C. F. MURRAY.

EXPANSIBLE CORE BARREL.

APPLICATION FILED SEPT. 1, 1910.

996,661. **Patented July 4, 1911.**

Fig. 1

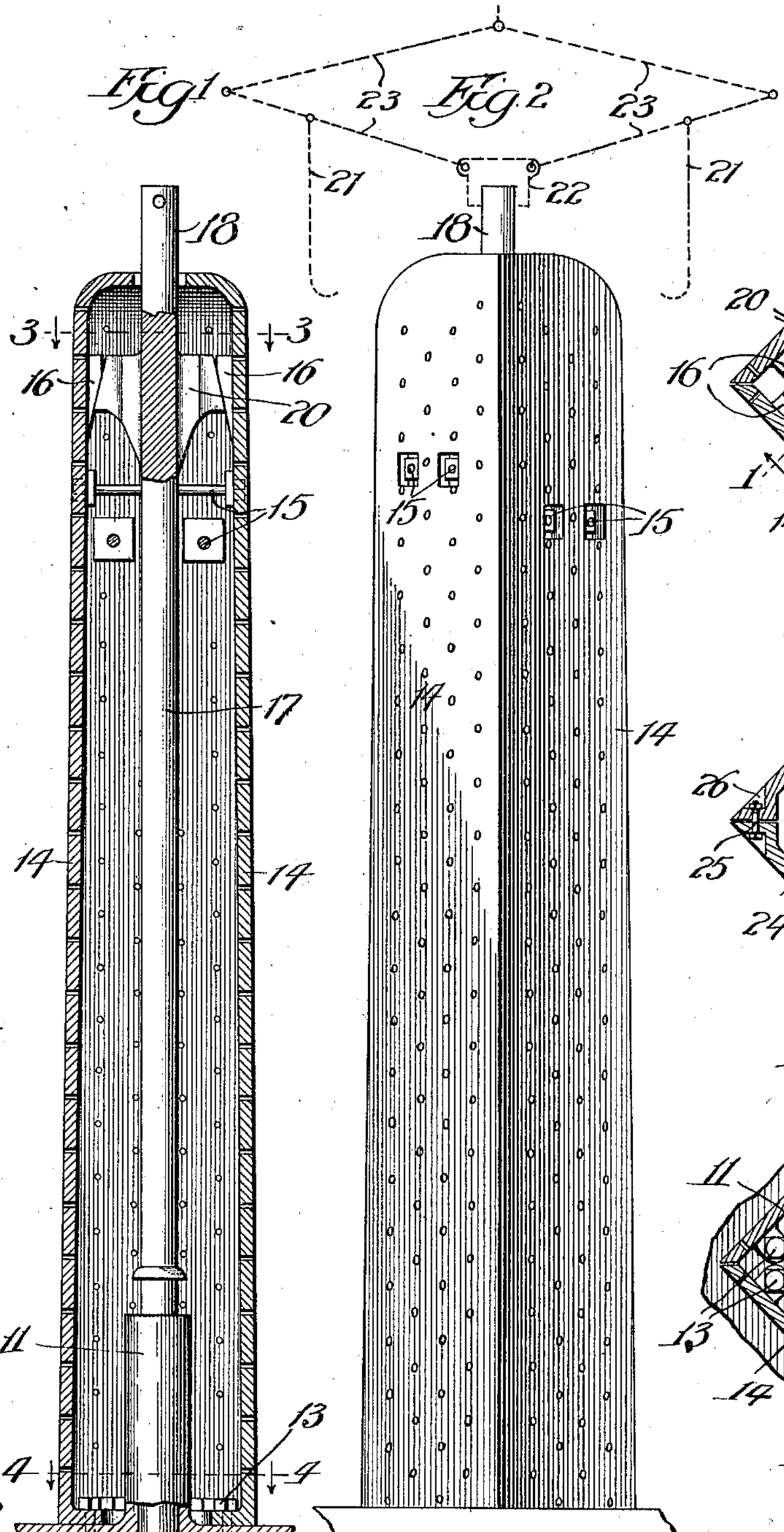


Fig. 2

Fig. 3

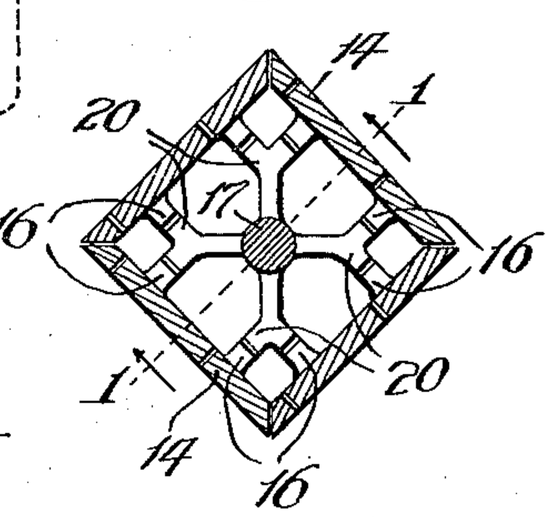


Fig. 5

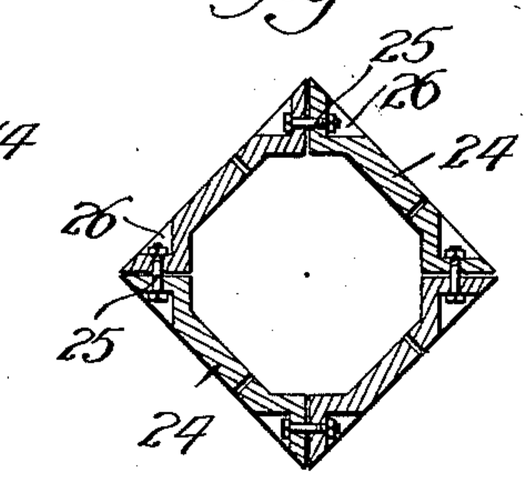
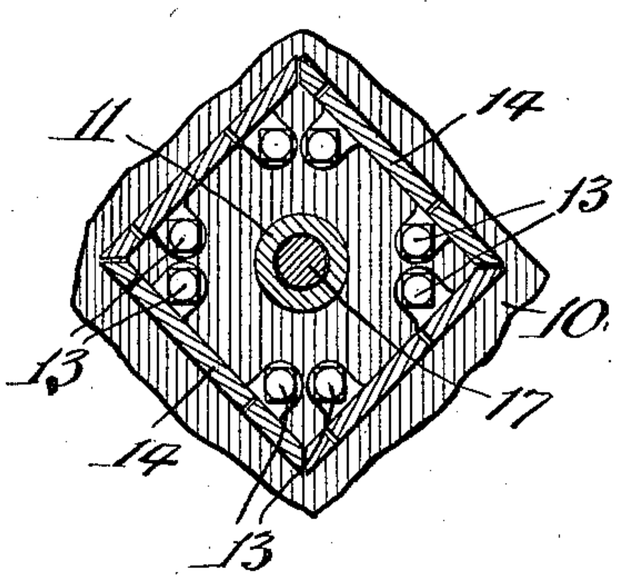


Fig. 4



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EXPANSIBLE CORE-BARREL.

996,661. Specification of Letters Patent. Patented July 4, 1911.

Application filed September 1, 1910. Serial No. 580,060.

To all whom it may concern:

Be it known that I, CHARLES F. MURRAY, of Evanston, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Expansible Core-Barrels, of which the following is a specification.

My invention relates to core barrels for use in casting molds for ingots and particularly to sectional, expansible core barrels which are positively expanded whenever the device is rested on its base.

This application is somewhat similar to applicant's co-pending application, entitled "Contractible Core-Barrels," Serial No. 573,145, filed July 21, 1910.

As will be readily understood by those skilled in the art, the production of steel ingots is accomplished by casting the fluid metal in molds. The molds in which this metal is cast are also formed of cast metal and are very heavy. These molds are usually about six feet in height and of varying rectangular cross section. The practice in the production of these ingot molds is to employ a core of the proper dimensions, coating this core with sand, then drying the same until the sand coating is rigid and hard, then surrounding the said core with a properly equipped flask, then pouring the molten metal around the core in the opening between the flask and the said core. When the fluid metal has set the core is removed, and it is to this step of removing the core from the casting that my invention relates.

As will be understood, the metal in cooling contracts and binds itself upon the core, and in order to free the same from the casting, it has been found necessary to employ a great deal of force by the use of dolly bars, electric extractors and other means, all of which require considerable labor and consumption of power. I have therefore devised a core barrel composed of sections which are adapted to be wedged apart whenever the device is rested on its base and which is adapted to be collapsed when the plates composing the shell of the core barrel are raised.

Referring to the drawings; Figure 1 is a central, vertical section, of a device of the class described, on the line 1—1 of Fig. 3. Fig. 2 is a side elevation showing the plates contracted. Fig. 3 is a transverse section on the line 3—3 of Fig. 1. Fig. 4 is a transverse section on the line 4—4 of Fig. 1, and Fig. 5 is a modification of the construction shown in previous figures, showing other means for preventing undue separation of the side plates.

