G. E. DUNTON.

METHOD OF BACKING UP ELECTROTYPE SHELLS IN THE MANUFACTURE OF ELECTROTYPE PRINTING PLATES.

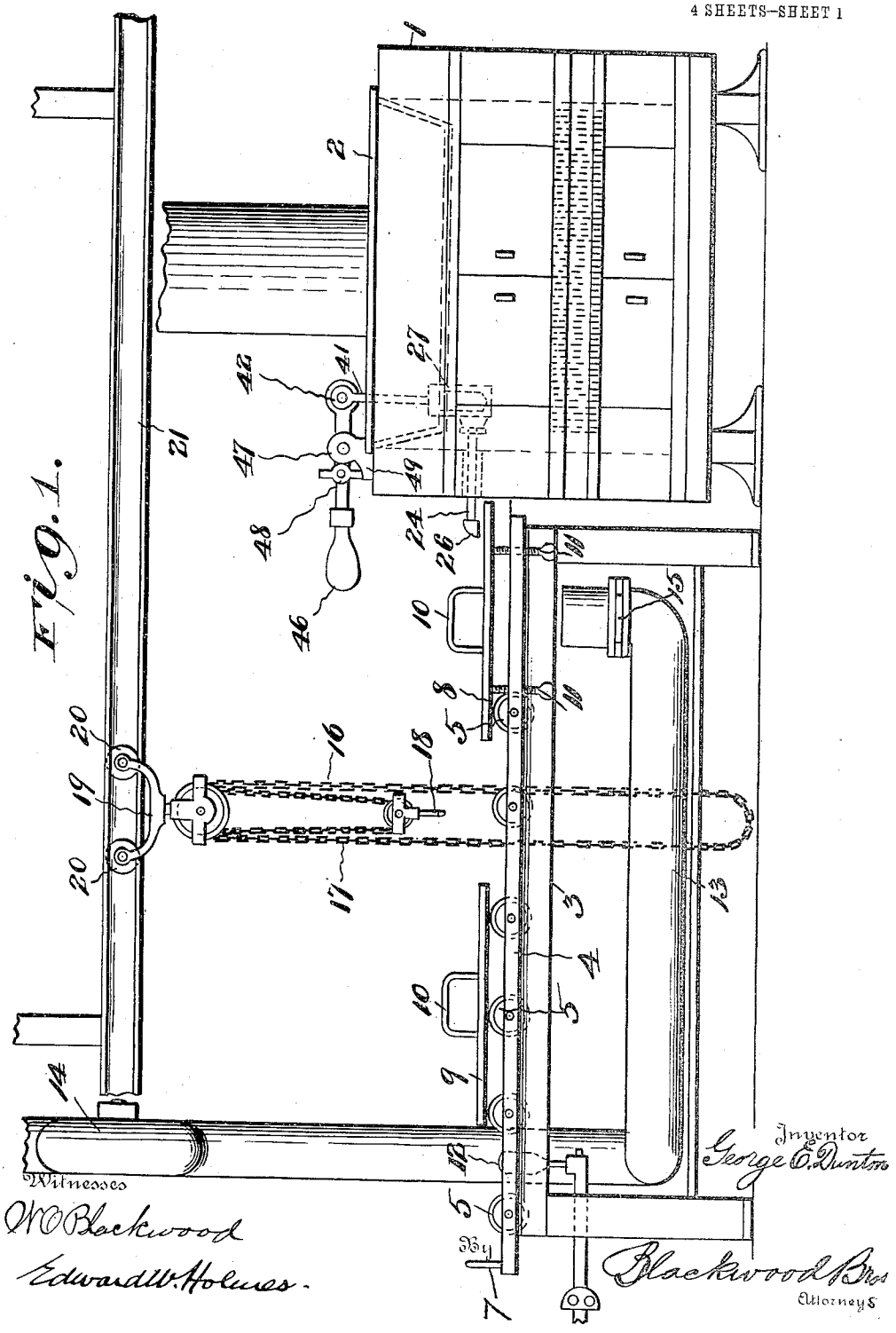
APPLICATION FILED JAN. 2, 1914.

