Feb. 12, 1929. 1,701,722

T. LEWIN

METAL SWEATING FURNACE

Filed Aug. 1, 1927 2 Sheets-Sheet 1

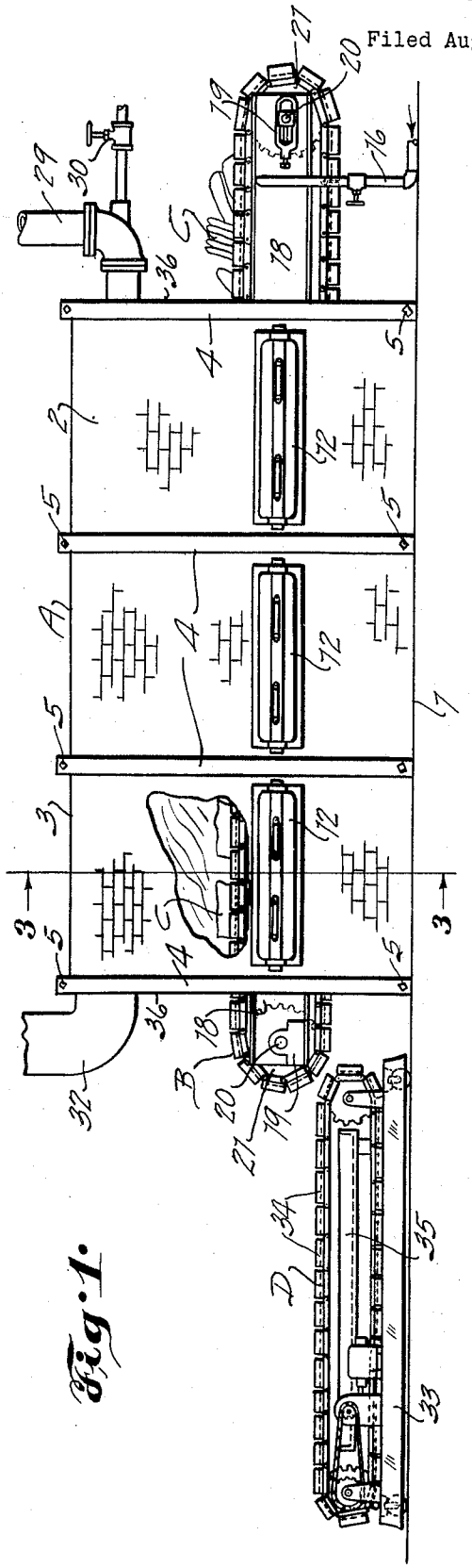


Fig. 1.

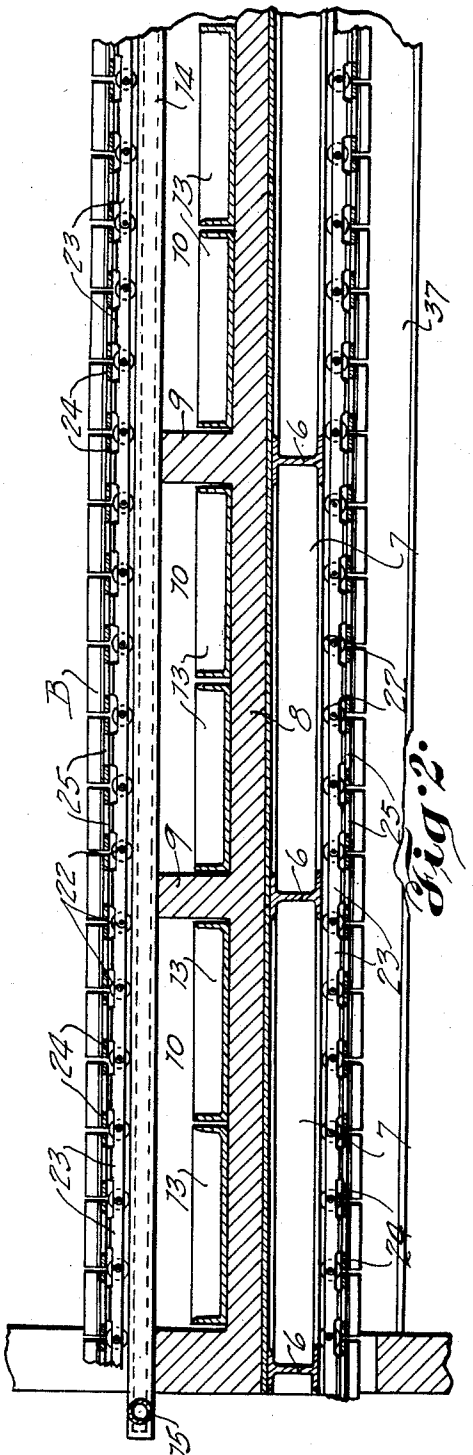


Fig. 2.

