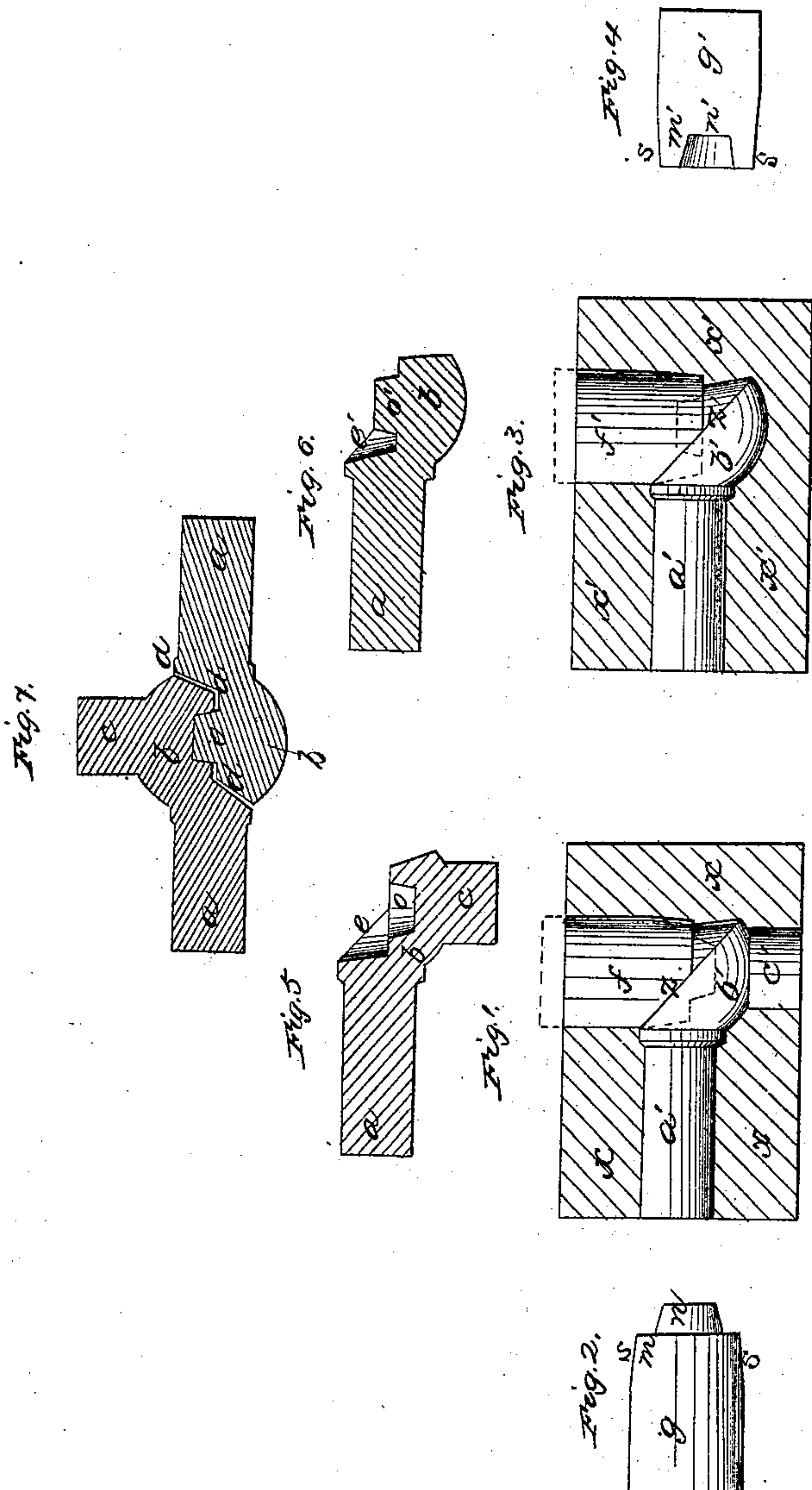


J. M. Cooper,
Casting Globe Valves.
N^o 70,965. Patented Nov. 19, 1867.



Witnesses:
W. A. Lewis
C. P. Taylor

Inventor:
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United States Patent Office.

JOHN M. COOPER, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 70,965, dated November 19, 1867.