1,125,671.

Patented Jan. 19, 1915.

4 SHEETS—SHEET 1

Fig. 1.



Witnesses

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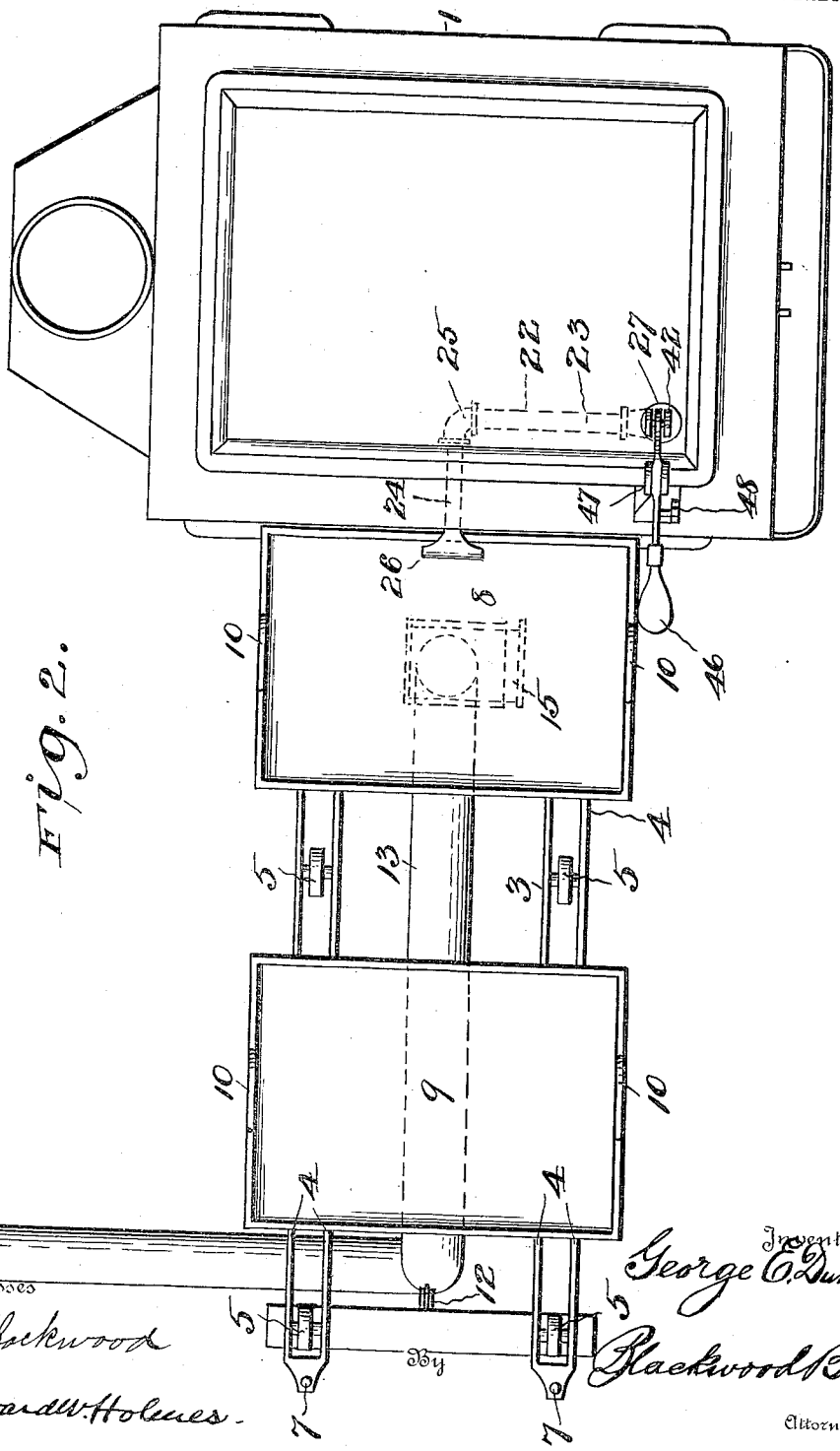


Fig. 2.

