(No Model.) 2 Sheets—Sheet 1.

E. CRONIN.

FURNACE FOR SMELTING METALS.

No. 597,460. Patented Jan. 18, 1898.

Fig. 1.

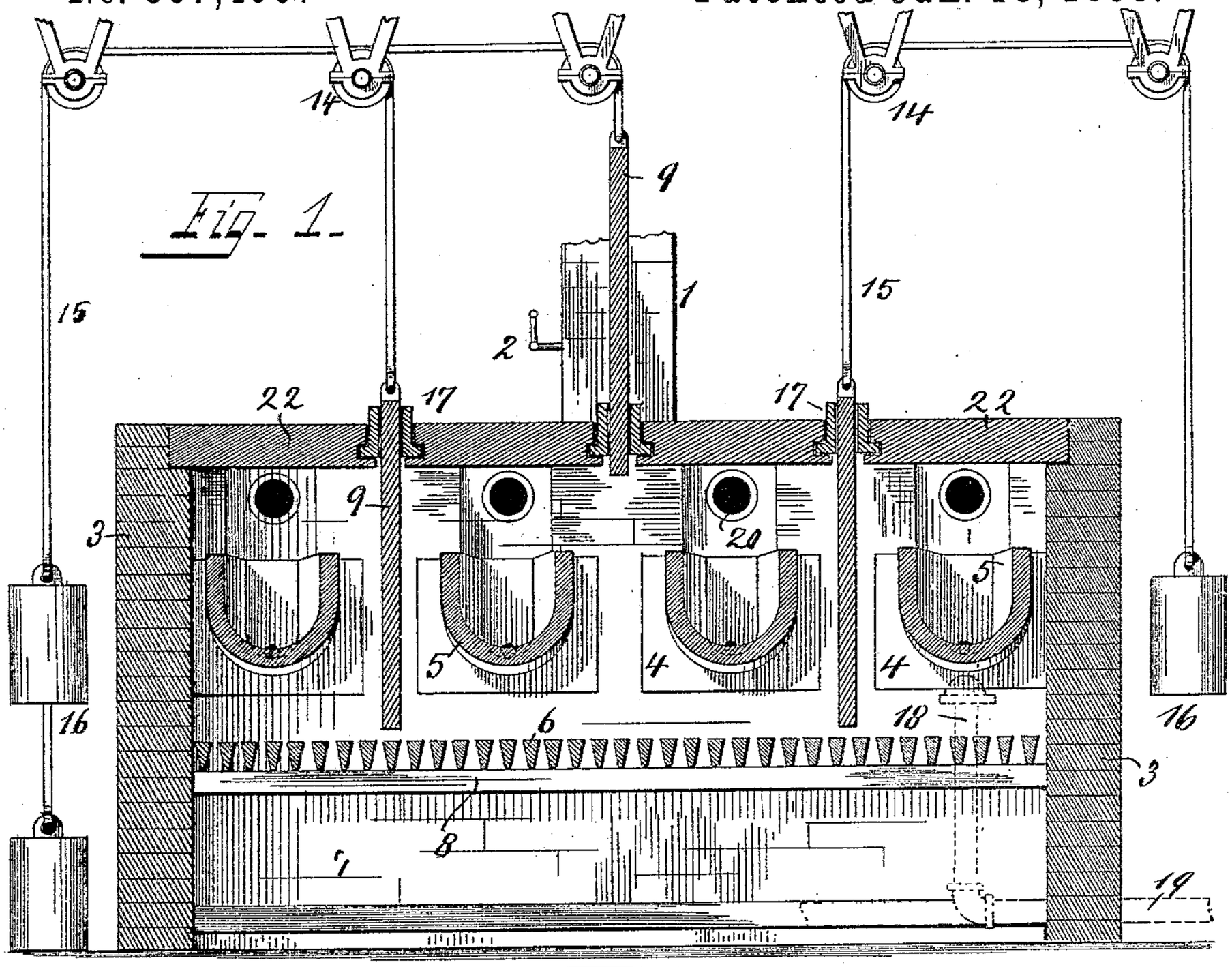
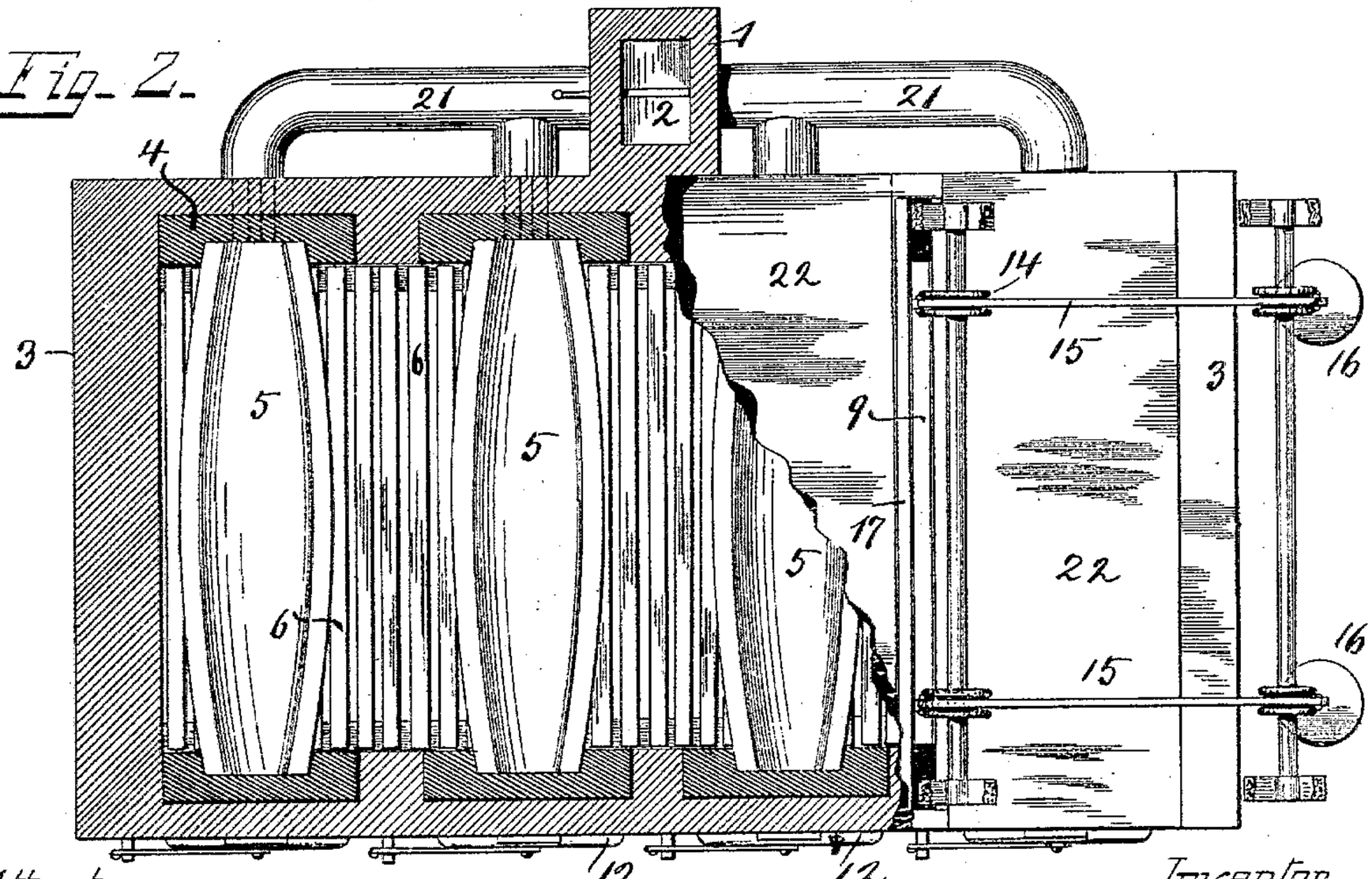


