Dec. 5, 1939. G. W. BUNGAY 2,182,114

APPARATUS FOR BACKING ELECTROTYPES

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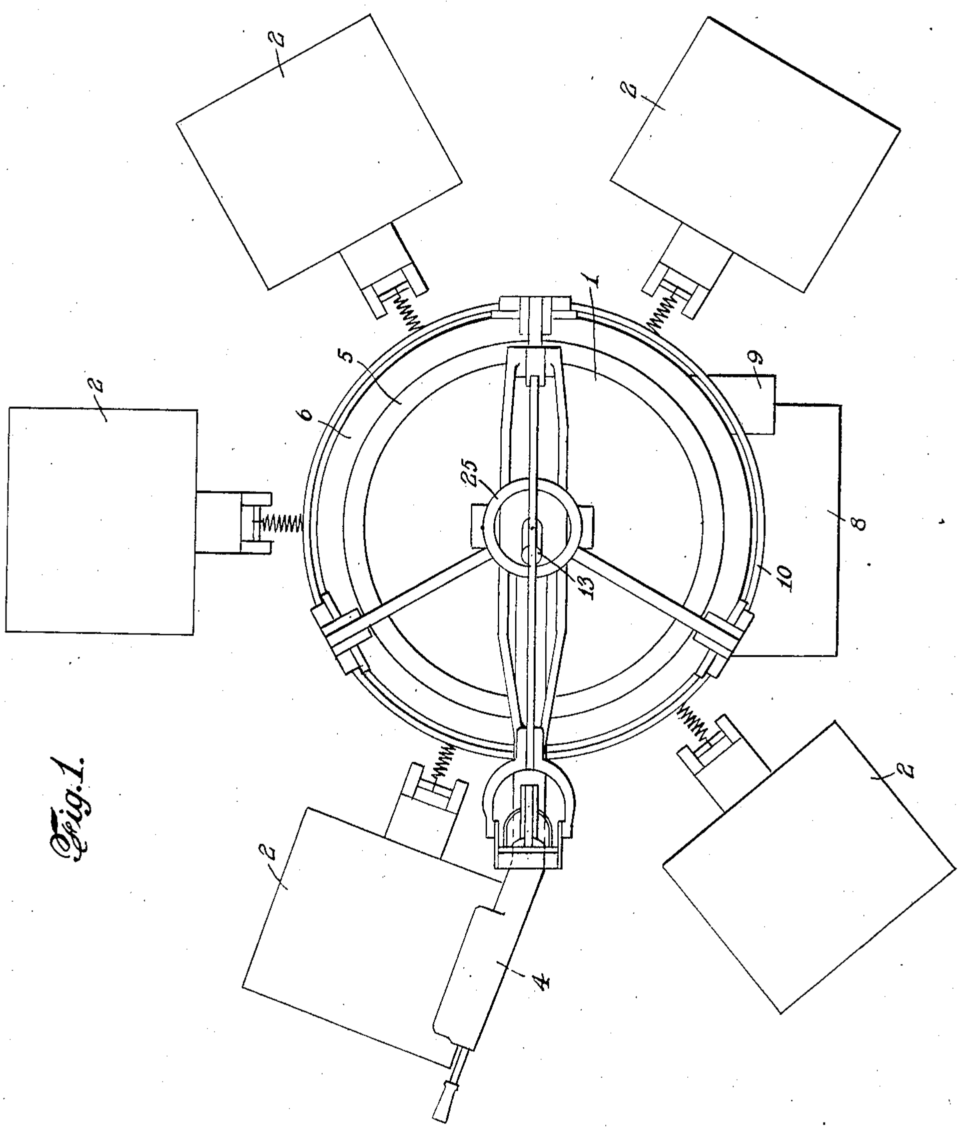
Fig. 1.