Witnesses

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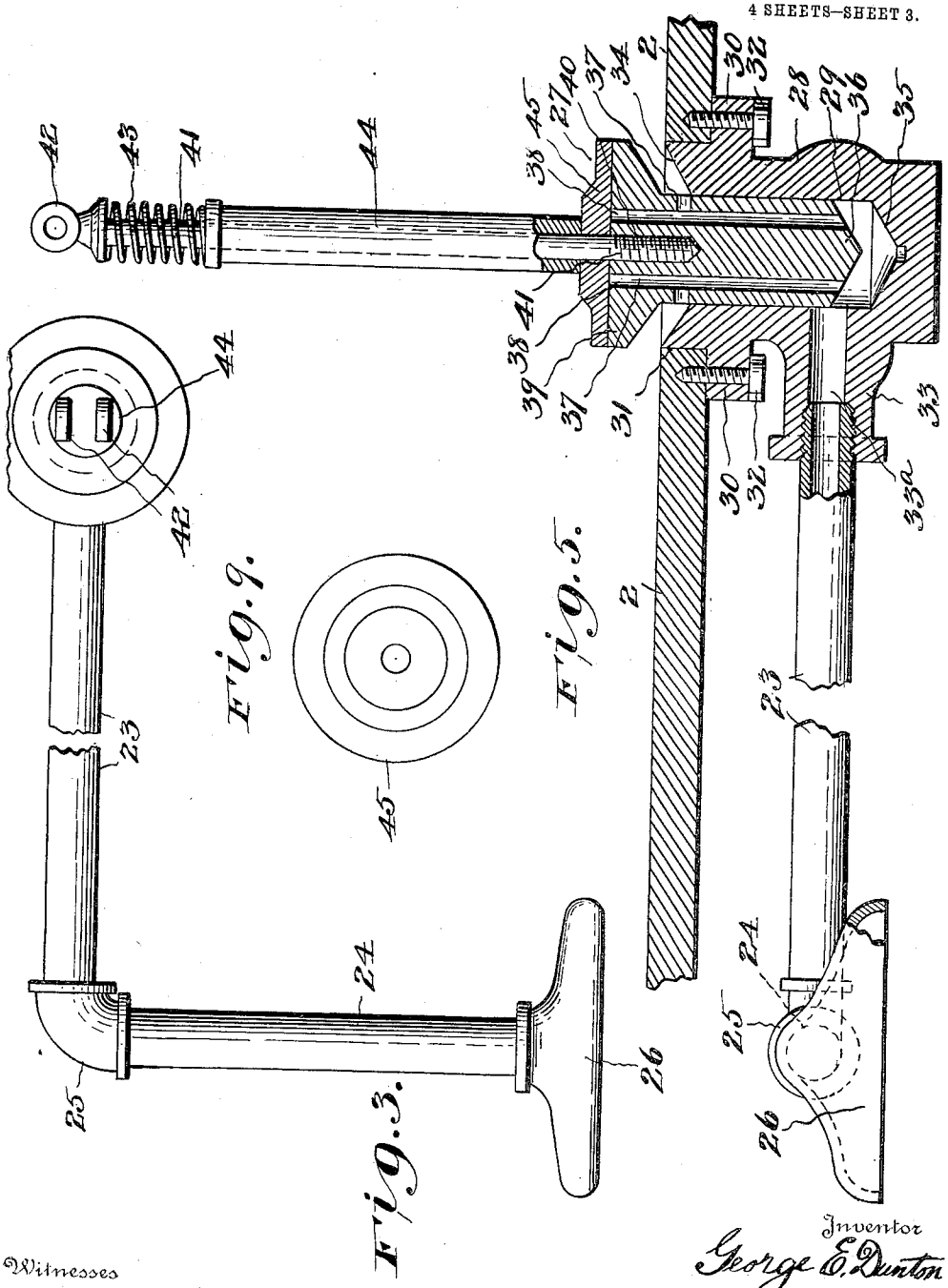


Fig. 4.

