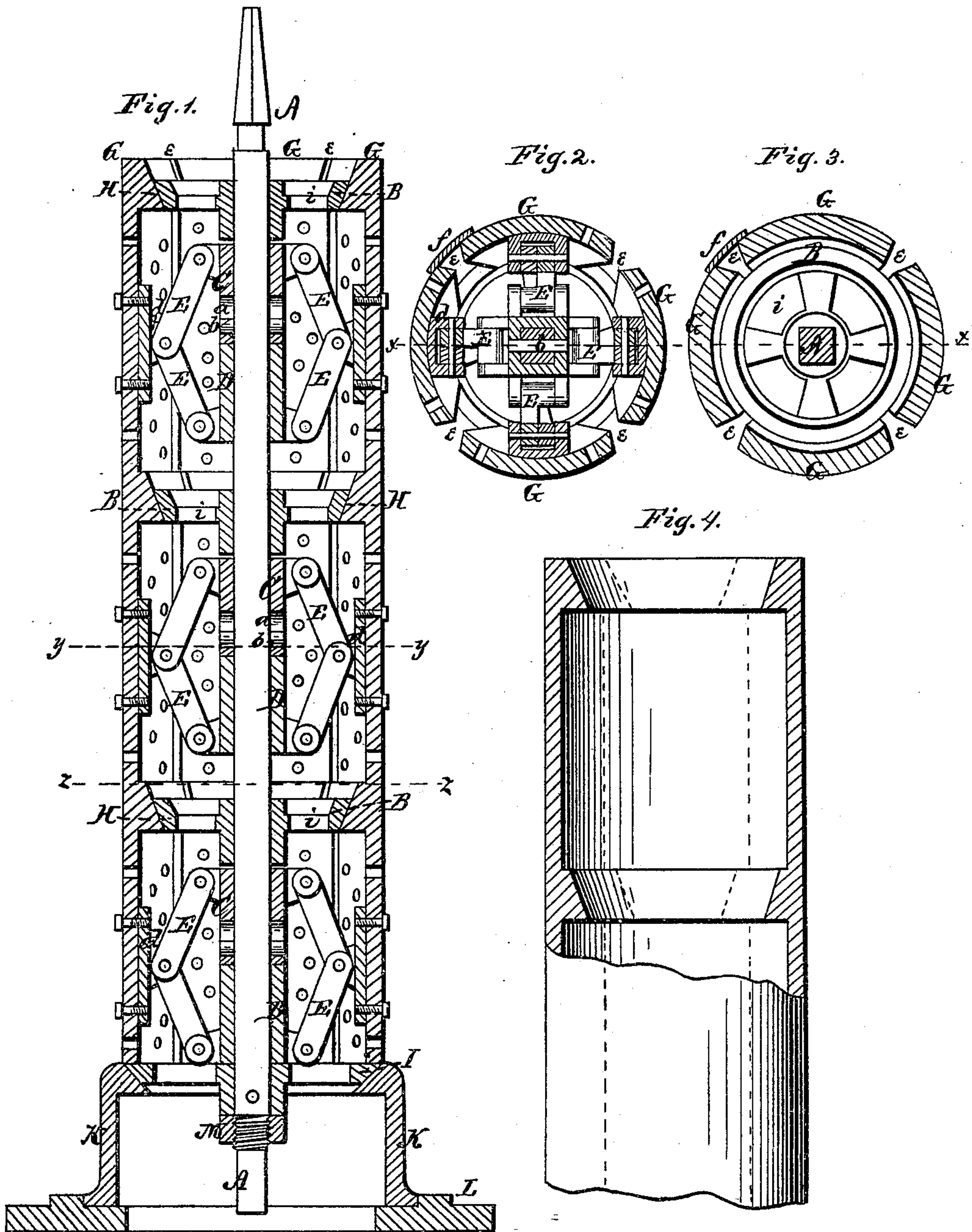


W. SMITH.

Core-Barrels for Castings.

No. 142,746.

Patented September 9, 1873.



Witnesses:

Henry N. Miller
C. L. Everts

Inventor.

William Smith.

per
Alexander D. Mason

Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM SMITH, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN CORE-BARRELS FOR CASTING.

Specification forming part of Letters Patent No. **142,746**, dated September 9, 1873; application filed June 4, 1873.

To all whom it may concern:

Be it known that I, WILLIAM SMITH, of Pittsburg, in the county of Allegheny and in the State of Pennsylvania, have invented certain new and useful Improvements in Collapsing Core-Barrels, used in the manufacture of cast-iron pipe; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, making a part of this specification.

My invention relates to that class of core-barrels which have for their object the relief of the pipe-casting while cooling, and the doing away with the use of straw rope for that purpose, as well as the preventing of cracks and flaws in the casting; and the nature of my invention consists in the construction and arrangement of an expanding and contracting core-barrel, used in the manufacture of cast-iron pipe, the said core-barrel to be expanded to a certain size when the core is being made, and contracted to a smaller diameter after the metal has been poured around it, and while the same is cooling, thus preventing any strain or binding of the casting, and allowing a free escape of gas and air.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing, in which—

Figure 1 is a longitudinal section of my core-barrel through lines *x x*, Figs. 2 and 3. Fig. 2 is a cross-section through the line *y y*, Fig. 1; and Fig. 3, a similar section through the line *z z*, same figure. Fig. 4 is a section and side view of the outside shell before it is cut into plates.

