

H. F. D. SCHWAHN.

APPARATUS FOR REDUCING, ALLOYING, REMELTING, AND MIXING METALS.

No. 522,675.

Patented July 10, 1894.

Fig. I.

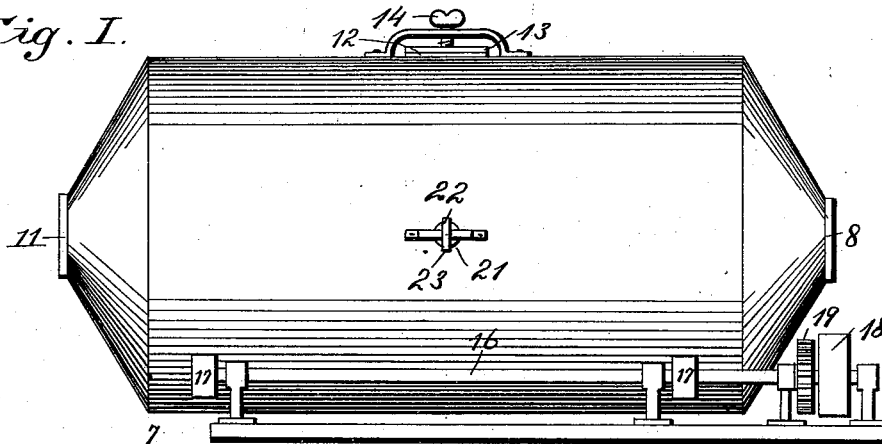


Fig. II.

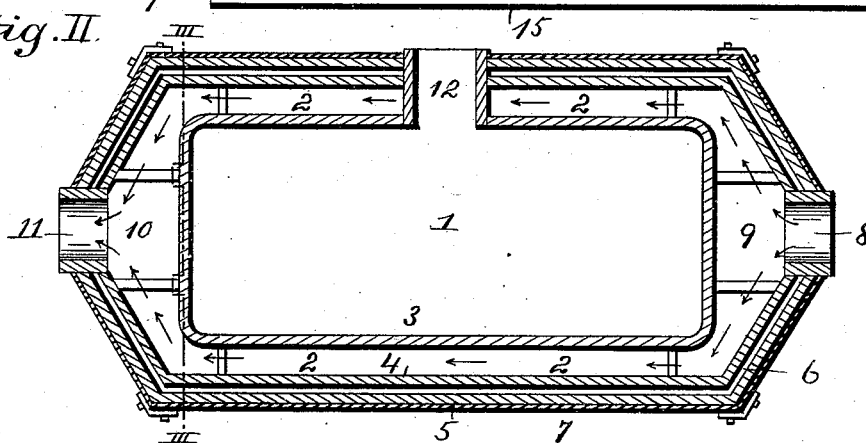


Fig. III.

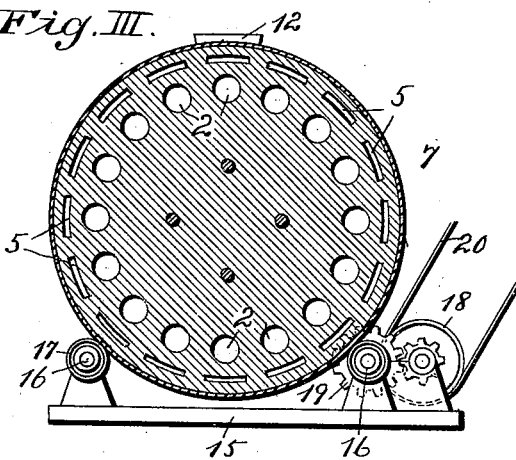
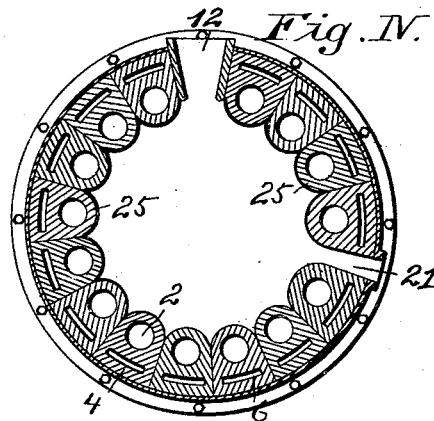


Fig. IV.



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Fig. V.