Fig. 2.



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his Atty

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

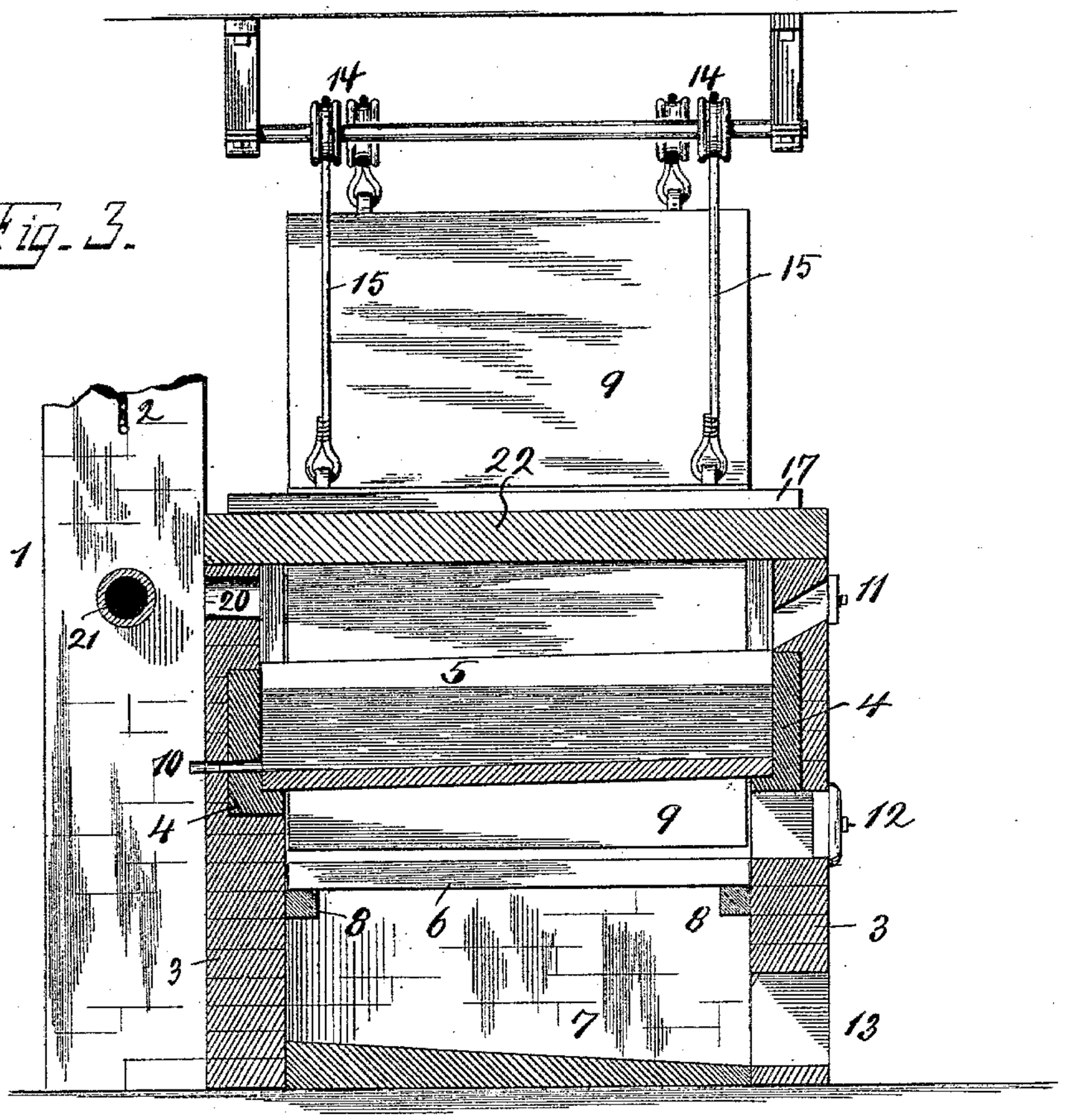

Fig. 4.

