

July 28, 1953

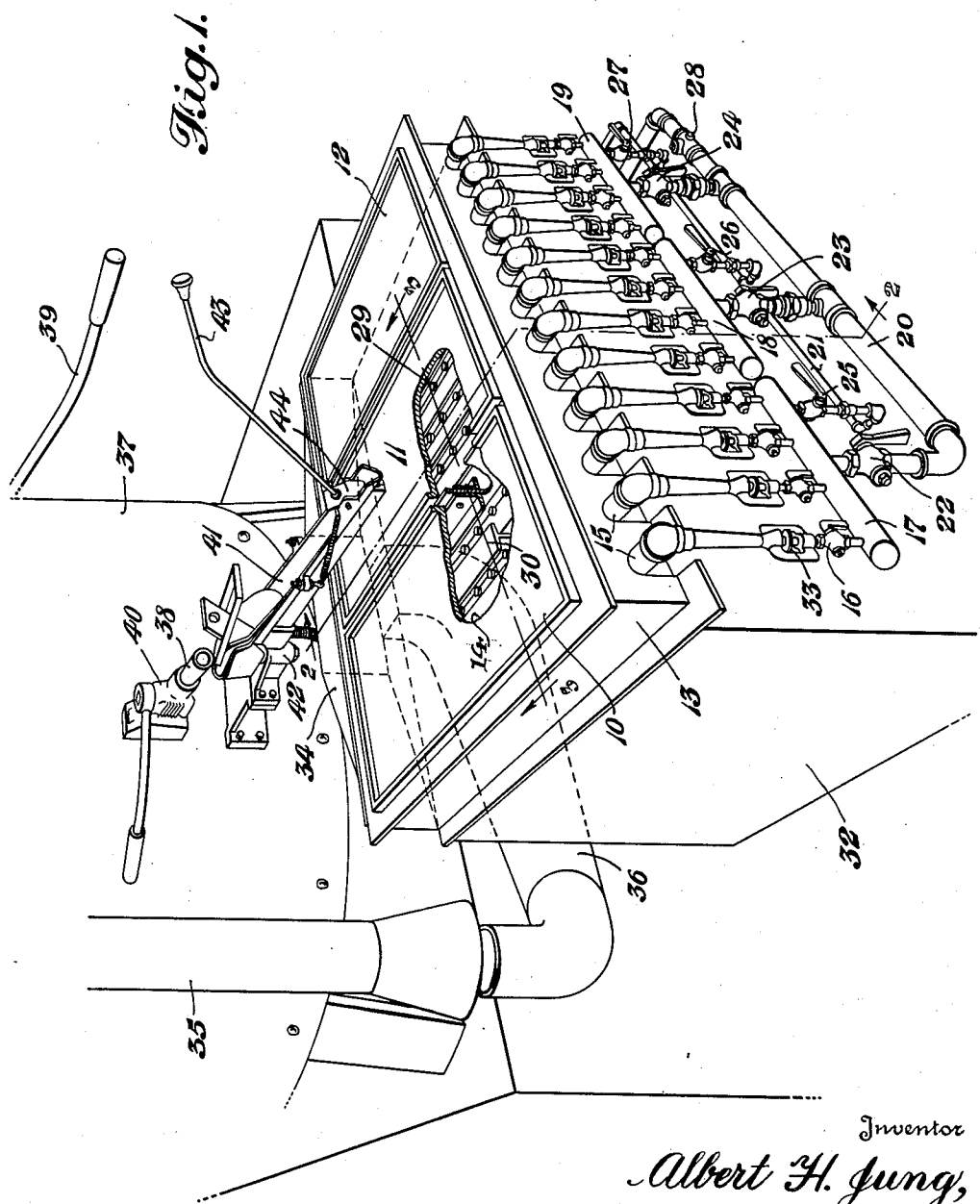
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2,646,601

HEATING AND COOLING BACKING PAN

Filed Sept. 14, 1949

3 Sheets-Sheet 1



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Fig. 2.