Fig. 5.

Fig. 3.

Witnesses

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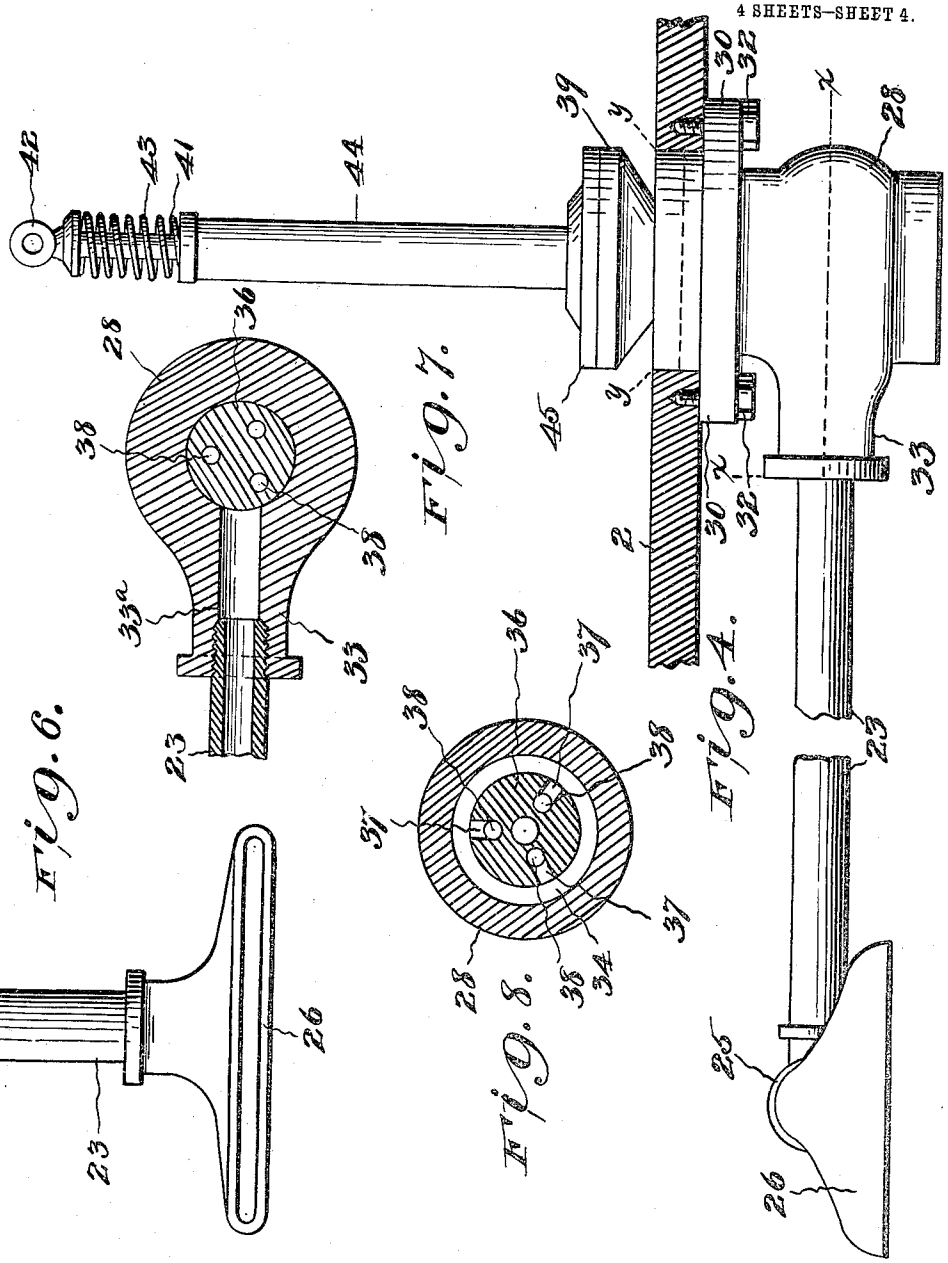