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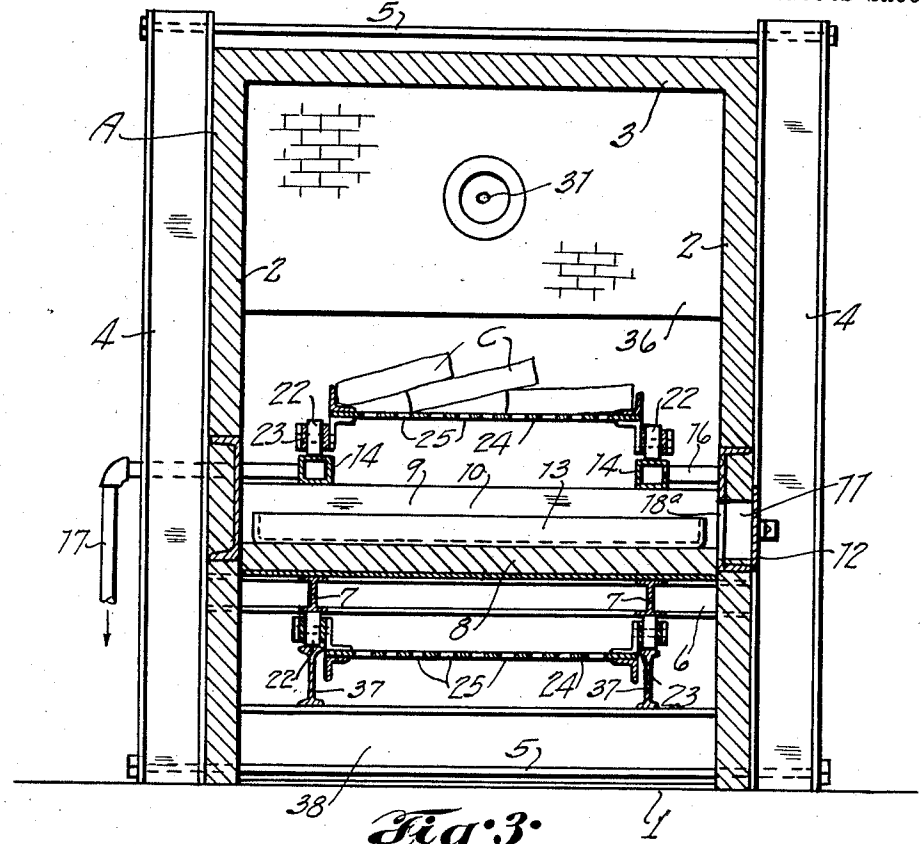


Fig. 3.

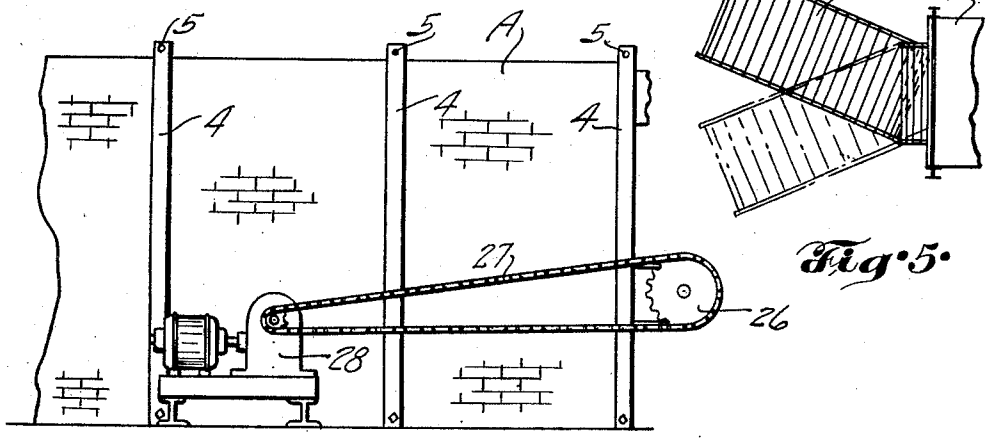


Fig. 4.

Fig. 5.

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Patented Feb. 12, 1929. 1,701,722

UNITED STATES PATENT OFFICE.

TANNIE LEWIN, OF UNIVERSITY CITY, MISSOURI.

METAL-SWEATING FURNACE.

Application filed August 1, 1927. Serial No. 209,806.

This invention relates generally to material-treating furnaces. More particularly, my invention relates to a certain new and useful improvement in furnaces of the type that are especially adapted for effecting by sweating the extraction of the solder or other readily fusible metal constituent of manufactured products and the like.