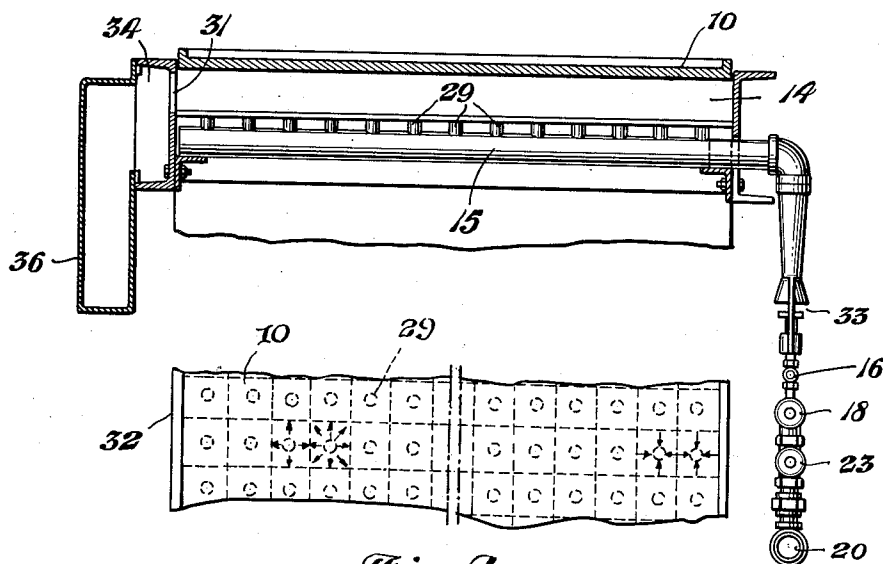


Fig. 4.

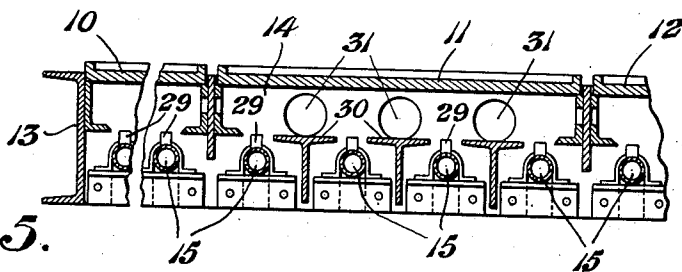
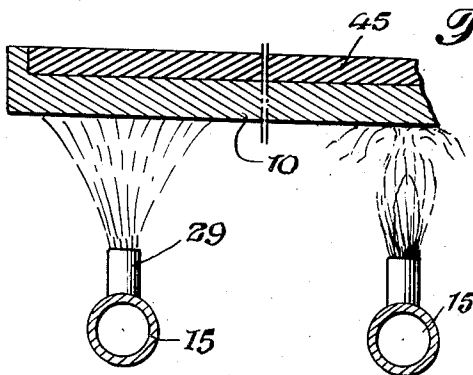


Fig. 5.

Fig. 3.



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Fig. 6.

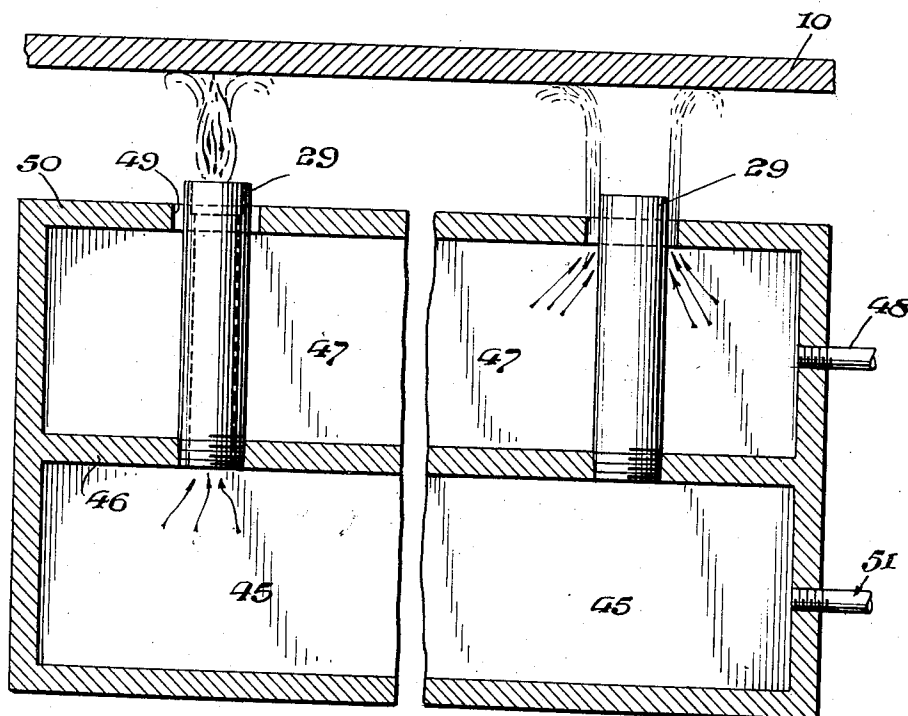


Fig. 7.