Fig. 1.

Fig. 4.

Fig. 6.

Fig. 8.

Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE E. DUNTON, OF NEW YORK, N. Y.

METHOD OF BACKING UP ELECTROTYPE-SHELLS IN THE MANUFACTURE OF ELECTROTYPE PRINTING-PLATES.

1,125,671. Specification of Letters Patent. Patented Jan. 19, 1915.

Application filed January 2, 1914. Serial No. 810,021.

To all whom it may concern:

Be it known that I, GEORGE E. DUNTON, residing at New York, in the county of New York and State of New York, a citizen of the United States, have invented a certain new and useful Method of Backing Up Electrotype-Shells in the Manufacture of Electrotype Printing-Plates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to an improved method of backing up electrotype shells in the manufacture of electrotype printing plates.

Ever since the conception of the possibility of producing printing plates by the electrotyping process the method of backing up the shells has been the same, namely, the dipping of the melted backing metal, a composition consisting of a combination of lead, tin and antimony, out of the melting pot or kettle with a hand ladle and pouring said melted backing metal over the prepared back of the electrotype shell from this ladle. To the best of my knowledge no attempt has ever been made to improve this old and time honored custom which produced very unsatisfactory results and was very severe on the operator doing the work because it meant that the operator must stand close to the side of the furnace carrying the melting pot or kettle and dip out the molten metal backing with a hand ladle and pour it over the prepared shell contained in the backing pan which was placed on a stand directly beside the furnace.

The above method is unsatisfactory in that the results obtained are not always uniform or equal, and sometimes when the operator becomes careless, tired or overheated he will throw the melted metal down on the upturned back surface of the shell, which results in spots being made, directly beneath the point where the metal splashed, resulting in that portion of the shell becoming overheated, compared with the balance of the surface area of the shell, and the unequal contraction resulting from the cooling of the mass results in shrinkages in the backed up plate which must be pounded out in the subsequent straightening of the surface of the plate which detracts from the printing qualities of the finished printing plate.

My invention therefore has for its object to dispense with the old method of backing up an electrotype shell, which consisted in dipping the molten metal backing from the melting pot or kettle and pouring it over the back of the electrotype shell in the backing pan by means of a hand ladle, and performing the operation by a new and more convenient manner or method which consists in transferring the molten metal backing from the melting pot or kettle to the backing pan, and causing it to be distributed over the back of the electrotype shell therein, through a communicating pipe, duct or other means, preferably, by gravity.

It further has for its object to provide a method for controlling the flow of the molten metal backing through the pipe or duct or other means which forms the communication between the melting pot or kettle and the backing pan.

It further has for its object to provide a method for transferring the molten metal backing from the melting pot or kettle to the back of the electrotype shell in the backing pan, in such a manner that the molten metal backing will be evenly and uniformly distributed over the entire surface of the back of the shell.

It further has for its object to provide a method for melting the solder, or other binder placed on the electrotype shell before applying the molten metal backing, transferring the molten metal backing from the melting pot or kettle to the back of the electrotype shell in the backing pan and for cooling the shell and backing.

It still further has for its object to provide a method for controlling the flow of molten metal backing from the melting pot or kettle to the backing pan and for compensating for any excessive amount or overflow of the molten metal backing in said controlling means.

