Oct. 27, 1925. 1,559,231

A. B. ECKERSALL

APPARATUS AND METHOD FOR CASTING ELECTROTYPES

Filed Aug. 23, 1924 4 Sheets-Sheet 1

Fig. 1

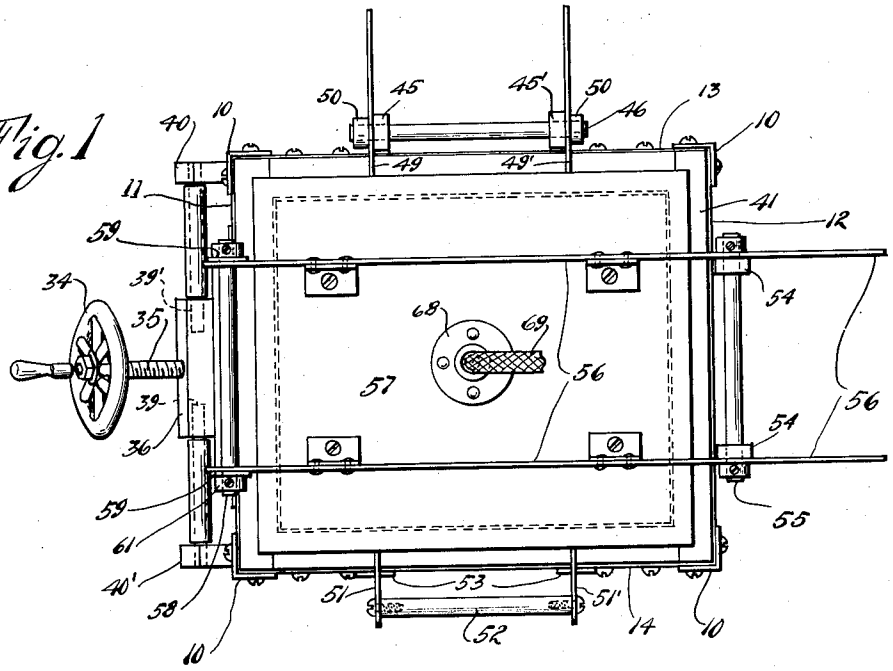
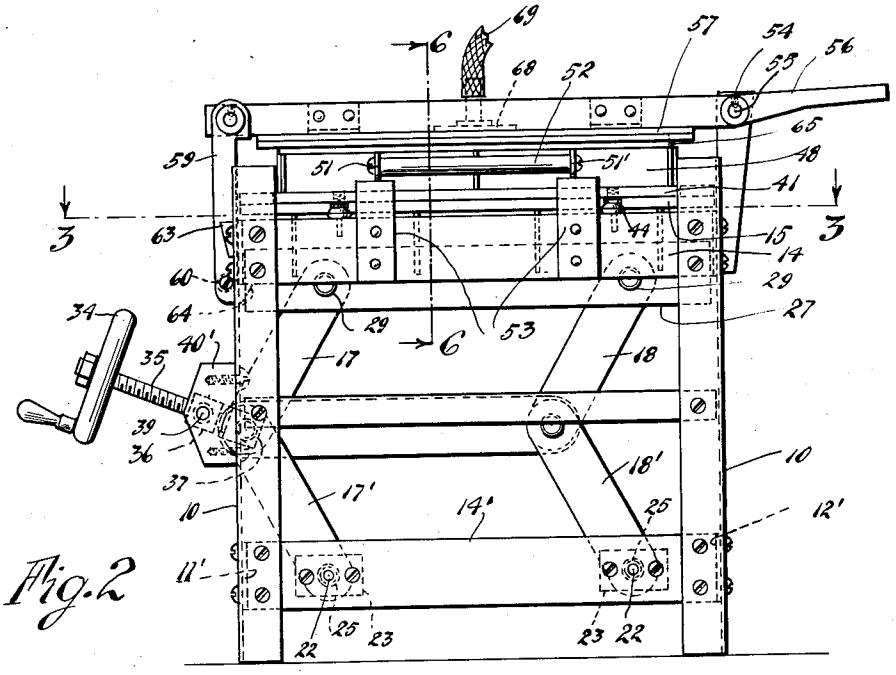


Fig. 2



Witnesses:

W. Schmeltzer

Roof

Inventor:

Alphonzo B. Eckersall

By Joshua R. H. Potts

His Attorney.