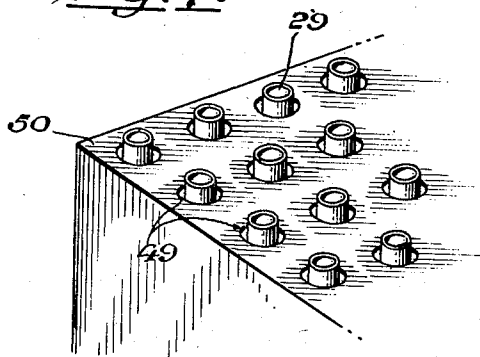
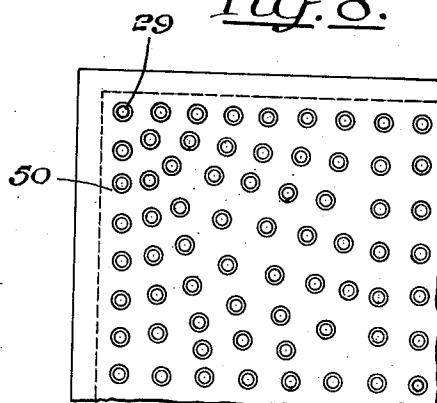


Fig. 8.



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HEATING AND COOLING BACKING PAN

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1 Claim. (Cl. 22—58)

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This invention relates to the backing of electrotypes and more particularly to the heating and cooling of backing pans used in such apparatus.

The apparatus comprising this invention is used for backing-up electrolytically produced printing faces used for printing type-matter, illustrations and the like. These faces, the result of the electrotype process, are metallic shells, copper being generally used, which on account of their limited thickness require strengthening to render them available for use in printing. This is done by what is called "backing-up" and consists of providing these shells with a back formed of a suitable alloy or so-called type metal. The usual procedure for forming this backing is by placing the metal shells face down upon the bottom of a flat pan, known as a backing pan, after which the metal to be used for backing them is poured into the pan in a molten condition. The pans are of a depth to permit them to receive sufficient of this metal to cause the formation of a backing of proper thickness, this thickness being approximately one-fourth of an inch more or less. The connection between the shell and this metal whereby it is backed, is substantially a soldered connection, formed in a manner analogous to a soldered joint wherein the backs of the shells are first tinned. The backed-up shells after being cooled are removed from the pans, planed off and leveled, trimmed around their edges and mounted upon wooden bases and are then ready for use in the printing press.

The subject of this invention concerns an apparatus used for backing-up electrotype shells in the manner outlined, with special provision for keeping the shrinkage to a uniform minimum. If the shell and molten backing are subjected to an uneven cooling, a shrinkage of the molten metal occurs in localized areas at the time the molten metal cools, and the shell following this shrinkage retracts from the surface of the backing pan and an uneven and imperfect printing surface is the result. To correct such defects in the surface of the printing plate, it is necessary for the plate to be removed from the backing pan and the surface carefully examined by a workman to locate the shrunken area. The plate is then turned over, with its face resting on and against the surface of a smooth, level steel plate, and with a hammer, blows are struck on the back of the plate until the surface of the plate has been forced outward and is in contact with the surface of the steel plate. This operation requires considerable skill and

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dexterity as too much hammering will cause the surface of the printing plate to become battered or flattened and if the blows are too heavy, individual spots corresponding to each blow will appear in the surface of the printing plate, which will result in heavy and light spots on the printed sheet reproduced from the plate.

The objects of the present invention are to obviate the necessity for this finishing operation of the printing surface of the plate, reduce the heat in the vicinity of the backing pans and permit a uniform heating and cooling of the backing pans to maintain shrinkage at a minimum.

The invention consists of an apparatus, constructed as hereinafter described and pointed out in the claim, and as illustrated in the accompanying two sheets of drawings, in which:

Fig. 1 shows a perspective view of the apparatus partly broken away;

Fig. 2 shows an enlarged cross-section of the apparatus along line 2—2 of Fig. 1, and

Fig. 3 shows an enlarged cross-section partly broken away of the apparatus along line 3—3 of Fig. 1.