In the drawings, 10, represents a base plate which preferably forms the drag of the mold. This portion, 10, is provided with an upstanding hollow boss or guide, 11. The base portion, 10, has a counter-sunk opening, 12, concentric with the opening through the boss, 11. Secured to the plate, 10, by means of bolts, 13, are side plates or staves, 14. Although I have shown four of these, it will be understood that a less or greater number may be employed if desired. These side plates, 14, have their tops converging, an opening being left, however, for the central stem to be hereafter described. The plates, 14, are prevented from undue separation by the through bolts, 15, as shown in Fig. 1. When the plates are collapsed the heads and nuts of the bolts do not contact the plates, that is, they permit contraction; but expansion is limited by the heads and nuts as will be readily understood by reference to the drawings. On the interior of the plates, 14, I provide inclined surfaces, 16, and although I have shown one set of these wedge surfaces at the upper end of the plates, it is apparent that other sets may be placed at other points on the interior of the plates. In practice, however, it has been found that one set of inclined surfaces, taken in connection with the fact that the plates are rigidly bolted to the drag, is sufficient. A central stem, 17, is mounted within the core barrel, its upper end, 18, projecting through the converging upper portions of the plates and its lower end projecting through the base plate, 10, and being provided with a plate, 19, which may be screw-threaded onto the stem, 17, or otherwise secured thereto. This plate 19, fits within the opening, 12, in the plate, 10. The stem 17 is adapted for vertical movement and is guided at its lower end by the integral hollow sleeve 11 on the base 10. Near the upper portion of the stem, 17, I provide integral wedge portions, 20, adapted to cooperate with the surfaces, 16, on the plates. As shown in Fig. 3, I prefer to construct the wedges Y-shaped, in order to get a proper bearing surface against the plates, although this construction is not essential.

For stripping the casting and the flask (not shown) from the core barrel of my inven-

tion, I employ any well known form of stripper, such a stripper being shown in Fig. 2. This is composed of the hooked depending portions, 21, the central cap, 22, and the lazy tongs, 23.

The operation of my device may be described as follows: Assume that a casting has been formed around the core barrel, as shown in Fig. 1, and that the casting has set sufficiently, the lifting tongs or stripper are placed by the crane, the hooks, 21, engaging flanges on the flask of the mold, the cap, 22, resting upon the upper portion, 18, of the stem, 17. As will be seen, a lifting action by the crane will press downward on the stem, 17, and lift upward on the flask. As the flask, casting, side plates and drag are lifted, the stem, 18, will remain stationary, the inclined wedges, 16 and 20, permitting the side plates to contract sufficiently to free the plates from the casting. As soon as the plates are free, they will drop to the position shown in Fig. 1 and the casting may be removed. It will be understood that the core barrel is shown in expanded condition in Fig. 1 and contracted in Fig. 2. In order to prepare the device for further use, it is lifted by the stem, 17, carried to a point where it is again coated with sand and the operation above described repeated indefinitely.

It will be understood that the core barrel is adapted to be expanded whenever the portion 19 is resting upon a supporting surface, the force tending to expand the plates, being the weight of the side plates and the base portion secured thereto; that is, whenever the core barrel as a whole is resting upon a flat, supporting surface, the parts are in expanded position. The extent of the wedging force tending to separate the side plates is the weight of the core barrel and base. The stem 17, having a bearing portion 19, also carries the wedge members 20. Thus it will be seen that there is nothing opposing the descent of the stem and parts connected thereto except the contact of the bearing portion against a support. The bearing portion will extend below the base only at such times as when the flask and casting surrounding the core barrel are lifted thus permitting the plates to contract and free themselves from the casting. They will then drop back and the stem and its bearing member resting on a support will cause the forcible contraction of the side plates.

In Fig. 5 I have shown a construction for uniting the side plates, wherein, 24, represents the side plates joined by the corner bolts, 25, seated in notches or depressions, 26, within the plates.

I realize that various modifications in the construction shown and described may be made by those skilled in the art, and I therefore do not wish to be limited to the precise construction herein shown and described.

I claim:

1. An expansible core barrel comprising, in combination, a supporting member, side plates connected to said supporting member, and wedge means having a bearing portion extending below the lower edges of said side plates, said wedge means being adapted to forcibly expand the side plates when said bearing portion is in contact with a support.

2. An expansible core barrel comprising, in combination, a supporting member, side plates connected to said supporting member, and wedge means having a bearing portion extending below the lower edge of said side plates, said wedge means being adapted to forcibly expand the side plates when said bearing portion is in contact with a support and when said core barrel is lifted by its stem.

3. An expansible core barrel, comprising in combination, a drag, side plates secured to said drag, a central stem, said stem extending above said side plates and also passing through said drag, and wedge means on said stem adapted to forcibly expand said side plates, substantially as described.

4. An expansible core barrel, comprising in combination, a drag provided with an integral guide, side plates secured to said drag, a central stem, said stem extending above said side plates and also passing through said drag, and wedge means on said stem adapted to forcibly expand said side plates, substantially as described.

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