Oct. 27, 1925. 1,559,231

A. B. ECKERSALL

APPARATUS AND METHOD FOR CASTING ELECTROTYPES

Filed Aug. 23, 1924 4 Sheets-Sheet 2

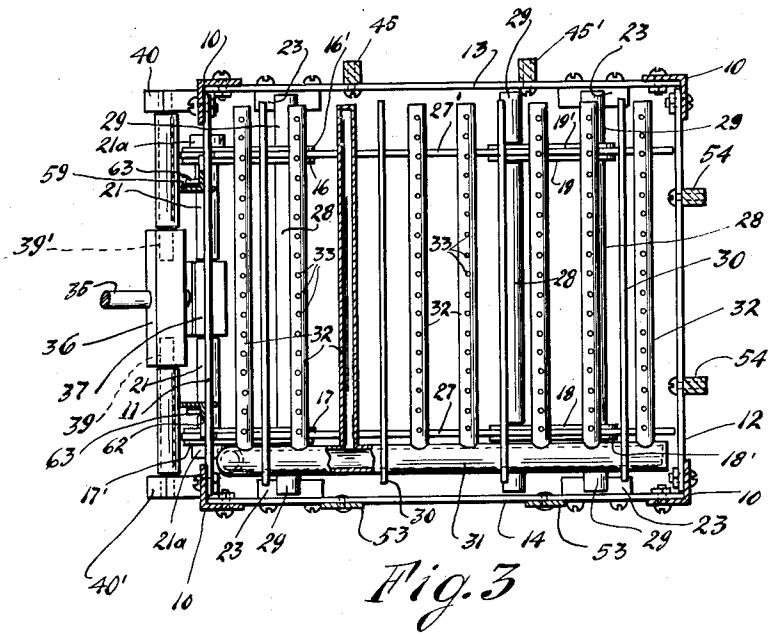


Fig. 3

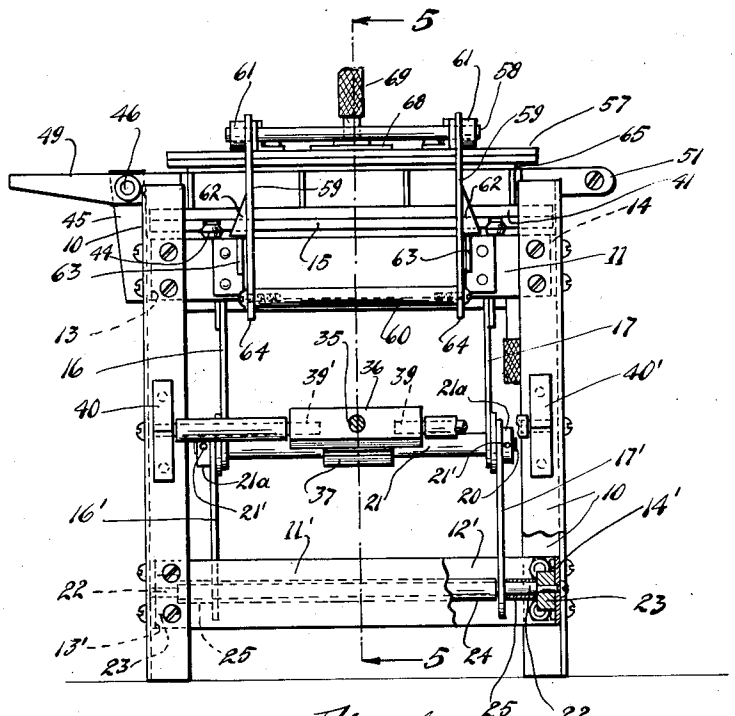


Fig. 4

Witnesses:

Inventor:
Alphonzo B. Eckersall
By Joshua R. H. Potts
His Attorney.