Used manufactured products, such as used receptacles and containers, automobile radiators, and the like, commonly known as scrap, comprise solder more or less largely as a constituent of their manufacture, and my invention has for its chief object the provision of a furnace of the type mentioned wherein and whereby especially the solder constituent of such material or scrap may be economically and efficiently extracted and substantially without waste recovered for commercial utilization.

And with the above and other objects and advantages in view, my invention resides in the novel features of form, construction, arrangement, and combination of parts hereinafter described and pointed out in the claims.

In the accompanying drawings:

Figure 1 is a side elevational, partly broken, view of a metal-sweating furnace embodying my invention;

Figure 2 is an enlarged fragmental longitudinal sectional view of the furnace;

Figure 3 is a transverse sectional view of the furnace on approximately the line 3—3, Figure 1;

Figure 4 is a reduced fragmental side elevational view of the furnace, looking upon the side thereof opposite to that of Figure 1; and

Figure 5 is a reduced plan view of the auxiliary conveyor of the furnace.

Referring now more in detail and by reference characters to the drawings, which illustrate a preferred embodiment of my invention, A designates the furnace-shell or casing, which is built or otherwise disposed on a foundation or other place of support 1, and which includes suitably spaced parallel side walls 2, 2, and a top wall 3, all constructed of fire-brick or other suitable refractory material and re-enforced and tied together by upstanding externally disposed metallic beams or braces 4, and cross-rods 5, as best seen in Figures 1 and 3.

The shell A at its opposite end walls 36 is preferably more or less of open structure, and disposed transversely within the shell A and imbedded at their opposite ends in its side walls 2, is a series of spaced I-beams 6, which, in turn, support spaced longitudinal series of beams 7, 7. Further, in turn, upon the beams 6 and 7, is supported a suitable refractory floor 8 and a plurality of stub-partitions 9, which provide or form within shell A a series or plurality of chambers 10, access into which may be conveniently had through respective openings 11 provided for the purpose in one of the shell side-walls 2, as best seen in Figure 3, the openings 11 being normally closed by suitable doors or gates 12. Chambers 10 function to receive and collect the solder sweat or extracted from the material being treated, as will shortly appear, the collected solder or other fused metal being drained or removed from such chambers in any suitable or convenient manner; preferably for this purpose pan-like receptacles 13 are disposed removably in the several chambers 10, as best seen in Figure 2.

Disposed lengthwise or longitudinally from end to end within the shell A and supported by the partitions 9, is a trackway comprising a pair of spaced parallel track-members 14, each of which members is of hollow preferably rectangular formation, the track-members 14 being closed at the ends of the furnace and connected together preferably at the rear end of shell A by a transversely disposed communicating tubular or pipe member 15.

Leading from a suitable source of cooling fluid supply under pressure and communicating with one of the track-members 14 preferably at the forward end of shell A, is a supply-pipe 16, and leading from the other track-member 14 also preferably at the forward end of shell A, is a discharge-pipe 17, the water or other cooling fluid so supplied to the one track-member 14 circulating through the trackway and functioning to constantly cool and maintain the trackway at more or less reduced even temperature to prevent buckling thereof under the more or less intense heat to which the trackway is subjected in the operation of the furnace.

Suitably supported on or imbedded in the side walls 2 of shell A and extending longitudinally through, and beyond the opposite

ends of, shell A, as best seen in Figure 1, are parallel channels 18, which provide supports at the ends of shell A for suitable bearings 19 for cross-shafts 20, 20, upon each of which are mounted in substantially the vertical planes of the track-members 14 suitable sprocket-wheels 21, 21, and disposed for movement relatively to and through shell A, is an endless carrier or conveyor B comprising suitable rollers 22 adapted for travel upon the track-members 14 and links 23 pivotally connecting the several rollers 22 and adapted for meshing engagement with the sprockets 21. Forming part of conveyer B and supported for movement in and through shell A by the pivotally or flexibly connected rollers 22, are plate-sections 24 preferably of oblong rectangular structure, which plates, by means of slots or other suitable openings, are each provided or formed preferably with a plurality of apertures, as at 25. The link-connected rollers 22 having meshing engagement with the sprockets 21, it will be evident that, as the sprockets 21 are rotatably driven, the conveyor B will be caused to travel on said trackway in a feeding direction rearwardly relatively to and through shell A, and then under or beneath the flooring 8 in a non-feeding direction forwardly through shell A, and for such purpose preferably the rear shaft 20 has fixed thereon a suitable gear 26 having driven chain-connection 27 with a motor or other prime mover 28. Preferably the bearings 19 of the forward shaft 20 are adapted for shifting adjustably relatively to shell A, so that play or slack in the conveyer B may be conveniently controlled and regulated, and to facilitate return travel of conveyer B under the flooring 8, shell A is preferably provided with a supplementary trackway provided by longitudinally disposed parallel series of suitable preferably I-beams 37 disposed on cross-beams 38 supported by the shell-walls 2.