By my method the backing metal is placed in the melting pot of a furnace and heated until it is in a molten state, an electrotype shell is placed in a suitable backing pan, which is situated in a lower horizontal plane than the melting pot or kettle, and both are

heated to a sufficient degree, a suitable binder is applied to the back of the electrotype shell by melting the binder, fusing it to the back of the shell or in any other suitable manner, the molten metal backing in the melting pot or kettle is then transferred to the back of the electrotype shell in the backing pan by causing said molten metal backing to flow, by gravity, through a suitable communicating pipe or duct from the melting pot or kettle to the backing pan and be evenly and uniformly distributed over the entire surface of the back of the electrotype shell, a valve or other suitable controlling means, being employed to control the flow of the molten metal backing through the pipe or duct, and means being also provided to compensate for any excessive amount or overflow of the molten metal backing in the valve.

Referring to the drawings, which illustrate one form of apparatus for carrying out or performing my method:—Figure 1 is a side view in elevation. Fig. 2 a top plan view. Figs. 3 and 4 detail top plan and side elevations, respectively, of the communicating pipe or duct, controlling valve and nozzle. Fig. 5 a detail vertical sectional view, partly in elevation, of the parts shown in Fig. 3. Fig. 6 a bottom plan view of the nozzle. Fig. 7 a horizontal sectional view of the valve taken on the line *x*—*x* of Fig. 4. Fig. 8 a similar view to Fig. 7 taken on the line *y*—*y* of Fig. 4. Fig. 9 a top plan view of the safety valve or plate.

In the drawings, in which similar reference characters denote similar parts throughout the several views, 1 represents the furnace, used to melt the metal backing for the electrotype shell, 2 the melting pot or kettle in which the metal to form the backing for the shell is placed and melted, 3 the backing pan stand having a pair of side bars 4, on each side, a series of rollers 5 mounted between the side bars, on each side, and 7 being lugs or pins projecting upwardly from the outer ends of the side bars 4 and serving as stops to prevent the backing pans being pushed off the end of the backing stand.

Backing pans 8 and 9 are provided, each having bails or handles 10, the backing pan 8 being shown as resting on leveling screws 11 by which it is adjusted to a perfectly level position. The backing pan 9 is shown as resting on rollers 5 ready to be moved over the Bunsen burner 12 for the purpose of melting the solder binder on the back of the electrotype shell before applying the molten metal backing. After the molten metal backing is supplied to the backing pans, and they are resting on the leveling screws, it is cooled by means of cool air supplied to the underside of the backing pan by means of a pipe 13, which is connected to a suitable blower 14, or other similar device, and 15 is a gate or valve controlling the feed of cold air.

The backing pans are lifted in and out of the melting pot or kettle, preferably, by means of a block and fall device 16, having a chain 17 and hook 18, and mounted on a carriage 19 which is provided with wheels 20 designed to travel on a beam 21.

The molten metal backing is transferred from the melting pot or kettle to the backing pan by means of an angular pipe or duct 22 made in two sections 23 and 24 joined or connected by means of an elbow 25. The outer end of the section 24 is provided with a downwardly extending nozzle or spreader 26 for the purpose of modifying or breaking the force of the discharge of the molten metal backing into the backing pan.

The inner end of the section 23, which is mounted in the melting pot or kettle, is connected to a valve 27 which controls the discharge of the molten metal backing from the melting pot or kettle through the angle pipe and nozzle to the backing pan.

The valve comprises a casing 28 having a central bore 29, ears or lugs 30, by which it is secured in a hole 31 in the bottom of the melting pot or kettle by screw bolts 32, a boss 33 having a hole 33ª therethrough with which the section 23 connects and communicates, a beveled valve seat 34, a downwardly beveled bottom 35, and a plug 36 having radially disposed horizontal inlet ports 37 which communicate with vertical ports 38, extending from end to end of the valve plug, and said valve having a head 39 with a beveled under surface designed to seat on the valve seat 34.