Oct. 27, 1925. 1,559,231

A. B. ECKERSALL

APPARATUS AND METHOD FOR CASTING ELECTROTYPES

Filed Aug. 23, 1924 4 Sheets-Sheet 3

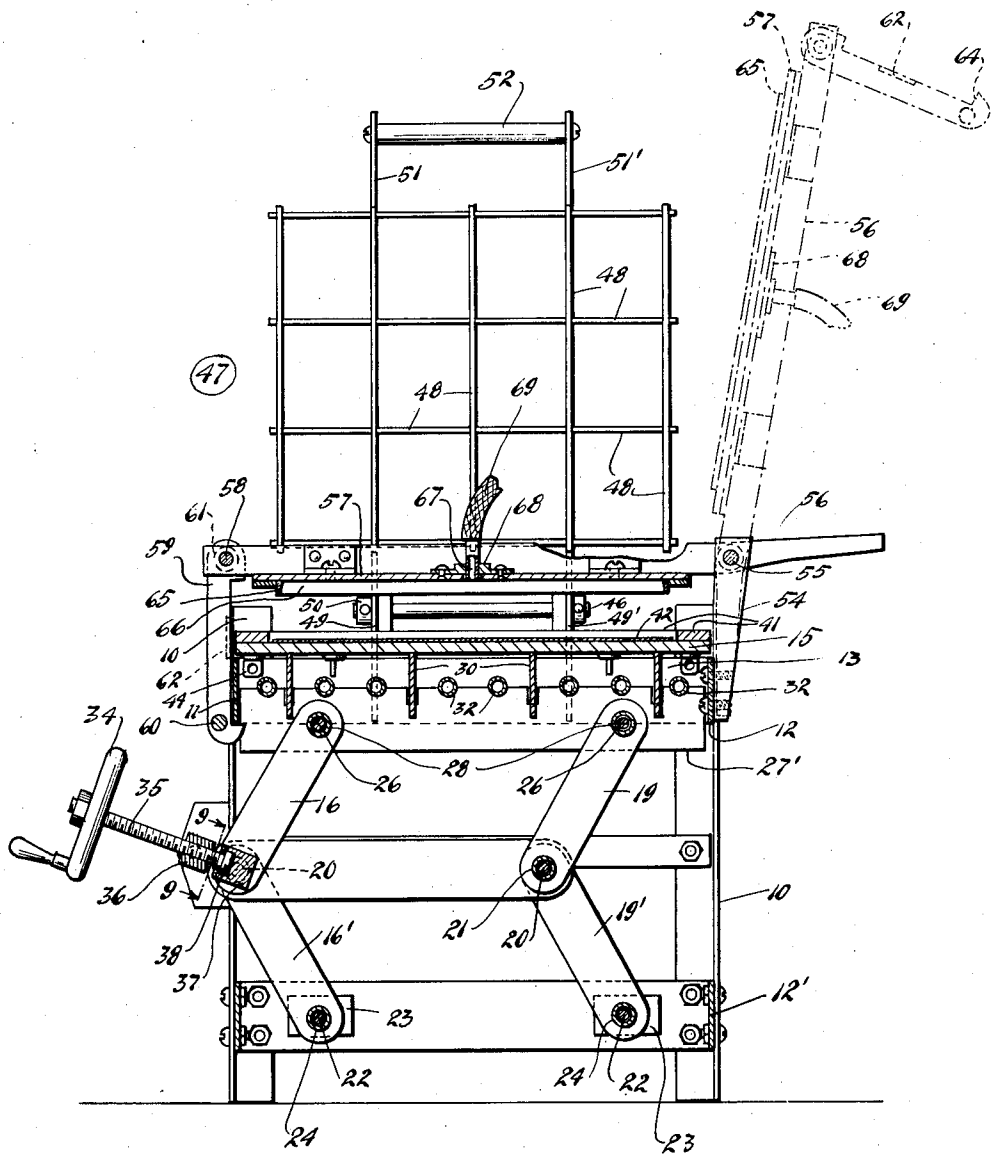


Fig. 5

Witnesses:

Inventor:

Alphonzo B. Eckersall

By Joshua R. H. Potts.

His Attorney.