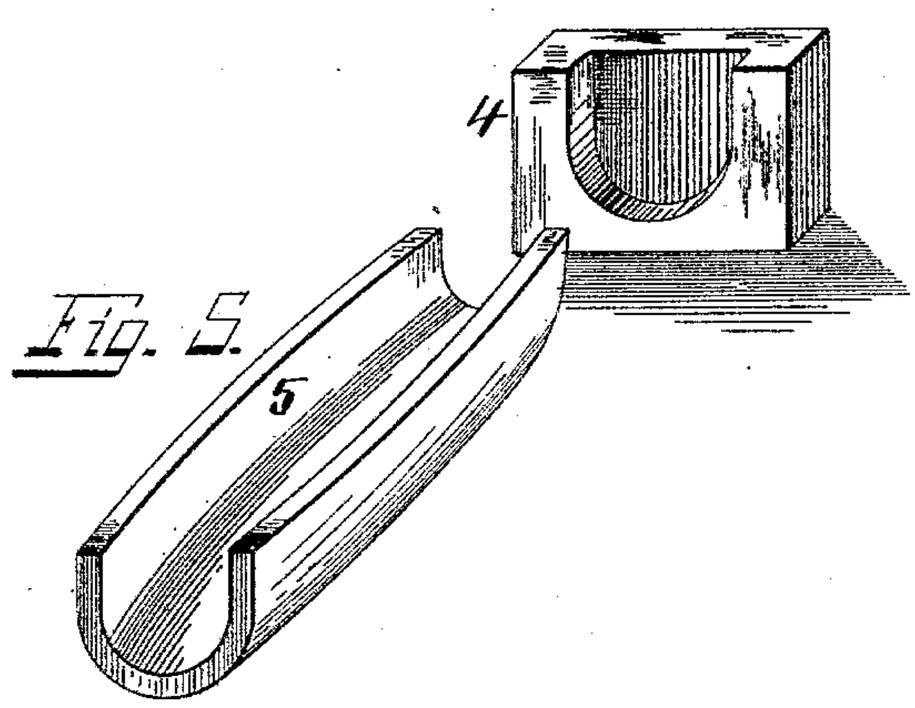

Fig. 5.

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UNITED STATES PATENT OFFICE.

EDWARD CRONIN, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-THIRD TO JOHN G. O'CONNELL, OF SAME PLACE.

FURNACE FOR SMELTING METALS.

SPECIFICATION forming part of Letters Patent No. 597,460, dated January 18, 1898.

Application filed January 23, 1897. Serial No. 620,415. (No model.)

To all whom it may concern:

Be it known that I, EDWARD CRONIN, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Furnace for the Smelting of Metals, of which the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates generally to the construction of furnaces for smelting metals, and especially to the construction of the crucibles and the manner of supporting the same in the furnace.

The primary object of my invention is to so construct and support the crucibles in the furnace that any of them or any part thereof when it becomes unfit for use may be easily removed and replaced.

A further object of my invention is to provide means for localizing the fire under any one or more of the crucibles, so that when only one crucible is used the fire need only be maintained thereunder, thus effecting a saving to a large extent of heat and fuel. I am also enabled by this means to smelt different kinds of ores at the same time in independent or separate chambers and to prevent the heated gases arising from the smelting of one kind of ore in one of the crucibles interfering with or otherwise affecting in any manner the metal contained in the adjacent crucibles.

The invention will be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and is summarized in the claims.

Figure 1 is a view, partly in elevation and partly in longitudinal vertical section, of a furnace constructed in accordance with my invention. Fig. 2 is a view partly in top plan and partly in horizontal section. Fig. 3 is a vertical transverse section of the furnace. Figs. 4 and 5 are detail perspective views, respectively, of one of the end supports for the crucibles and one of the crucibles.

The furnace is preferably rectangular in form, and the walls 3 thereof may be built from any desired refractory material. The crucibles, which are preferably arranged transversely of the furnace above the grate and parallel, are each composed of three parts—to wit, a body or crucible proper, 5, and combined ends and supports 4. The end supports 4 are so secured in or to the opposite side walls of the furnace that they can be easily removed and replaced when burned out, and they are preferably formed with the recesses 4^a to receive the open ends of the body portion 5. This body portion is preferably substantially semicircular in cross-section and with its sides slightly outwardly curved or bulged at center, as shown in Fig. 5. The joint between the body 5 and ends 4 can be closed by tamping with clay or other suitable material. This arrangement, it will be seen, permits of the body portion 5 or the ends 4 being easily removed and replaced when burned out or broken, thereby avoiding the necessity and expense of supplying an entirely new crucible.

The crucibles are preferably inclined, so that the metal when smelted will flow toward one end of the crucible, where it can be withdrawn through the outlet 10 in the end support and wall of the furnace, Fig. 3.

The ore can be fed into the crucibles through the openings 11 in the side of the furnace opposite the outlets 10. With this arrangement it will be seen that the metal can be drawn as desired from the crucibles and fed thereto without the necessity of removing the crucibles from the furnace or disturbing the fire. The openings 11 are provided with any suitable closure.