Fig. 4 shows a fragmentary top plan view of the backing pan with arrows indicating a condition of heating and cooling.

Fig. 5 shows a fragmentary vertical section of two burner tips and the backing plate, somewhat enlarged.

Fig. 6 shows an enlarged cross-section of a fragment of a second embodiment of the apparatus, according to this invention.

Fig. 7 is a fragmentary view in perspective of the heating and cooling element shown in Fig. 6.

Fig. 8 is a somewhat diagrammatic fragmentary plan view of the heating and cooling element shown in Figs. 6 and 7.

Referring to the drawings, the backing pans 10, 11 and 12 are preferably made of metal and are supported on a frame 13, resting on a stand 32. A plurality of pipes 15 are uniformly laterally arranged in the combustion chamber 14 below the backing pans, each pipe extending from the front of the backing pans to the rear where the pipes are closed. At the front, the pipes are each bent downward, and are each provided with a valve 16 and an inspirator 33. The pipes 15 under the backing pans 10, 11 and 12 are each connected to a manifold 17, 18 and 19, respectively. Each of the manifolds 17, 18 and 19 has welded ends and is connected to both a pipe 20 connected to a heating gas supply and to a pipe 21 connected to a cooling fluid or air supply.

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Valves 22, 23 and 24 control the flow of fluid from pipe 20 to the manifolds 17, 18 and 19, respectively. Valves 25, 26 and 27 control the flow of fluid from pipe 21 to the manifolds 17, 18 and 19, respectively. A check valve 28 is provided in the pipe 20 to prevent back pressure of fluid from line 21 into the line 20 during the cooling process. Each pipe 15 extending beneath the backing pans is provided with a plurality of uniformly spaced screened burner tips 29.

A T-bar 30 extending parallel to the pipes 15 is provided between each pipe 15, with its flat side up. The fluids leaving the burner tips 29 flow rearwardly in the combustion chamber 14 above the T-bars 30 and below the backing pans to the rear wall of the frame 13 which is provided with a plurality of exhaust ports 31 leading to an exhaust manifold 34 at the rear of the unit. The combustion gases pass from the manifold 34 to an exhaust pipe 35 through a connection 36. The combustion chamber 14 beneath each backing pan is efficiently insulated.

Extending upwardly and behind the unit described above, is a furnace 37 in which the backing metal is melted and maintained at the desired temperature. The furnace forms no part of the instant invention and may generally comprise a melting pot and heating means of any type such as a gas burner, coal burner or electrical resistance element. The furnace is provided near the bottom with a spout 38 through which the molten metal flows. The flow through the spout is controlled by a primary valve control 39 and an auxiliary valve 40. The molten metal flows from the spout into a pivoted casting trough 41 from which it is directed to each of the backing pans as desired. The trough 41 is pivoted about pivot 42 and is arranged to be swung in a generally horizontal plane. Close to the discharge end of the trough 41 is a pivotally mounted gate 44 shaped to correspond to the cross section of the trough, so that it may be swung into open and closed position by raising or lowering the handle 43 to effect flow of molten metal or discontinue such flow.

The apparatus is used in the following manner: The shells may be produced by being deposited in a bath in any of the ways usually employed in electrotyping. Upon removal from the bath, the shells are released from the molds and thoroughly cleaned, preparatory to the casting operations. This cleaning may be effected by any of the methods or means well known in the electrotypers' art. The electrotype shells are placed face down on the backing pans and are covered in the usual way with a thin sheet of solder, consisting preferably of tin foil. The backs of the shells are first subjected to treatment by acid or soldering fluid. Sufficient heat is then applied to bring the tin to the melting point so as to cover the back of the shells. This application of heat is accomplished by burning gas in the uniformly spaced burner tips 29. The gas is supplied through pipe 20, valves 22, 23 and 24, manifolds 17, 18 and 19, valves 16, inspirators 33, pipes 15 and the burner tips 29. The valves 25, 26 and 27 are closed during the period of heating up the backing pans. As soon as the foil has melted, the burners are turned off by closing the valves 22, 23 and 24. The molten backing metal 45 is then poured into the backing pans. As soon as the metal is cast, valves 25, 26 and 27 are opened and the cooling means, such as compressed air, is forced through the same set of burner ports which now act as air

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jets (see Fig. 5). The flow of air is from pipe 21, through valves 25, 26 and 27, manifolds 17, 18 and 19, valves 16, inspirators 33, pipes 15 and the burner tips 29.