Oct. 27, 1925. 1,559,231

A. B. ECKERSALL

APPARATUS AND METHOD FOR CASTING ELECTROTYPES

Filed Aug. 23, 1924 4 Sheets-Sheet 4

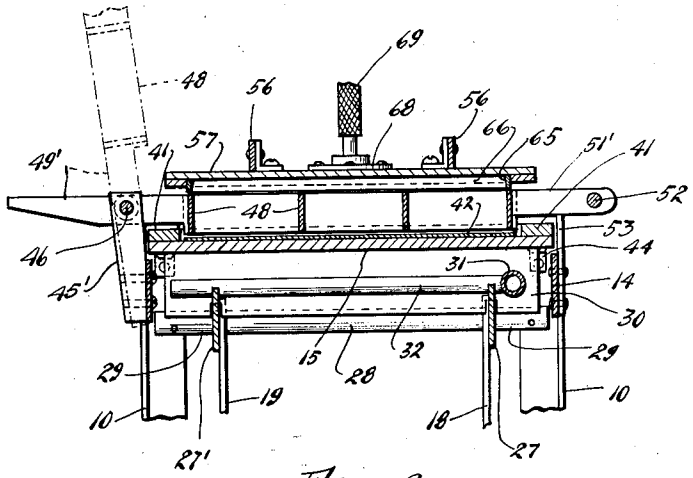


Fig. 6

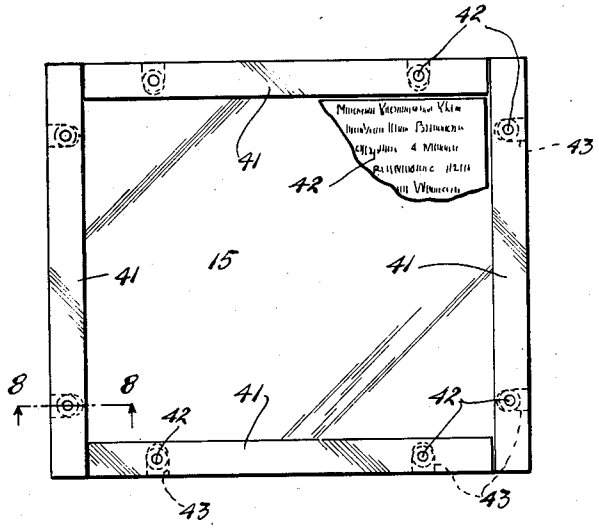


Fig. 7

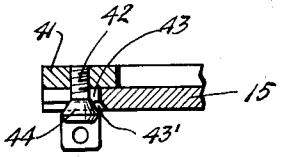


Fig. 8

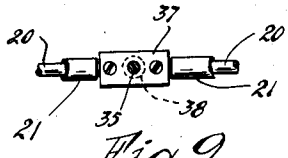


Fig. 9

Witnesses:

Inventor:
Alphonzo B. Eckersall
By Joshua R. Potts
His Attorney.

Patented Oct. 27, 1925. 1,559,231

UNITED STATES PATENT OFFICE.

ALPHONZO B. ECKERSALL, OF CHICAGO, ILLINOIS.

APPARATUS AND METHOD FOR CASTING ELECTROTYPES.

Application filed August 23, 1924. Serial No. 733,742.

To all whom it may concern:

Be it known that I, ALPHONZO B. ECKERSALL, a citizen of the United States, and a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Apparatus and Methods for Casting Electrotypes, of which the following is a specification.

My invention relates to an apparatus and method for casting electrotypes, and has for its primary object the provision of a new apparatus and method of the character described, which will be highly efficient and economical in use.

The main object of my invention is the provision of an apparatus through the agency of which the shells, produced in the usual manner in the deposit bath, will be effectually amalgamated with backing material and will be held during the amalgamation process in such manner that they will be effectually safeguarded against warping, buckling or other deformation although free at all times to react to changes of temperature.

Another object of my invention is to make provision for facilitating the tinning operation and for so maintaining the shells during the tinning operation as to insure a uniform deposit.

Another object of my invention is the provision of an apparatus of the character specified, in which the amalgamated casting without being removed from the backing plate or otherwise molested, may be sealed up and subjected to air pressure, in order to insure uniform cooling and setting under conditions that safeguard against bending, springing or other deformation.

A further object of my invention is the provision of an apparatus that will eliminate the repeated handling of these shells, that will be easy to operate and effective in operation, that will produce more uniform castings, and that will effect a considerable saving in time and labor both in the casting operations and in the subsequent finishing operations.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which,

Fig. 1 is a top plan view of a structure embodying my improvements,

Fig. 2 is a side elevational view thereof,

Fig. 3 is a cross section taken on line 3—3 of Fig. 2,

Fig. 4 is a front elevational view, parts being broken away,

Fig. 5 is a section taken on the line 5—5 of Fig. 4, the presser frame being here shown in elevated position, and the cover plate being also illustrated in elevated position in broken lines,

Fig. 6 is a cross section taken in the direction indicated by lines 6—6 of Fig. 2,

Fig. 7 represents a top plan view of the backing plate,

Fig. 8 is a cross section taken on the line 8—8 of Fig. 7, and

Fig. 9 represents a section taken on the line 9—9 of Fig. 5.

Before entering upon the detailed description, it is desirable to explain that my present invention is not concerned with the production of shells themselves, but only with casting operations involving a union of the shells with the backing metal, preparatory to the finishing and polishing operation. 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.

In the embodiment herein illustrated, it will be seen that I employ as a means for supporting the operating mechanism, a skeleton frame consisting of supporting legs 10, of which there are four, one for each corner of the structure, the legs at the front of the machine being connected by top and bottom front plates 11 and 11′, at the rear of the machine, by top and bottom rear plates 12 and 12′, at the left side by the top and bottom side plates 13 and 13′, and at the right side by top and bottom side plates 14 and 14′. The supporting legs are

made of angular form in cross section as shown, and the plates are connected to the legs on the inner sides thereof. In the present construction, the top plates are so supported that their top edges lie flush in the same horizontal plane, so as to constitute a level stop frame for the backing or casting plate 15 which is mounted on a toggle construction in such manner that it may be elevated from and lowered to said top plates.

