# Brodie & Smith,

## Metalic Core.

No. 111,173. Patented Jan. 24, 1871.

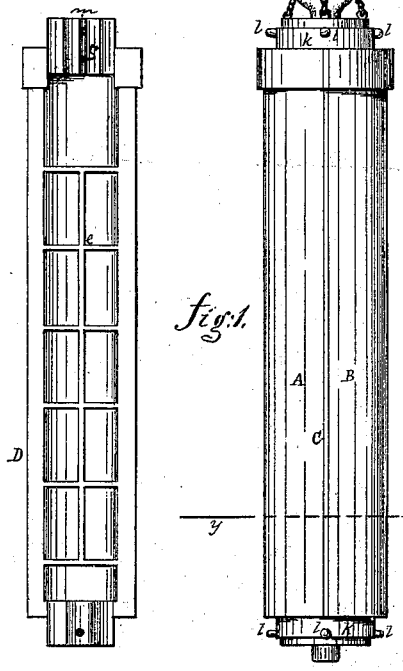


fig:3. fig:1.

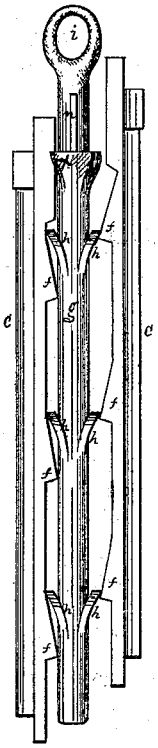


fig:2.

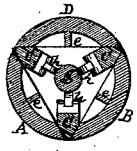


fig:4.

Witnesses
A. E. Johnston
James A. Johnston

Inventors
A. T. Brodie
Robert R. Smith

# United States Patent Office.

ANTHONY T. BRODIE AND ROBERT R. SMITH, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 111,173, dated January 24, 1871.

## IMPROVEMENT IN COLLAPSING-CORES.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that we, ANTHONY T. BRODIE and ROBERT R. SMITH, both of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Metallic-Core; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

The nature of our invention consists in a metallic core, so constructed that it will yield to the contraction of the article cast while casting and during the process of cooling, and also susceptible of being collapsed for the purpose of removing the core from the casting.

To enable others skilled in the art to make and use our invention, we will proceed to describe more fully its construction and operation.

In the accompanying drawing which forms part of our specification—

Figure 1 is a side elevation of our improvement in metallic core.

Figure 2 represents three parts of the same, showing the relation that said parts bear to each other when the core is collapsed, and also when it is expanded to its greatest diameter.

Figure 3 represents the inside of one of the main sections of the metallic core.

Figure 4 is a transverse section of the metallic core when cut through at line *y* of fig. 1.

In the accompanying drawing—

A, B, and D are the three main sections of the core. These sections are each a longitudinal section of a tube, and are braced with a series of stays, *e*, on the inside, as clearly shown in fig. 3.

Between the main sections A, B, and D are placed the sections C, the sides of which are beveled and fitted to the edges of the sections A, B, and D, as shown in fig. 4.

The inner side of the sections C are provided with a series of inclines, *f*, which are used, in combination with the springs *h*, for expanding the core to its greatest diameter, and also for collapsing it for the purpose of removing it from the casting.

The springs *h* are secured to the shaft *g* by means of set-screws, and may be easily removed for other purposes.

The shaft *g* is provided with a tongue or guide, *n*, which is fitted to a groove, *m*, in the end of the section D, shown in fig. 3, and is also provided with an enlargement or shoulder, *x*, which, in connection with the end piece *s* of the sections A, B, and D, limits the movement of the shaft *g* endwise.

The tongue or guide *n* and groove *m* prevent the shaft *g* from turning in the core.

The several parts are held in juxtaposition through the medium of the rings *k* and pins or set-screws *l*.

The core herein described and represented is for pipe; hence it is represented as being suspended by chains, which are secured to the upper end of sections A, B, and D; but we wish it clearly understood that we do not confine our invention to pipe-cores, for it may be applied to a great number of other articles.

As the construction and arrangement of the several parts of our improvement in metallic core, and the relation that said parts bear to each other, will be readily understood from the foregoing description, and by reference to the accompanying drawing, we will therefore proceed to describe its operation.

The core is expanded to its proper diameter by forcing down or in the shaft *g*, which will cause the springs *h* to move and press on the inclines *f* of the sections, which will press them outward, and thereby expand the sections A, B, and D to the proper degree for obtaining the diameter of the core.

The core is then coated with a suitable material, (such as is in common use in foundries for coating sand-cores and "dry-sand molds;") the core is then placed in a core-oven and dried. It is then ready for use.

The core is placed in the mold in the usual manner, and the "vent" carried off at the end in the ordinary manner.

In the process of casting, the metal commences to contract as soon as it comes in contact with the core. To compensate for this contraction the springs *h* and inclines *f* are used.

The pressure of the casting in contracting, coming on the main sections A, B, and D, will be thrown on the sections C and force them in against the springs *h*, which will yield sufficient to allow the core to gradually contract its diameter so as to compensate for the contraction of the casting in cooling.

When the core is to be moved from the casting, the operator takes hold of the ring *i* of shaft *g*, and draws it endwise. This will cause the core to collapse, so that it may be readily removed from the casting.

When the core is collapsed, the springs *h* are drawn off the inclines *f*, as indicated by the position of section C on the left-hand side of shaft *g*, in fig. 2.

When the core is expanded to its greatest diameter, the springs *h* are on the inclines *f*, as indicated by the position of section C on the right-hand side of shaft *g*, as shown in fig. 2.

The advantage of our metallic core consists in saving labor and expense of making a new core for each

casting, the advantage of which will be very apparent to the skillful molder and manufacturer of castings.

Having described the nature, construction, and operation of our improvement,

What we claim as of our invention is--

A metallic core, consisting of the parts A B D C and shaft *g*, provided with springs *h*, said parts being held together by rings *k* and pins or screws *l*, the whole being so constructed as to yield, as and for the purpose herein described.

A. T. BRODIE.
R. R. SMITH.

Witnesses:
A. C. JOHNSTON,
JAMES J. JOHNSTON.