A vertical hole 40 is provided in the head 39 of the valve plug in which a screwthreaded stem 41 is mounted having perforated ears 42 at its upper end, spiral spring 43, a sleeve 44 and a safety valve or plate 45 loosely mounted on the stem 41 for the purpose of allowing the escape or return through the vertical ports 38 of the excess molten metal backing remaining in the valve to the melting pot or kettle. As the valve plug, and said valve having a head sure of the excess molten metal remaining in the vertical ports 38 of the valve plug will cause the safety overflow valve or plate to move upward and uncover the vertical ports 38, but just as soon as this pressure is released the spiral spring will cause the said valve to close.

The valve plug is operated by means of a hand lever 46 pivotally mounted on a bracket 47 on the top of the furnace, the inner end of said hand lever being pivoted to the ears on the upper end of the stem 41 and 48 is a locking device, pivoted to the hand lever, which, when in use, contacts or

impinges against the base 49 of the bracket 47 and thereby locks the valve plug in its closed position.

In using the apparatus, I close the controlling valve 27 by moving the valve plug 36 downward, by means of the hand lever 46, until it contacts and is tightly seated on the valve seat 34 of the valve casing, the backing metal is then placed in the melting pot or kettle. I then make a fire in the furnace and after seeing that the inner surfaces of the backing pans are clean and smooth and the leveling screws are adjusted to their proper positions and locked I produce the electrotype shell in the usual manner by the deposition of metal electrolytically upon the surface of the mold made in wax and duly prepared with reference to having its surface made conductive and having deposited a shell, to the desired thickness, upon the surface of the wax mold the shell is carefully removed by pouring boiling water over its surface with the mold resting in an inclined position in a suitable receptacle, the water being poured from one corner of the mold carefully along the top of the shell, gradually downward, until the heat of the water is transmitted throughout the metal of the shell, which causes the wax of the mold to melt thus releasing the metal shell when the shell may be drawn away from the wax mold and the mold removed to a suitable place where the wax is stripped from the pan and remelted for future use. The shell is then thoroughly rinsed in a boiling solution of caustic soda or potash lye to remove the adherent wax, then thoroughly rinsed in hot water to remove all the lye and then plunged into a pickle of dilute sulfuric acid (in water) where it is allowed to remain until ready for backing. I then prepare a solution of zinc chlorid, by placing zinc spelter in hydrochloric acid until the hydrogen has been replaced by the zinc by the following reaction:—

$$2HCl+Zn=ZnCl_2+H_2$$

and as soon as the ebulition has practically subsided take one part of this clear solution of chlorid of zinc and add to it three parts of water to which has been added a few drops of ammonia water to prevent the zinc chlorid deliquescing and depositing in slaggy patches on the back of the shell, when heat is applied for melting the binder of solder foil to the back of the shell. With this solution prepared I thoroughly rinse the shell in running water, to remove all traces of acid pickle, and flow the back, or bright side of the shell, with this ammoniated solution of zinc chlorid which acts as a flux in joining the solder foil binder to the metallic shell, then drain off all the chlorid solution by holding the shell in a perpendicular position over the receptacle containing the solution, lay the shell flat upon its face and cover its exposed back with thin sheets of solder foil. The backing pan having been previously heated by being floated upon the surface of the molten metal backing in the melting pot or kettle of the furnace the shell is carefully laid upon the surface of the backing pan and the solder foil allowed to melt over the back of the shell until it covers the entire surface of the same and enters all the indentures and interstices in the back of the shell or if desired the solder may be melted over the back of the shell by heating the backing pan over a Bunsen or other burner. I then remove the backing pan containing the shell, by lifting the pan by a block and fall, or other suitable means, from the melting pot or kettle and swing the pan over and deposit it upon the tops of the leveling screws on the backing stand directly under the nozzle or spreader of the pipe or duct leading from the melting pot or kettle, then with everything in readiness I carefully raise the hand lever and allow the molten metal backing to flow from the melting pot or kettle, through the valve, angle pipe and nozzle or spreader onto the edge of the backing pan in a small stream and when sufficient molten metal has been supplied to the backing pan to cover the shell the valve is closed by pressing down on the hand lever, then with long thin sticks held in both hands the edges of the metal covered shell are carfully rubbed down until there is no space showing between the edges thereof and the pan, which is termed "sealing the shell to the backing pan", then I again lift the valve by raising the hand lever, opening the pipe or duct to its full capacity, and allow the molten metal backing to again flow from the melting pot or kettle, through the valve, angle pipe or duct and out of the nozzle or spreader into the backing pan until the molten metal has attained the required level in the backing pan and has covered the shell to the desired depth, by which the thickness of the plate is determined, the valve is again closed by pressing down upon the hand lever until the valve plug is seated upon its seat and the supply of molten metal backing is shut off. The gate in the air pipe is then opened and a blast of cool air is allowed to act on the bottom of the backing pan until such time as the molten metal backing becomes set or sufficiently rigid or hard to allow the backing pan to be lifted and placed upon the rollers when it is pushed away from the furnace and allowed to stand until it is sufficiently cooled to allow the removal of the plate from the pan. The plate is then removed to the cleaners' bench where its is washed in kerosene oil, or some other detergent, and in heated lye, rinsed in water and dried in