The toggle construction includes front and rear sets of toggle levers; 16 and 16′ representing one of the front sets, 17 and 17′ representing the other of the front sets. At the rear of the machine 18 and 18′ represent one of the toggle lever sets while 19 and 19′ represent the other of the toggle lever sets. The members 16 and 16′ constituting one of the front toggle lever sets have their overlapping ends mounted for turning movement on a horizontal spindle 20; and the members 17 and 17′ constituting the other front set are also mounted on this spindle in any similar manner. 21 denotes a spacing sleeve which is mounted on the spindle 20 between the front sets of toggle levers. On the opposite ends of the spindle 20 there are secured the collars 21ª, designed to maintain the toggle levers in proper operative relation on the spindle, each of these collars being furnished with a set screw 21′ whereby to be adjusted on the spindle. The lower toggle levers 16′ and 17′ have turning fit on a spindle 22 whose opposite ends are secured to blocks 23, of which the one on the right hand side is attached to the bottom side plate 14 while the one at the left hand side is attached to the bottom side plate 13′. 24 is a spacing sleeve which is mounted on the spindle 22 between the toggle levers 16′ and 17′; and other spacing sleeves 25 are interposed between these toggle levers and the blocks 23. The rear sets of toggle levers 18 18′ and 19 19′ are mounted for operation precisely like the front sets, the mounting being accomplished by a spindle 20 and associated collars 21 at the central or knee regions, and also by means of a spindle 22 supported on blocks 23 as before, spacing sleeves 24 and 25 also being employed as in the previous instance.

The top toggle levers 16 and 17 at the front of the machine have turning fit on a spindle 26 and at the rear of the machine the top toggle levers 18 and 19 are similarly engaged on a corresponding spindle 26. Connecting the spindle 26 on which the front toggle levers 16 and 17 are mounted with the rear spindle on which the rear toggle levers 18 and 19 are mounted are supporting plates 27 and 27′. At the front and at the rear as well spacing sleeves 28 and adjustable collars 29 are employed on the spindles for the purpose of maintaining the toggle levers and supporting plates in proper operative relation.

Arranged upon the supporting plates 27 and 27′ and projecting upwardly therefrom for a distance as clearly illustrated in the accompanying drawings are spaced apart parallel cross plates 30. In Fig. 3 of the drawings it will be seen that these cross plates 30 extend beyond the plates 26 and 27, and that in the portions that extend beyond the plate 27′ is mounted a fuel pipe 31 from which lead a plurality of branches 32 which find support upon the plates 26 and 27. The said branches 32 have apertures 33 to permit flow of fuel therefrom for the purpose of heating the backing plate 15. It will be noted in this connection that the fuel or gas pipes 32 are so arranged and are of such extent that they are adapted to heat the backing plate 15 uniformly throughout its extent. As clearly shown in Fig. 5 the backing plate 15 rests upon the cross members 30; and it will be understood from the description given, taken in connection with the accompanying drawings that the heating elements and the backing plate will be elevated and lowered relatively to the machine upon the manipulation of the toggle mechanism, which manipulation may be accomplished by means of an adjustment wheel 34, fast on the end of a screw 35 which is screw threaded through a supporting block 36 and thence enters a block 37 wherein is attached a retaining disc 38. Said block 37 is mounted on the spindle 20 being interposed thereon between sections of the spacing sleeve carried thereby. The block 36 is supported by and between the spindles 39 and 39′ which are fast in and projected from brackets 40 and 40′, respectively, which are secured to the faces of the front leg supports. In view of this construction it will be evident that upon the turning of the adjustment wheel 34 in one direction the toggle mechanism will be operated to elevate the backing plate and the heating elements supported in conjunction therewith, and also that when said adjustment wheel is turned in the opposite direction said toggle mechanism will function to lower the said backing plate and heating elements, the entire arrangement being such that the backing plate is moved from and toward the top plates connecting the leg supports, as hereinbefore mentioned.

As clearly exhibited in Fig. 7, the backing plate is provided with removable raised edges 41 in order that an electrotype shell, fractionally indicated at 42 may, when backed up, be readily removed from the backing plate without danger of bending or deforming the same. The raised edges 41 consist of strips carrying depending screws 42 adapted to enter the open eyes 43 provided in the marginal edges of the back-

ing plate. Said open eyes 43 have countersunk regions 43′ with which the tapering heads 44 of the screws will co-operate, when the screws are turned home, in order to draw the edges 41 in tight and uniform engagement with the backing plate.