A represents the central spindle or shaft to which all the movable parts are affixed. The body of this shaft may be square or round, as desired, and it is provided with trunnions at each end to allow of its being revolved when the core is being made. At regular distances dished pieces or plates B B are securely fastened to the shaft A by keys or set-screws, which pieces or plates have an angular face to fit tightly, when the barrel is fully expanded, upon sloping projections H H on the plates

which form the outside of the barrel. The dished pieces or plates B B may be made round, square, octagonal, or any other suitable shape, and the projections H H made of corresponding shape. Directly below each of the pieces or plates B on the shaft A is placed a frame or hub, C. These hubs must not be rigidly attached to the shaft, as I find in practice that they must have a certain amount of movement in order to allow the plates B B to leave their seats and get above them before the collapsing motion commences. This I accomplish by making an oblong slot, *a*, in two sides of each hub, in which a pin, *b*, fastened in the shaft A, works. This allows the shaft to move upward a certain distance before the contraction begins. These hubs have four sets of lugs, arranged to receive each one end of the movable toggle-arms E E. Immediately below each of the hubs C is another hub, D, of exactly the same shape, and answering the same purpose. They meet the upper hubs end to end when the barrel is fully expanded, as shown; but when the barrel is contracted these hubs D D slide loosely on the shaft and drop below. *d d* are lugs in which the outer angles of the toggles E E are secured. The lugs are then bolted to the plates forming the outside of the core-barrel, and regulated by set-screws. G G represent the outside plates of the barrel, circular in form, each being the segment of a circle. They are perforated with a number of small holes to hold the mud of the core and admit of the gas escaping, and they are provided at the proper places with the angular seats H H projecting inward, into which the plates or pieces B B fit. I represents the bottom or head plate of the barrel, made with an angular face fitting into a seat in the base K, which forms the bowl of the pipe. The bottom I is made with arms and a hub fitting the shaft A, and having a key-hole matching a similar hole in the shaft. Below this hub a thread is cut upon the shaft, upon which a nut, M, works. L is the base-plate, on which the bowl-piece K is placed, which also acts as a foundation for the flask. When the barrel is expanded, open spaces *e e* are formed between the plates G G, as shown in Figs. 2 and 3, to allow of its contraction. These spaces are of a V shape, opening out-

ward in order to form a base for the mud of the core to rest in, and offer a resistance to the pressure of the iron.

In lieu of the V shape of the openings I may use a thin sheet-metal plate, *f*, covering the opening, and extending the whole length of the barrel to prevent the melted iron from forcing its way through the mud into the barrel.

In constructing my core-barrel, I cast the outside plates G G in one piece—that is to say, in pipe form, as shown in Fig. 4; and after the toggle-joints, wedge-plates, and shaft have been fitted therein, I cut the open spaces *e e* by means of a planer, thus dividing it into four parts, and securing uniformity of size and shape in the core-barrel, which is of the utmost importance.

The pieces or plates B B are provided with openings *i i*, as shown in Figs. 1 and 3, to allow of the easy escape of gas, &c.

The barrel thus constructed being collapsed, and the workman about to form a new core upon it, the barrel is first placed in its necessary position on the horses, the nut M is started on the thread, and as it is screwed up and advances it forces up the plate I and the loose hubs D D, at the same time drawing the angular-faced plates B B into the seats H H until the hubs of the toggles meet. The barrel is then expanded as far as it can go. A key is now driven through the seat in the hub of the plate I and through the shaft A, whereby the whole is securely locked. The nut M is then removed, and the workman proceeds to form his core at once, straw rope not being required, as is now the case. When the core is dry it is ready to be placed in the mold.

The bowl-piece K and the base-plate L form the head of the pipe, and the flask forming the outside of the pipe is placed around them. The core is then lowered to its place, and, by means of the plate I fitting in the angular seat in the bowl K, it takes its proper position.

Everything being in order, the molten metal

is poured around the core. As soon as the metal has set or become solid the key in the hub of the plate I is knocked out, and, a lifting power being applied to the shaft A, the plates B B are drawn out of their seats H H, and the outside plates G G, by their own weight, compel the toggles E E to move their loose hubs D D downward on the shaft; and they therefore contract or collapse as far as the openings *e e* will allow, thus giving the pipe plenty of room to contract and cool without danger of its cracking.

This mode of working saves a large amount of labor and expense.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A core-barrel formed of a series of segmental plates, G G, cast with the interior inclined seats H H in one piece, and provided with V-shaped openings cut the entire length between said plates, substantially as and for the purposes herein set forth.

2. In combination with the segmental plates G G and their seats H H, the central shaft A with plates B B, hubs C D, toggles E E, and lugs *d d*, all constructed and arranged substantially as and for the purposes herein set forth.

3. In combination with the central shaft A, plates G G, and intermediate devices, the bottom plate I, nut M, bowl K, and bed-plate L, all substantially as and for the purposes herein set forth.

4. The slotted hubs C, attached to the central shaft A by pins *b* passing through the slots in the hubs, as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of May, 1873.

WM. SMITH.

Witnesses:

JOHN B. GEYSER,
RICHARD ALLEN.