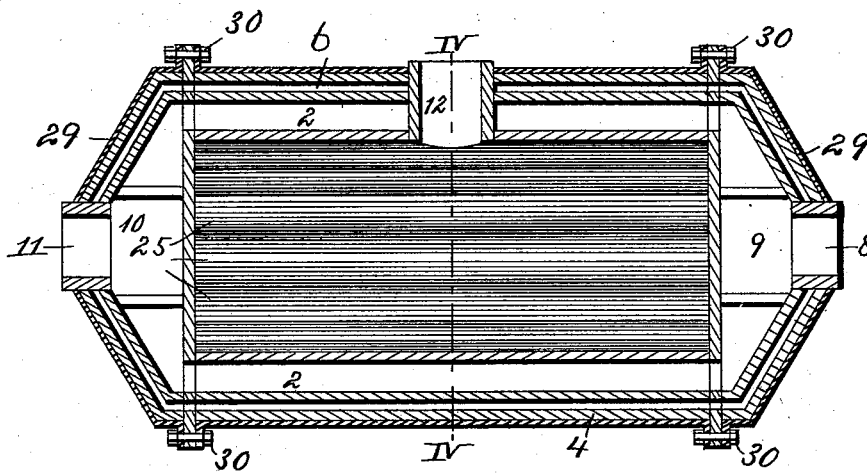


Fig. VI.

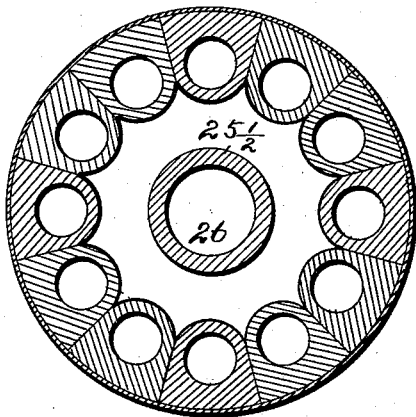
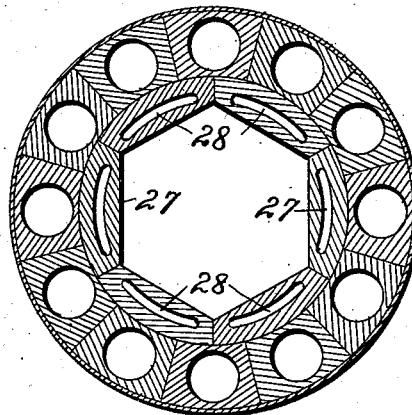


Fig. VII.



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UNITED STATES PATENT OFFICE.

HEINRICH F. D. SCHWAHN, OF KANSAS CITY, MISSOURI.

APPARATUS FOR REDUCING, ALLOYING, REMELTING, AND MIXING METALS.

SPECIFICATION forming part of Letters Patent No. 522,675, dated July 10, 1894.

Application filed March 21, 1893. Serial No. 467,029. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH F. D. SCHWAHN, a citizen of the United States, and a resident of Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Apparatus for Reducing, Alloying, Remelting, and Mixing Metals, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to a certain new and useful apparatus whereby metals can be reduced, alloyed, remelted and mixed within an air-tight receptacle or retort, said retort being capable of being set in motion, and heat applied thereto; and my invention consists in certain features of novelty hereinafter described and pointed out in the claims.

Figure I, represents a side elevation of my improved receptacle. Fig. II, represents a longitudinal, vertical section of the same. Fig. III, is a transverse section taken on line III, III, of Fig. II. Fig. IV, represents a modification, the same being a transverse section taken on line IV, IV of Fig. V. Fig. V, represents a longitudinal section showing my mixing receptacle in a modified form. Fig. VI, represents a transverse section of the receptacle in a modified form. Fig. VII, represents still another modification, the same being taken in transverse section.

Referring to the drawings: 1, represents a receptacle or retort surrounded by a series of auxiliary chambers or flues 2, to permit the passage of heat, said flues being located between the shell 3, of the retort and an annular shell 4, surrounding said retort.

5, represents an annular shell surrounding the shell 4, but having an intervening dead air space 6, to prevent radiation. Around the shell 5, is an outer shell 7, preferably made of iron. The retort and shells surrounding the same are preferably made oblong in longitudinal section and round in cross section.

8, represents an aperture leading through the outer shells into a space 9, for the passage of gases or heat, conducting the same to the flues 2, surrounding the retort, the heat atoms passing through said flues, as shown by arrows, passing into a space 10, at the opposite end of the receptacle, and out through an ap-

erture 11, connecting with a stack or flue (not shown).