Attached to the top side plate 13 are spaced apart upwardly projecting bracket members 45 and 45′ which carry a spindle 46 on which is mounted for swinging movement a presser device characterized generally by the numeral 47. As clearly illustrated in Fig. 5 this presser device consists of spaced intersecting plate members 48, two of which have extensions 49 and 49′ which are mounted for turning movement upon the spindle 46, adjustable collars as 50 being mounted on the extremities of this spindle whereby to maintain the parts in operative relation. At the opposite end of the presser device two of the plate members 48 are made with extensions 51 51′ which are connected by a handle member 52, by means of which the presser device may be readily elevated into the position illustrated in Fig. 5 or lowered into horizontal position with relation to the backing plate as illustrated in Fig. 4. When the presser device is moved into elevated position the extensions 49 49′ are adapted to engage the top side plate 13 for the purpose of maintaining the presser device in elevated position. When the presser plate is moved into horizontal position it is normally adapted to rest upon upright plates 53 which are secured to the top side plate 14. The relation of the top edges of the uprights 53 to the hinged engagement of the presser plate is such that when the presser plate is moved into horizontal position the lower edges of its spaced intersecting members 48 will lie in a horizontal plane which is parallel to the plane of the backing plate, so that when an electrotype shell is placed on the backing plate and the hand and wheel 34 is manipulated the supported electrotype shell may be brought into such close or remote horizontal relation with the intersecting plate members 48, as desired, in order effectually to carry out the casting operations presently to be described.

Secured to the top rear plate 12 are a pair of spaced upright members 54 which carry a spindle 55 on which are mounted for swinging movement the parallel members 56 which carry a cover plate 57, designed to be moved into elevated position where it will be sustained by means of the members 56 contacting with the top rear plate 12, and which is also adapted to be swung into horizontal position for co-operation with the backing plate in carrying out the casting operations. The cover supporting members 56 at the front of the machine carry a spindle 58 on which is mounted a pair of arms 59 carrying a handle member 60. To the extremities of the spindle 58 are applied adjustable collars 61 whereby to maintain the parts in operative position. The arms 60 are each formed with a lateral projection 62 which is adapted to engage with a lug 63 attached to the top front plate 11, for the purpose of maintaining the cover plate in a plane which is horizontal to the plane of movement of the backing plate. Each of the arms 59 is also provided at its extremity with a hook-shaped portion 64, designed to engage over the body portion of the lug member 63 on the top front plate 11. This arrangement is such that when the projections 62 engage the lugs 63, the hooked ends 64 will engage over the lower ends of the body portions of said lugs 63, so that the cover plate will be firmly held in horizontal position against displacement. According to an important feature of my invention the cover plate is provided on its underside with a flange 65, designed to press into the casting on the backing plate, to seal the same on the backing plate, and to form with the casting an air chamber 66, into which compressed air may be introduced through an inlet pipe 67 that projects through the cover plate for the purpose, said inlet pipe being supported by a bracket 68 which is riveted or otherwise secured to the cover plate. A flexible tube 69 is attached to the inlet pipe 67 and leads to a suitable source or supply of compressed air.

In the use of my improved machine the electrotype shell, after being thoroughly cleansed on its removal from the bath, is covered in the usual way with a thin sheet of solder, consisting preferably of tin foil. The gas underneath the backing plate is lighted and the backing plate is heated to the temperature desired. The shell with the applied solder is then placed upon the hot backing plate and the presser device or frame is lowered, the adjusting wheel 34 being manipulated in such manner that the backing plate will sustain the shell in that position whereat the lower edges of the intersecting strips 48 constituting the presser device will merely meet the top surface of the shell. At this point the shell is protected during the heating period from the influence of the outside atmosphere by the cover plate, which is lowered and secured in position upon the presser device. Thus enclosed and protected, the tinning operation takes place, the solder melting on the shell and covering the latter with a thin coating, the uniformity of which is insured by reason of the fact that there can be no interference or disturbance of atmospheric conditions. The shell is thus maintained until it is in the right condition for the casting thereon of the backing metal, when the cover plate is elevated.

Thereupon the backing metal is poured

onto the thin shell through the openings provided by the intersecting plates 48 of the presser device. In this connection it will be understood that the presser device provides intersecting lines of mere contact all over the shell. These lines of contact permit the shell to respond to changing temperature while at the same time they prevent the shell from warping, buckling or otherwise becoming deformed. Obviously the adjustment wheel and the toggle construction constitute instrumentalities through which the shell may be adjusted with respect to the presser device so that the lines of contact may be as close or as remote as desired. While the poured backing metal is still in a molten state, the presser device is moved into elevated position, thereby permitting the backing metal to fill up and cover the bare lines or partially bare lines on the shell which were due to the contact of the presser device plates therewith. The mechanism is then manipulated so as to raise the backing plate to such height whereat the cover plate upon being lowered and secured in position will cause its flange to penetrate for a distance into the casting, sealing the congealing metal against any outside influence, and forming with the casting an air chamber 66 into which compressed air may be introduced for the purpose of exerting fluid pressure upon the casting and maintaining it against warping, buckling or other deformation during the cooling process. The fluid pressure is maintained until the casting becomes sufficiently cool for handling. Subsequently, the casting is finished and polished in accordance with the methods well known to electrotypers.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. A casting apparatus of the class described including a main frame, a vertically movable frame therein, a backing plate on the movable frame, and mechanism for elevating and lowering said movable frame.