IMPROVED MOULDS FOR MAKING CORES FOR CASTING GLOBE-VALVES.

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

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN M. COOPER, of Pittsburg, in the county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Making Cores for Casting Globe-Valves; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 shows a longitudinal section of the core-box, in which is formed one end of the core, a portion of the body of the core, and the print for the valve-opening, such section being made by a plane passing through the axes of the core-barrel and plug-aperture.

Figure 2 is an outside view of the plug employed with the core-box shown in fig. 1.

Figure 3 is a sectional view, similar to that shown in fig. 1, and similarly made, of the other core-box, in which is formed the other end of the core and the rest of the body of the core.

Figure 4 represents a longitudinal section of the plug used in the core-box shown in fig. 3.

Figures 5 and 6 show separate longitudinal sections of the core as formed by the core-boxes shown in section in figs. 1 and 3 respectively; and

Figure 7 is a longitudinal and vertical section of the core, showing the part-cores represented in figs. 5 and 6 put together in their proper relative position, and ready for the mould.

Like letters of reference indicate like parts.

In consequence of the peculiar shape which must be given to cores for casting globe-valves, it is necessary that those parts of the core-box which form and shape the cavities in the core in which to cast the seat of the valve and the sides of the seat, sometimes called the diaphragm, be removed from the core before the core itself can be lifted out of its core-box. Great difficulty has heretofore been experienced in doing this, even with the utmost care and skill, on account of the liability of the edges of the core to be broken or crumbled away, especially as, with the devices now generally in use, such parts of the core-box are irregular in shape, or, if regular, are removed by taking off the entire end of the core-box. In either case, the least unsteadiness of movement is liable to break the edges of the core, especially since such parts of the core thereby lose their only support. By such methods much time is consumed, many cores are unavoidably spoiled, and others more or less injured.

By the method which I am about to describe, certain parts of the core-box are made easily detachable, whereby to remove such parts as prevent the lifting out of the core, such removal being made in such a way as not to injure the edges of the core, and at the same time the core is held firmly enclosed in its box, so as to be supported on all sides. Thus I obviate all danger of breaking the body of the core, or of crumbling or otherwise injuring its edges.

Another difficulty which has heretofore been generally experienced is the difficulty of so steadying the core in the mould in which the casting was to be done as to secure in the casting a valve-seat and sides, or diaphragm, of sufficient and uniform thickness, and as a consequence the castings for globe-valves frequently prove worthless. This difficulty I obviate by increasing the length of the core, so as to provide a bearing at each outer end, which, being packed in the mould, secures for the core the requisite steadiness.

The nature of my invention, then, consists in constructing core-boxes for making the cores of globe or other similar valves or cocks with certain parts easily detachable, so that the cores may be easily and safely removed from the core-boxes, and so placed in the moulds in which the casting is to be done as to retain their position till the casting is complete.

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

The core-boxes and plugs, shown in figs. 1 to 4 inclusive, are made of wood, or other suitable material commonly used for such purposes. I usually make them in halves, dividing them by planes passing longitudinally through them, substantially as above stated, and as shown in the drawings. The configuration which the interiors of the boxes receive is, of course, such as it is desirable to give the outer face of the core. As illustrated in the drawings, figs. 5 and 6 are sectional views of the two ends of a core, which are formed respectively in the boxes x x' , the bearings a of each, the body of the core, (represented in two parts, b b'), and the core c for the valve-

opening being each formed in its corresponding box x or x' , and in the parts thereof designated a' b' c' respectively. But as the two ends $b b$, forming the body of the core, have to be so fitted to each other that an aperture or space, d , shall be left between them in which to cast the seat and sides or the diaphragm of the valve, it is necessary that a lip or flange, $e e'$, be formed on each of the parts $b b$ of the body of the core. To form and give the proper shape to the inner faces of such lips or flanges $e e'$, and make them so as to provide for the required aperture or space d , I introduce, through holes $f f'$ in the boxes $x x'$, the plugs $g g'$, which commonly have a slight bevel or taper, $s s$, at or near their lower ends. The plugs $g g'$ are commonly divided in halves longitudinally, so that each half will be the more easily used with its corresponding half of the core-box x or x' . The plug g thus divided is inserted in the core-box x , also divided, as above, through the plug-hole f to the position indicated by dotted lines, fig. 1. Under its shoulder m and neck n are formed or moulded the lips or flanges e and recess o , the bearing a and core c for the valve-opening, and the other parts of the core being moulded in the usual way, one-half in each half of the core-box x . The projecting shoulder z in the bottom of the box x forms the upper or lower edge, as the case may be, of the lips or flanges e . By this shoulder z and the plug g , the aperture or space d is made to extend diagonally across from the upper to the lower face of the core, or in other desirable direction.