The result of cooling the plate directly on the same spots where the jets of flame impinged during heating allows for localized contraction of the plate in each area that was previously heated, producing a plate with a minimum of uniform overall shrinkage.

The arrangement described permits of uniform heating and uniform cooling, with instant change-over from heating to cooling. Due to the balanced expansion and contraction in the course of heating and cooling, this arrangement casts relatively non-shrinking plates and also increases the life of the backing pans. The apparatus is so insulated and enclosed that practically no heat or fumes pass beyond their enclosure, thus resulting in a substantial saving of fuel and also affording greatly improved working conditions for the operators.

As shown by the arrows in the left hand fragment of Figure 4, during the heating cycle each small burner area will expand evenly, giving a uniform over-all expansion to the plate. During the cooling cycle, shown by the arrows to the right in Figure 4, the shrinkage of each small area will be offset by that of adjacent areas, and result in a negligible amount of casting distortion. Moreover, the casting will freeze first along its edges, thereby reducing shrinkage.

A second embodiment of a backing pan heating and cooling device is shown in Figures 6, 7, and 8. In this form of the invention the gas is supplied to the burners 29 from a general gas chamber 45 fed through the port 51. The burners 29 are threaded into the upper wall 46 of the gas chamber 45, as shown in Figure 6. A general air chamber 47 is provided immediately above the gas chamber 45. Air is fed into the air chamber 47 through the port 48. The amount of air entering the chamber 47 may be controlled by an air solenoid valve (not shown). Openings 49 are provided in the upper wall 50 of the air chamber 47. These openings 49 are of sufficient diameter to allow the burners 29 to extend therethrough with a suitable clearance between the burners 29 and the periphery of the said openings 49, as shown in Figures 6 and 7, to allow for the passage of air to the underside of the pans 10.

The second embodiment of the present invention enables air and gas to be used simultaneously or alternately, as desired. The air supply is thus not limited by the size of the burner openings, so that cooling may be accelerated. Moreover, the cooling air may be used during the heating cycle of operation to supply secondary air to the burners 29 when they are lighted.

Since the frames 13 of the backing pans 10 absorb heat rapidly, cooling is accelerated at the corners of the pans. The use of a single general gas chamber 45 permits of a location of the burners 29 and air jets in the most advantageous pattern, such as is shown in Figure 7, instead of the arrangement made necessary by the parallel pipes disclosed above, thereby equalizing the heating and cooling over the entire pan.

While the use of gas burners for heating the backing pans has been described herein, it is within the purview of this invention to use other heating means, such as electrical induction,

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etc., without departing from the spirit of the invention.

I claim:

An apparatus for backing electro-type shells comprising, a backing pan, a source of heating fluid, heat generating means connected to the said heating fluid source, consisting of a general gas chamber and a plurality of gas burners carried by the upper wall of the gas chamber and communicating with the interior of said gas chambers, said burners extending upwardly from the upper wall and disposed so as to apply the heat coming therefrom to specific areas of the backing pan, a source of cooling fluid, cooling means connected to said cooling fluid source comprising, an air chamber overlying the gas chamber, said air chamber having an upper plate provided with a plurality of openings therein, each of said openings being of sufficient size and disposition to allow the burners to extend therethrough with a suitable clearance between the wall of the opening and the said burner to allow the cooling fluid to be directed at the specific areas of the backing pans

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toward which the burners are disposed, and controls associated with the source of heating and cooling fluid to regulate their passage into the apparatus.

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References Cited in the file of this patent

UNITED STATES PATENTS

	Number	Name	Date
10	397,593	Hassman	Feb. 12, 1889
	821,845	Albert	May 29, 1906
	1,073,105	Dunton	Sept. 16, 1913
	1,125,671	Dunton	Jan. 19, 1915
15	1,164,078	Dunton	Dec. 14, 1915
	1,199,429	Roth	Sept. 26, 1916
	1,219,289	Gounley	Mar. 13, 1917
	2,177,168	Van Bolt	Oct. 24, 1939
20	2,182,114	Bungay	Dec. 5, 1939

FOREIGN PATENTS

	Number	Country	Date
	445,425	Great Britain	Apr. 8, 1936