2. A casting apparatus of the class described including a main frame, a movable frame therein, a backing plate supported on the movable frame, heating means supported on the movable frame below the backing plate, and toggle mechanism for actuating said movable frame.

3. A casting apparatus of the class described including a main frame, a cover adapted to be locked to the main frame, and a backing plate adapted to carry a shell mounted in the main frame for vertical movement relatively to said cover.

4. A casting apparatus of the class described including a main frame, a cover adapted to be locked to the main frame, a sealing flange on the cover, and a backing plate adapted to carry a shell mounted in the main frame for movement to and from said sealing flange.

5. A casting apparatus of the class described including a main frame, a movable frame therein, a backing plate adapted to hold a shell carried by the movable frame, a cover supported on the main frame, and toggle mechanism for actuating said movable frame to adjust said backing plate relatively to said cover.

6. A casting apparatus of the class described including a main frame, a movable frame therein, a backing plate adapted to hold a shell carried by the movable frame, a cover supported on the main frame, a sealing flange on the cover, and mechanism comprising a hand wheel and toggle mechanism actuated thereby for moving the backing plate into and out of engagement with said sealing flange.

7. A casting apparatus of the class described including a main frame, a presser frame adapted to be locked to the main frame, and a backing plate adapted to carry a shell mounted in the main frame, for vertical movement relatively to said presser frame.

8. A casting apparatus of the class described including a main frame, a presser frame, a movable frame in the main frame, a backing plate and heating means therefor supported on the movable frame, and toggle mechanism for actuating said movable frame.

9. A casting apparatus of the class described including a main frame, a backing plate mounted therein, a presser frame hingedly engaged with the main frame and having crossed strips adapted to engage said backing plate and to form pockets therewith, and a cover hingedly engaged with the main frame and adapted to constitute a top closure for said pockets.

10. A casting apparatus of the class described including a main frame, a movable frame therein, a backing plate carried by the movable frame, a presser frame having crossed strips adapted to engage said backing plate and to form pockets therewith, a cover adapted to constitute a top closure for said pockets, and mechanism in the main frame for actuating said movable frame.

11. A casting apparatus of the character described including an adjustably mounted backing plate having removable raised edges,

means for heating the backing plate, and means for maintaining a shell on the backing plate against deformation during casting operations.

12. A casting apparatus of the character described including an adjustably mounted backing plate having removable raised edges, and a cover plate having means co-operative with the backing plate for sealing a shell thereon between said raised edges.

13. A casting apparatus of the character described including an adjustably mounted backing plate having removable raised edges, a device constituting a presser frame adapted to co-operate with the backing plate for maintaining a shell thereon between said raised edges during casting operations, and a cover plate having means adapted to co-operate with the backing plate between said raised edges for establishing a presser chamber with the shell, said cover plate also having means through which to introduce a pressure agent into said chamber.

14. A casting apparatus of the character described including a frame, a backing plate adapted to support a shell, means on the frame for elevating and lowering the backing plate, and a device constituting a presser frame hinged to the frame and adapted to co-operate with the backing plate in maintaining a shell thereon against deformation during casting operations.

15. A casting apparatus of the character described including a frame, a backing plate adapted to support a shell, means on the frame for elevating and lowering the backing plate in horizontal position, a device constituting a presser frame hinged to the frame and a device on which the presser frame may rest to co-operate with the backing plate in horizontal relation.

16. A casting apparatus of the character described including a frame, a backing plate adapted to support a shell, means on the frame for elevating and lowering the backing plate in horizontal position, and a cover plate hinged to the frame and adapted to co-operate with the backing plate in sealing a shell thereon and in forming an air chamber with the shell.

17. A casting apparatus of the character described including a frame, a backing plate adapted to support a shell, means on the frame for elevating and lowering the backing plate in horizontal position, a cover plate attached to the frame and adapted to seal a shell on the backing plate, and means in connection with the cover plate and the frame for securing the former in sealed position.

18. A casting apparatus of the character described including a frame, a backing plate adapted to support a shell, heating means for the backing plate, means on the frame for elevating and lowering the backing plate and heating means, and a device constituting a presser frame pivoted to the frame and adapted to co-operate with the backing plate in maintaining a shell thereon against deformation during casting operations.