When each half of one end of the core, as thus described, has been moulded, the halves of the core-box x , with the half-cores in them, are closed together. I then remove the plug g , which, especially if tapering, as above described, can obviously be drawn out without injury to the edges of the lips e or recess o , which, with the remainder of the core, are left firmly enclosed in the box x . The box x may then be opened, and the core removed substantially of the shape shown in fig. 5.

The other plug g' has a recess, n' , in which to mould a print, o' , to fit into the recess o , already described. This plug g' operates similarly to the plug g , and is inserted in its core-box x' through the aperture f' . The lip e' is moulded under its shoulder m' , and the print o' in the recess n' . The shoulder z' perform a function similar to that of the shoulder z of the box x . After the two halves of this end of the core have been moulded substantially in the manner hereinbefore described, the half-boxes x' are closed together, the plug g' withdrawn by the aperture f' , the box x' opened, and the rest of the core thus formed taken out, substantially of the shape as drawn in fig. 6. The two ends of the core thus formed in the boxes $x x'$, and of the shape represented in figs. 5 and 6, are then placed in the mould preparatory to casting, which mould may be of any known form, material, or description. The positions which the two ends occupy with reference to each other, when put together in the mould, are shown in fig. 7. The bearings $a a$, being made of sufficient length for that purpose, extend into the mould in which the casting is to be done a sufficient distance beyond the ends of the desired casting, so that thereby the two parts of the core will each be held firmly in its proper place. I thus obviate all danger of the two parts of the body $b b$ being twisted or deflected in any direction by the molten metal as it is run into the mould. This feature of my invention I regard as an important one, since, by such twisting or deflection, to which cores as usually constructed are exceedingly liable, the casting of a good and sufficient diaphragm of uniform thickness often becomes impossible, and the work is all lost. The axes of the bearings $a a$ are in the same line, or nearly so. The print o' rests in the recess o , to form an opening in the diaphragm for the passage of the water or other liquid. In the space d , and around the print o' , the valve-seat and sides of the seat or diaphragm are cast. The valve-barrel and valve-opening are cast around the body $b b$, the inner ends of the bearings $a a$, and the valve-print o , and between them and the mould in which they are enclosed.

The relative sizes of the different parts of the boxes $x x'$, and of the plugs $g g'$, may be varied at pleasure, so far as to vary the size or shape of the core, the breadth of the print o' and recess o , or the thickness and shape of the space d , or the size and shape of the lips $e e'$, the mode of making and shaping such parts, however, remaining substantially as above described.

I do not limit myself in my invention to a form of print o' and recess o which shall secure a valve-seat only of circular shape, nor to a space d which shall, in all cases, give a diaphragm of uniform thickness, since these are capable of variation without materially injuring the value of the valve. The plugs $g g'$, and apertures or plug-holes $f f'$, may also be considerably increased in size, provided, thereby, the interior bearing-surfaces of the boxes $x x'$, against those parts of the core particularly liable to crumble away, be not materially lessened.

I include in my invention the manufacture of cores, not only for casting globe-valves, but also for casting what are commonly known as bib-cocks, and other valves and cocks similar in construction or mode of operation, and particularly such valves and cocks as require a seat similar in form to that of the globe-valve. For all such cores the method hereinbefore described for forming the several parts of the body of the core is especially applicable and useful.

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

The core-boxes x and x' , with their respective plugs g and g' , constructed substantially as hereinbefore described, for the purpose of forming cores for casting globe-valves with diaphragm valve-seat.

In testimony whereof I, the said JOHN M. COOPER, have hereunto set my hand in the presence of—

JOHN M. COOPER.

Witnesses:

A. S. NICHOLSON,
GEO. H. CHRISTY.