The retort 1, is provided with an opening 12, through which the same may be filled or stocked, and then closed and made air-tight by a suitable door such for instance, as the plate 13, held in close contact with the walls of the aperture 12, by means of a screw 14.

After the metals to be reduced or alloyed, &c., are placed within the retort 1, the door 13, is sealed, and the receptacle is rotated, turning completely around, or partially so, as may be desired. The means of rotation are as follows: The receptacle is placed within a cradle formed of a base 15, supporting shafts 16, having rollers 17, thereon, said rollers supporting the receptacle.

18, represents a drive pulley connected with one of the shafts 16, by a suitable gearing 19, in order to drive said shaft and rotate said pulleys, and thus agitate the receptacle, turning the same completely over or oscillating it as before mentioned.

20, represents a drive belt for driving the pulley 18.

21, represents a tap-hole located in the side of the receptacle passing from the retort through the different shells in order that the metal after being mixed and alloyed, &c., may be tapped out at will, or for resulting gases to make their exit through the same, said tap-hole being suitably closed, normally by means of clay, for instance, held in place by a plate 22, and screw 23.

In Fig. IV, I have shown a modification in construction of the retort, the same being formed of a series of staves 24, preferably made of fire-clay, having the flues 2, and the dead air space 6, therein. The inner ends of said staves are made rounding, as shown at 25, so that when a series of them have been placed together they form a corrugated surface for the retort, said corrugated surface aiding in mixing the metals during the reduction and alloying of the same, as the receptacle is rotated.

In Fig. VI, I have shown still another modification in which the staves 24, are formed the same as in Fig. IV; but in said modification I have dispensed with the dead air space 6, and have inserted a central pipe 25½, forming a flue 26, in the center of the retort through

which a portion of the heat atoms pass, thus forming a greater radiating surface for the heat.

In Fig. VII, I have shown still another modification, in which the corrugated surfaces of the staves 24, are dispensed with, and a lining formed of a series of iron or steel segments 27, is placed within the fire-clay, the retort 1, being within the iron segments. In order to prevent deterioration of the iron or steel by the extraction of the carbon therefrom I provide a series of longitudinal chambers 28, within the said iron or steel segments in which carbon is placed before heat is applied to the retort and the said chambers are perfectly closed with clay.

In the modified form, as shown in Fig. V, the ends 29, of the receptacle are made in section and bolted to the body of the receptacle as shown at 30. I am thus able to remove said ends at will in order to gain access to the interior of the retort and shells surrounding the same.

My preferable method of heating the retort is by means of gas ignited as it passes through the aperture 8; but I do not confine myself to this means of heating the same.

I do not confine myself to the precise construction or arrangement of the device above described as it is manifest the same may be varied without changing the principle. For instance the flue passing through the crucible may be left out or the apparatus be built in another form and set in motion by other suitable means, or said retort, flues and spaces may be greatly varied in form and the supply of the heat to said flues differently arranged without changing the principle.

In reduction and alloying combined I preferably reduce a metal like aluminum first, and then add other metals to be alloyed thereto; but two or more may be reduced together if found to be desirable. In alloying I preferably bring all the metals first into a molten state and then run them into the already heated retort to be alloyed by mixing,

but if metals shall be alloyed with aluminum then I have the latter first remelted in my improved apparatus and then I add the said molten metals thereto to be alloyed. The retort is closed during the process as before described, and set in motion, and the heat continued to reduce or keep the mixed metals in a liquid state while the same are being mixed and alloyed by the rotation of the receptacle, the agitation being kept up until the metals are perfectly alloyed, which is determined by sampling at the tap-hole. The remelting is carried out by placing the metal into the retort and heating the same, which is in general done for the purification of the metals.

I claim as my invention—

1. In an apparatus for reducing, alloying, remelting and mixing metals a combination of a suitably constructed retort composed of suitable material, suitable flues surrounding the same for conveying heat to the said retort, and intervening spaces arranged in the manner and for the purposes as specified; the said combination suitably built into a metallic shell, the resultant apparatus provided with suitable means for charging, discharging, closing and sealing the said retort; with suitable means for introducing heat into the said flues, and with suitable means to set the said apparatus in motion, substantially as and for the purpose set forth.

2. In an apparatus for reducing, alloying, remelting and mixing metals a combination of a retort, flues and intervening spaces all arranged as specified; the said combination built into a metallic shell, with detachable ends connected with said shell; means for charging, discharging and closing the said retort; means for introducing heat into the said flues of the resultant apparatus, and means to set the same in motion, substantially as shown and for the purpose set forth.

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Witnesses:

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