19. A casting apparatus of the character described including a frame, a backing plate adapted to support a shell, heating means for the backing plate, means on the frame for elevating and lowering the backing plate and heating means in horizontal position, and a cover plate pivotally attached to the frame and adapted to co-operate with the backing plate in sealing a shell thereon and forming an air chamber with the sealed shell.

20. An apparatus of the character described including a frame, a backing plate adapted to support a shell, heating means for the backing plate, means on the frame for elevating and lowering the backing plate in horizontal position, a device constituting a presser frame pivoted to the frame and adapted to co-operate with the backing plate in maintaining a shell thereon against deformation during casting operations, and a cover plate pivotally attached to the frame and adapted to co-operate with the backing frame in sealing a shell thereon and in forming an air chamber with the sealed shell.

21. In combination, a frame, toggle mechanism arranged in the frame, a backing plate supported on the toggle mechanism and adapted to be elevated and lowered thereby, and a presser device pivoted to the frame and adapted to be swung into and out of operative relation with the backing plate.

22. In combination, a frame, a toggle mechanism arranged in the frame, a backing plate supported on the toggle mechanism and adapted to be elevated and lowered thereby, and a cover plate pivoted to the frame and adapted to be swung into and out of operative relation with the backing plate.

23. In combination, a frame, toggle mechanism arranged in the frame, a backing plate supported on the toggle mechanism and adapted to be elevated and lowered thereby, a presser device pivoted to the frame and adapted to be swung into and out of operative relation with respect to the backing plate, a cover plate pivoted to the frame and adapted to be swung into operative relation with the backing plate when the presser device is swung out of operation with respect to the backing plate.

24. In combination, a frame, toggle mechanism arranged in the frame, a backing plate supported on the toggle mechanism, heating means supported on the toggle mechanism, said backing plate and heating means being adapted to be elevated and lowered by toggle mechanism, and a presser device pivotally mounted on the frame and adapted to be swung into position to co-operate with the

backing plate in maintaining a shell thereon against deformation during casting operations.

25. In combination, a frame, toggle mechanism arranged in the frame, a backing plate and heating means supported on the toggle mechanism and adapted to be elevated and lowered thereby, and a cover plate pivotally mounted on the frame and adapted to be swung into position to co-operate with the backing plate in sealing a shell thereon and in forming an air chamber for the sealed shell.

26. In combination, a frame, toggle mechanism arranged in the frame, a backing plate and heating means therefor supported on the toggle mechanism and adapted to be elevated and lowered thereby, a presser device pivotally attached to the frame and adapted to be swung into position to co-operate with the backing plate in maintaining a shell thereon against deformation during casting operations, a cover plate pivotally attached to the frame and adapted to be swung into position to seal a shell on the backing plate and to form an air chamber with the sealed shell when the presser device is swung into inoperative position.

27. In combination, a frame, a backing plate adapted to hold a shell to be united with backing metal, heating means beneath the backing plate, means on the frame supporting the backing plate and heating means for elevating and lowering the same, means on the frame adapted to co-operate with the backing plate in sealing the shell and backing metal cast thereon and in forming an air chamber with the same, and means through which to introduce compressed air into said air chamber.

28. The method of casting backing metal on a shell, which includes, applying a sheet of solder to the shell and placing the shell on a heated backing plate, in establishing intersecting lines of contact with the top of the shell, in pouring molten backing metal into the pockets between the lines of contact and in sealing the backed up shell upon the backing plate during the cooling operation.

29. The method of casting backing metal on a shell, which includes, applying a sheet of solder to the shell and placing the shell on a heated backing plate, in establishing intersecting lines of contact with the top of the shell, in pouring the molten backing metal into the pockets between the lines of contact, in removing the lines of contact while the poured metal is still liquid enough to flow freely, and in sealing the backed up shell upon the backing plate during the cooling operation.

30. The method of casting backing material on a shell, which includes, placing the shell on a heated backing plate and applying solder, establishing intersecting lines of pressure with the top of the shell, covering over the pockets formed by the intersecting lines to insure equal distribution of the solder, removing the covering and pouring the molten backing metal and then sealing the shell during the cooling operation.

31. The method of casting backing material on a shell, which includes, placing the shell on a heated backing plate and applying solder, covering the shell to insure equal distribution of the solder, pouring the molten backing metal on the shell and then sealing the shell during the cooling operation.

32. The method of casting backing material on a shell, which includes, placing the shell on a heated backing plate and applying solder, establishing intersecting lines of contact with the top of the shell, and covering over the pockets formed by the intersecting lines to insure equal distribution of the solder.

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

ALPHONZO B. ECKERSALL.