The roof or top of the furnace is preferably formed of transverse sections, which sections are of any suitable refractory substance, and held in position by cross-bars 17, (preferably coated on their exposed surfaces with a refractory substance in order to prevent their being destroyed by the heat.) The cross-bars 17 are arranged in pairs and spaced apart, so as to form openings between them in which the partitions 9 slide. These partitions are of refractory material and can be moved vertically between the cross-bars and in guide-grooves in the side walls of the furnace. The partitions can be easily raised and lowered by means of cords 15, which pass over pulleys 14, and are connected at one of their

ends to the partitions and supported at their other ends with weights 16. The purpose of these partitions is to divide the furnace into chambers, so that any crucible can be separated from the others and heated separately if desired, whereby when only one crucible is used the heat from the fire will not spread through the whole furnace, but will be confined to that crucible, thereby effecting a saving of heat and fuel. These partitions also enable me to smelt different kinds of metals, requiring different degrees of heat or separate currents of heat at the same time, as the partitions will prevent the heated products of combustion and gases rising from one fire in one chamber affecting the smelting of the metal in an adjoining chamber. From the several chambers the products of combustion and gases escape through outlets 20 into a flue-pipe 21, communicating with a smoke-stack 1. The grate is located directly under the crucibles, and its bars 6 are preferably arranged parallel with the crucibles and are supported by the longitudinally-arranged bars 8.

Access can be had to the fire-chamber 9 under each crucible through the openings provided with doors 12. Access can be had to the ash-pit 7 through openings 13.

Instead of hard fuel, gas, oil, or other liquid fuel can be used, burners 18 and pipes 19 being arranged under each crucible for this purpose.

The operation of my furnace is as follows: Fire is started under one or all of the crucibles, as occasion may require, and the partitions arranged as desired. The metal to be smelted is supplied through the openings 11, and when smelted may be drawn off through the outlets or pipes 10 by removing the plug therefrom. The progress of the smelting can be easily seen through the opening 11, and they also enable the metal to be conveniently worked in the crucibles should occasion demand it.

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

1. A crucible composed of an open-ended body portion and two end pieces separated from the body portion and forming a support therefor, substantially as described.

2. A crucible for smelting-furnaces, composed of the combined end pieces and supports, supported on the walls of the furnace, and the separate open-ended body portion having its ends supported in and closed by the said end pieces, substantially as shown and described.

3. A crucible for smelting-furnaces, composed of the opposite end pieces fixed in the walls of the furnace and formed with recesses in their inner faces, with the open-ended body portion having its ends fitted in the recesses in said end pieces and closed thereby, substantially as shown and described.

4. In a smelting-furnace, the combination of the fire-chamber, and ash-pit; a series of opposite recessed blocks in the side walls of the furnace and a series of removable transverse open-ended crucibles, supported in said blocks; each crucible being independently removable, substantially as described.

5. In a smelting-furnace, the combination of the fire-chamber, and ash-pit; a series of opposite recessed blocks in the side walls of the furnace and a series of removable transverse open-ended crucibles, supported in said blocks, each crucible being independently removable; with pairs of guide and roof-supporting bars in the roof of the furnace, located over the spaces between adjoining crucibles, the solid refractory partitions vertically and independently adjustable into or out of the fire-chamber, guided between said bars, and smoke-outlets beside each crucible, substantially as described.

6. In a smelting-furnace, the combination of the fire-chamber, a series or number of parallel horizontal crucibles supported therein, and a series of vertically-sliding partitions for separating any crucible from the others; with means for independently raising and lowering said partitions, and means for guiding the partitions provided in the roof of said furnace comprising a series of cross-bars arranged in pairs and having an opening between them in which said partitions slide, said cross-bars also forming a support for the roof of the furnace, substantially as described.

7. In a smelting-furnace, the combination of the fire-chamber, crucible-supports fixedly secured in the opposite walls thereof above the grate, and removable bodies or crucibles on said supports, with transverse vertically-movable partitions one located between each adjoining pair of crucibles, and means for independently adjusting said partitions so as to divide the fire-chamber into compartments or chambers each communicating with the common ash-pit and containing one or more crucibles; and a separate smoke-outlet between each adjoining pair of partitions, and between the end partitions and the end walls of the furnace, all substantially as described.

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Attest:
JOHN G. O'CONNELL,
F. N. TAYLOR.