Leading from a suitable source of fuel supply preferably liquid, oil or gas, into shell A through its forward end wall 36, is a feed-pipe 29 having a fuel feed control valve 30 and provided at its discharge-end within shell A with a suitable nozzle 31 adapted to direct the flame and heat of the ignited discharging fuel downwardly upon the conveyer B and rearwardly of shell A, a stack 32 being suitably provided in the rear end wall 36 of shell A, for carrying off the products of combustion.

Now, in use and operation, the conveyer B being caused to travel and the discharging fuel being ignited, the scrap or other material C to be treated for the extraction of its solder or other readily fusible constituent is placed upon the conveyor B at the forward end of shell A, as is illustrated in Figure 1. As the conveyer B moves rearwardly through the shell A, the material C is carried along through shell A and subjected to the heat created by the discharging fuel, with the result that its solder or other readily fusible constituent is melted or sweat off and flows through the openings or apertures 25 of the conveyer-plates 24 into the pans or other receptacles 13, which latter in due course may be removed from the shell A as described and the contained solder or other metal then recovered for utilization. It will, of course, be understood that the degree and kind of heat and the speed of travel of the conveyer B may be readily determined, regulated, and fixed to efficiently meet substantially all operating conditions. As shown in Figure 3, one of the channels 18 is suitably cut-away, as at 18^a, in alignment with the pan or other receptacle openings 11.

Frequently, some of the material being handled is of such shapes that the fused solder or other metal is prevented from flowing or running into the pans 13 during the feeding travel of conveyer B and is carried along with the material to the discharge end of shell A. To recover such portion of the fused metal and thereby obviate waste, I preferably provide at the rear or discharge end of shell A a second or auxiliary conveyer D comprising a shiftable preferably roller supported platform 33, mounted upon which is an endless series of link-connected and roller-supported slotted or otherwise perforated or apertured plates 34 substantially similar in structure and function to the plates 24 of the main conveyer B. The auxiliary conveyer D, in practice, is disposed in relation to the discharge-end of shell A and main conveyer B to receive thereon the material being handled and treated as it falls from conveyer B on being discharged from shell A, and also mounted on platform 33 to receive any fused metal flowing or falling from such material as it is received on and carried along with the plates 34, is a removable pan or other receptacle 35. Thus waste of metal fused in shell A is substantially entirely eliminated, and, the conveyer D being shiftable relatively to shell A, as illustrated in Figure 5, the treated material may be conveniently led from shell A in any desired direction for further handling.

Thus by my new furnace I am enabled with facility, speed, convenience, and little labor to handle and subject to proper heat material of the class mentioned and economically, efficiently, and substantially without waste extract and recover therefrom their solder or other easily fusible constituent.

It is to be also understood that changes in the form, construction, arrangement, and combination of the several parts of my furnace may be made and substituted for those

herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a metal-sweating furnace, a shell, a wall disposed horizontally within the shell, a trackway extending longitudinally of the shell and disposed over and spaced upwardly from said wall, a carrier comprising members adapted for travel on the trackway and apertured plates supported for movement relatively to the shell by said members for conveying through the shell the material being handled, means for subjecting the conveyed material to metal-sweating heat, and chambers upon said wall and beneath said trackway for receiving the fused metal flowing through said plates from the material being conveyed.

2. In a metal-sweating furnace, a shell, a wall disposed horizontally within and intermediate the top and bottom walls of the shell, a trackway extending longitudinally of the shell and disposed over and spaced upwardly from said wall, a second trackway also extending longitudinally of the shell and disposed under and spaced downwardly from said wall, an endless carrier for conveying through the shell the material being handled, said conveyor traveling upon said trackways over and under said wall and comprising a series of connected apertured plates, means for subjecting the conveyed material to heat, and chambers upon said wall and beneath the first trackway for receiving the fused metal flowing through said plates from the material being conveyed.

3. In a metal-sweating furnace, a shell, a wall disposed horizontally within and intermediate the top and bottom walls of the shell, a trackway extending longitudinally of the shell and disposed over and spaced upwardly from said wall, a second trackway also extending longitudinally of the shell and disposed under and spaced downwardly from said wall, an endless carrier for conveying through the shell the material being handled, said conveyor traveling upon said trackways over and under said wall and comprising a series of connected apertured plates, means for subjecting the conveyed material to heat, said heating means including a nozzle for discharging the heating medium downwardly upon the carrier and rearwardly of the shell, and chambers upon said wall and beneath the first trackway for receiving the fused metal flowing through said plates from the material being conveyed.

In testimony whereof, I have signed my name to this specification.

TANNIE LEWIN.