the core can be molded, as above described, and removed from the core-box by means of the rod, and the cores then placed on the drying-table *g*, and the core-rods removed from the cores through holes *g'* in the plate or by drawing them out of the cores. The cores can then be placed in the drying-ovens, and dried and hardened in the usual way, and after drying will be sufficiently strong, without the core-rods, to be placed in the molds. The one rod thus acts as a strengthening-rod to support the core and to withdraw the core from the core-box after its formation, and also to form the vent-hole extending entirely through the core, and the core can be formed in the core-box and lifted out of the box and placed within the molds by means of the supporting-rod, and the rod then withdrawn to form the vent-hole, as above described, when no longer needed to support the core. As the core is fully supported until placed in the mold, I overcome the necessity of drying the core, so that these molds can be formed with green-sand cores, and the expense of drying, in almost all cases, done away with. I also form the vent-hole centrally of the core, and by so doing give a uniform escape for the gas, in most cases opening out at both ends of the core. The vent-hole can also be formed of any desired size and a larger escape for the gas therefore obtained, and the roughened surface of the core-rods will form the walls of the vent-hole open and porous, so that the gases can easily escape from the core into the vent-hole; and consequently I prevent the blowing of the casting on account of the vent-hole extending only on one side of the core, or not extending far enough down the core, or on account of the walls of the vent-hole being closed by the smooth surface of the vent-wire passing over them. I am also enabled by means of the oval or pointed end *b'* of the core-supporting rod to direct the core to place without injuring the sides or base of the mold, and for this reason to form perfect molds. I also save the large number of core-supporting rods which have heretofore been considered necessary in the formation of these cores, and the time and labor of straightening and cleaning these rods or wires and assorting them, as but one rod is needed for each core-box. Where the core is used without drying, as by my invention I am in most cases able to do, I also save the cost of flour and other materials mixed with the sand in order to harden it when baked, as well as the ovens and fuel for baking the cores, these being large items of expense in the manufacture of these cores.

I am aware that cores have been formed in partible core-boxes, wherein the core was formed around a vent-pin extending part way into the core, and having a disk at its base supported in a frame, the core being formed within the box, the box opened, the core lifted off the frame by means of the disk at the base of the pin, and the vent-pin removed after the drying of the core. My invention differs from this apparatus in that the venting-rod extends entirely through the core, and the core is withdrawn from its core-box and supported by means of this rod, and by removing the rod I form the vent-hole entirely through the core, so that the core is completely vented.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The method herein described of forming cores for tubular castings, consisting in molding the core with the supporting-rod extending through it, withdrawing the core from its core-box by this rod and supporting it thereby, and before casting the article withdrawing the rod, and so forming a vent-hole extending through the core, substantially as described.

2. A core-venting rod having its surface serrated or roughened, substantially as and for the purposes set forth.

3. In combination with a core for tubular molds, the core-supporting rod B, having the button b' at its base, where said button is formed conical or tapering from its greatest diameter downwardly, as at b', substantially as and for the purposes set forth.

4. In combination with a mold open at both ends, a core adapted to be placed in said mold, and having a core supporting and venting rod adapted to be removed through the base of the mold, substantially as set forth.

5. The method herein described of forming molds, consisting in forming the mold open at both ends, placing the core therein, and removing the core-supporting rod through the base of the mold to vent the core, substantially as set forth.

6. In combination with the core-box A, having the opening c, the rod f, adapted to enter said opening and raise the core from the box, substantially as set forth.

In testimony whereof I, the said S. JARVIS ADAMS, have hereunto set my hand.

S. JARVIS ADAMS.

Witnesses:
JAMES I. KAY,
F. G. KAY.