S. J. ADAMS.
Sand-Core-Mold.

No. 210,392. **Patented Dec. 3, 1878.**

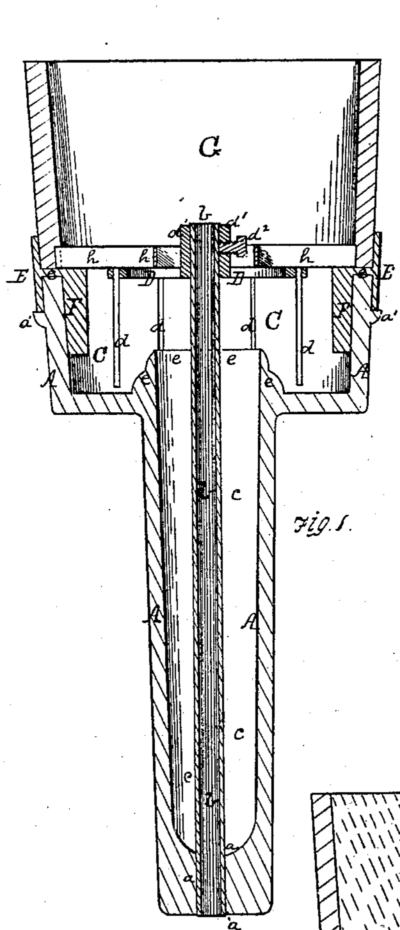

Fig. 1.

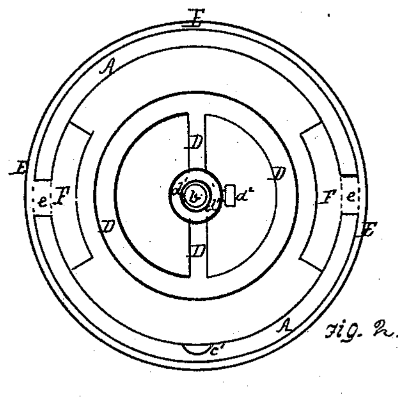

Fig. 2.

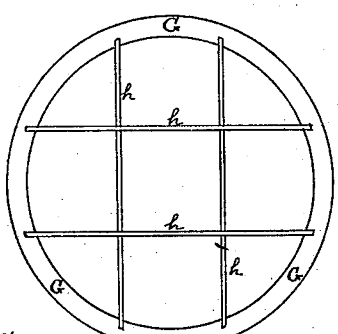

Fig. 4.

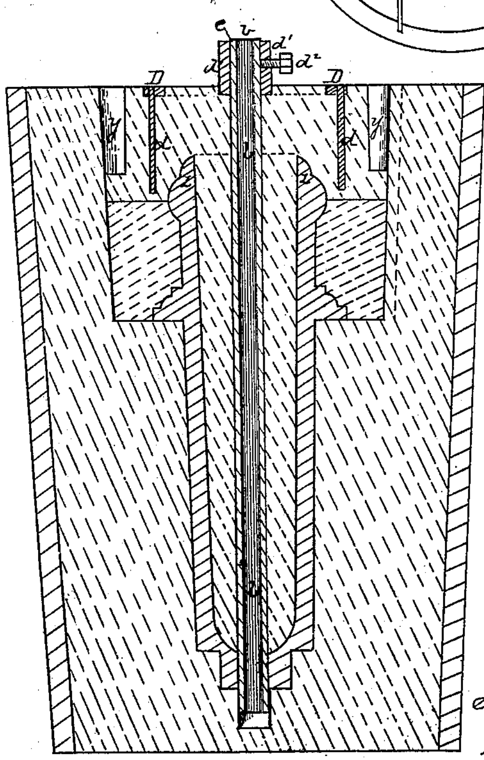

Fig. 5.

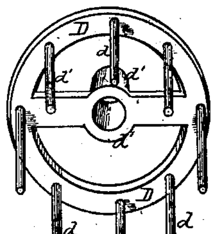

Fig. 3

Witnesses.
W. B. Wood
Theo. F. Aiskutz

Inventor.
S. Jarvis Adams
by James L. Kay
his Attorney

UNITED STATES PATENT OFFICE.

S. JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN SAND-CORE MOLDS.

Specification forming part of Letters Patent No. **210,392**, dated December 3, 1878; application filed April 5, 1878.

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 for Casting; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical section of my improved core-box, illustrating my invention. Fig. 2 is a top view of the core-box, the reservoir being removed. Fig. 3 is a detached view of the comb. Fig. 4 is a bottom view of the reservoir, and Fig. 5 is a vertical section of a mold, showing the core in position.

Like letters of reference indicate like parts in each.

My invention relates to the formation of cores to be used in molds for casting tubular articles—such as wagon-skeins and wagon-boxes—and especially to the formation of cores of the peculiar shape described in my application for Letters Patent of even date herewith, for use in the manufacture of bilged and similar shaped tubular castings.

In the molds for casting bilge-shaped articles, the core is formed with an enlarged head or cope, from which the cylindrical or other shaped core extends, and with an annular recess or rabbet around the cylindrical core, in which the upper part of the tubular casting is molded, as shown in Fig. 5.

It has been found extremely difficult to pack the cores of this peculiar shape firmly, on account of the large amount of sand in the head or cope and the "return" around the rabbet, and that, unless the core was baked, it would sag or crush when being placed in the mold.

My invention consists in apparatus for forming the core, and giving to it the peculiar shape desired; in devices for strengthening and supporting it, so that it may be handled by the operator without crushing or breaking; and in certain other apparatus relative thereto, hereinafter more specifically set forth.