sawdust when it is taken to the circular saw table where it is cut up and goes through the customary operations of finishing common to the electrotyping art. In the mean time the backing pan has been washed in a weak solution of lye, dried and carefully brushed off when it is ready to have the entire operation repeated.

The backing pan is preferably situated in a lower horizontal level than the melting pot or kettle for the purpose of allowing the molten metal backing to flow from the melting pot or kettle into the backing pan by gravity.

What I claim is:—

1. The method of backing up electrotype shells in the manufacture of electrotype printing plates, consisting in placing backing metal in a receptacle and melting it, placing an electrotype shell in a backing pan, heating both shell and pan and allowing the molten metal backing to flow by gravity from the heated receptacle onto the back of the electrotype shell in the heated backing pan.

2. The method of backing up electrotype shells in the manufacture of electrotype printing plates, consisting in placing backing metal in a melting pot and melting it, placing an electrotype shell in a backing pan and allowing the molten metal backing to flow by gravity from the melting pot onto the back of the electrotype shell in the backing pan.

3. The method of backing up electrotype shells in the manufacture of electrotype printing plates, consisting in placing backing metal in a melting pot and melting it, placing an electrotype shell in a backing pan and heating it, causing the molten metal backing to flow from the melting pot onto the electrotype shell in the backing pan and controlling the flow of molten metal backing onto the electrotype shell.

4. The method of backing up electrotype shells in the manufacture of electrotype printing plates, consisting in placing backing metal in a melting pot and melting it, placing an electrotype shell in a backing pan and heating it, delivering said molten metal backing onto the back of the electrotype shell in a downward direction and spreading said molten metal backing, as it is delivered to the electrotype shell, thereby modifying its force.

5. The method of backing up electrotype shells in the manufacture of electrotype printing plates, consisting in causing the molten metal backing, which has been melted in a melting pot, to flow by gravity from said melting pot onto an electrotype shell, which has been placed in a backing pan situated in a lower horizontal plane than the melting pot, and controlling the flow of molten metal backing.

6. The method of backing up electrotype shells in the manufacture of electrotype printing plates, consisting in placing the backing metal in a melting pot and melting it, placing an electrotype shell in a backing pan, heating both shell and pan, melting a binder over the back of the shell and allowing the molten metal backing to flow by gravity from the receptacle onto the back of the electrotype shell in the backing pan.

In testimony whereof I affix my signature in the presence of two witnesses.

GEORGE E. DUNTON.

Witnesses:
NETTIE F. FAIRCHILD,
HENRY W. BECKER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."