To enable others skilled in the art to make and use my invention, I will describe its construction and manner of use.

In the drawings referred to, A represents the core-box, which is made of metal in any suitable way. The base of the interior of the core-box is made rounded or tapering to form the core-print of the core, or to give shape to the base of the core; and in the center of the base is formed the tubular recess *a*, extending entirely or partially through the same, for the reception of the strengthening rod or tube *b*, and by means of which it is centered and held in proper position. The base of the core-box is made sufficiently strong and heavy to take the jar when the core is formed by the jarring process, by which process I have been accustomed to form the same. If an open-ended core-box is used, a block having a recess formed therein for the strengthening-rod and fitting on and attached to the end of the core-box may be used for centering the rod and taking the jar. At the top of the cylindrical part *c* of the core-box is the cope-cavity C, which is made of the same shape as the cope to be formed therein. The top of the cylindrical part *c* extends into the cope-cave C above the base thereof, so as to form the annular rib or bead *e* for forming the annular recess or rabbet *z* in the core. This rib *e* may be made of any desired height or shape, according to the casting to be molded in the core, and in some cases may have rises or depressions on its surface to form corresponding depressions and elevations in the core. In the side of the cope-cavity C is the longitudinal recess *c'*, for forming the guiding-lug on the core.

Attached to the strengthening rod or tube *b*, and fitting in the cope-cavity C, is the comb D, provided with the teeth *d*, which extend down into the cope-cavity and form a support for the annular return of the cope when formed. The tube *b* passes through the socket d^1, and the comb is attached to the tube by means of the set-screw d^2, thus forming a rigid connection between them, so that when the core is turned over by means of the tube the comb will support the cope in proper relative position, and prevent its sagging or breaking by its own weight. The frame of said comb is circular, or of other shape corresponding to that of the cope-cavity, and the teeth or prongs extend perpendicularly therefrom down into

the return of the cope, so that when the core is placed in the mold the comb can be drawn out.

Fitting around the top of the comb, and extending above its upper edge, is the ring E, which rests upon the lugs a' on the core-box. The said ring has attached to it, by means of the lugs e fitting in recesses in the edge of the box, the formers F, which extend down into the core-box and form the depressions y at the sides of the cope, in which the sand of the mold can be pressed to hold the core in place.

Above the core-box A, and fitting within the ring E, is the sand-reservoir G, through which the sand is fed to the core-box by jarring when the core is made, and which holds the surplus sand after the core is formed. Across the base of the sand-reservoir are the flat rods h, which support the surplus sand in the reservoir when it is lifted from the core-box. The bases of the rods are even with the base of the reservoir, and by turning the reservoir upon the core-box cut off the sand on the top thereof.

The method of forming cores by my improved apparatus is as follows: The rod b, with the comb D attached to it, is placed in the core-box, with the end resting in the recess a. The ring E, with its formers F, is then fitted on the core-box, and the reservoir, filled with sand, placed within the ring. The core-box and reservoir are then jarred together, the base of the box receiving the force of the blows in case no jarring-frame is used, thus forming the core. The reservoir is then turned within the ring E, thus cutting off the sand, and lifted off, carrying with it the surplus sand, which is supported therein by the rods h. The ring E is then removed, carrying with it the formers F, by means of which the recesses y were formed, and the core is removed from the core-box and is ready for use.

In Fig. 5 is shown a view of a mold in which the core is placed, the core-print at the base fitting into a corresponding recess, and the cope fitting into the cope-cavity of the mold. After the core is placed in the mold the sand of the mold is pressed into the depressions y of the core, thus holding it in place, and preventing its rising and floating on the molten metal, and dispensing with the weight ordinarily used for that purpose. After the core is placed in the mold the set-screw d^2 may be unscrewed, and the comb D removed from the core, to be used in forming another core.

If the core is not formed by jarring, as above described, the sand-reservoir G is unnecessary, and may be dispensed with. The comb D may also be rigidly attached to the rod and left in the core during the casting.

Among the advantages of my improved apparatus are that the core is easily and rapidly formed, and the parts are held firmly together. As the rod and comb are rigidly attached, the comb sustains the cope and its return in proper relative position with the rest of the core. The rod is always held in the center of the core by the tubular recess at the base of the core-box. The recesses in the sides of the cope dispense with the weight usually employed. The rods in the reservoir hold up the body of sand and preclude its falling out when the reservoir is lifted off; and the rabbet in the core is accurately and perfectly formed by the rib or bead in the core-box.

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

1. The core-box A, provided with the annular rib or bead e around the cylindrical portion c, extending into the cope-cavity for forming the rabbet in the core, substantially as set forth.

2. The combination of the rod or tube b and the supporting-comb D, substantially as and for the purposes set forth.

3. The supporting-comb D, removably attached to the strengthening rod or tube b by means of the socket d^1 and set-screw d^2, or equivalent mechanism, substantially as and for the purposes set forth.

4. The combination of the core-box and the ring E, carrying one or more formers, F, substantially as and for the purposes set forth.

5. The core provided with the depression or depressions y in the side thereof, substantially as and for the purposes set forth.

6. The sand-reservoir G, provided upon its bottom with transverse bars h, adapted to support the sand in the reservoir and to cut the same from the core-box, substantially as set forth.

7. The combination of the core-box, strengthening rod or tube, and supporting-comb, substantially as and for the purposes set forth.

8. The combination of the core-box A, separate ring E, and reservoir G, substantially as and for the purposes set forth.

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

S. JARVIS ADAMS.

Witnesses:

JAMES I. KAY,

R. J. MCCLURE.