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APPARATUS FOR BACKING ELECTROTYPES

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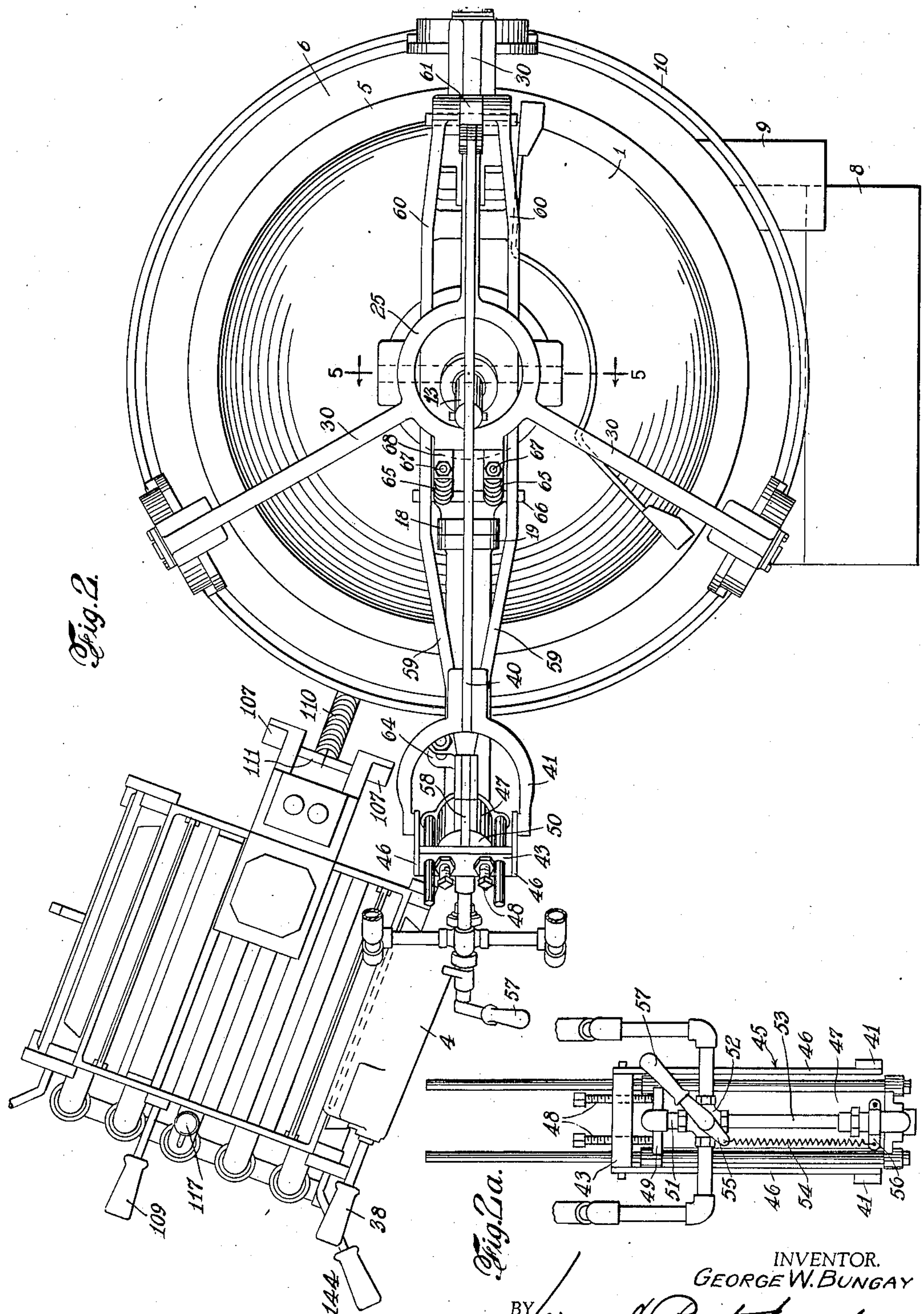

Fig. 2.

Fig. 2a.

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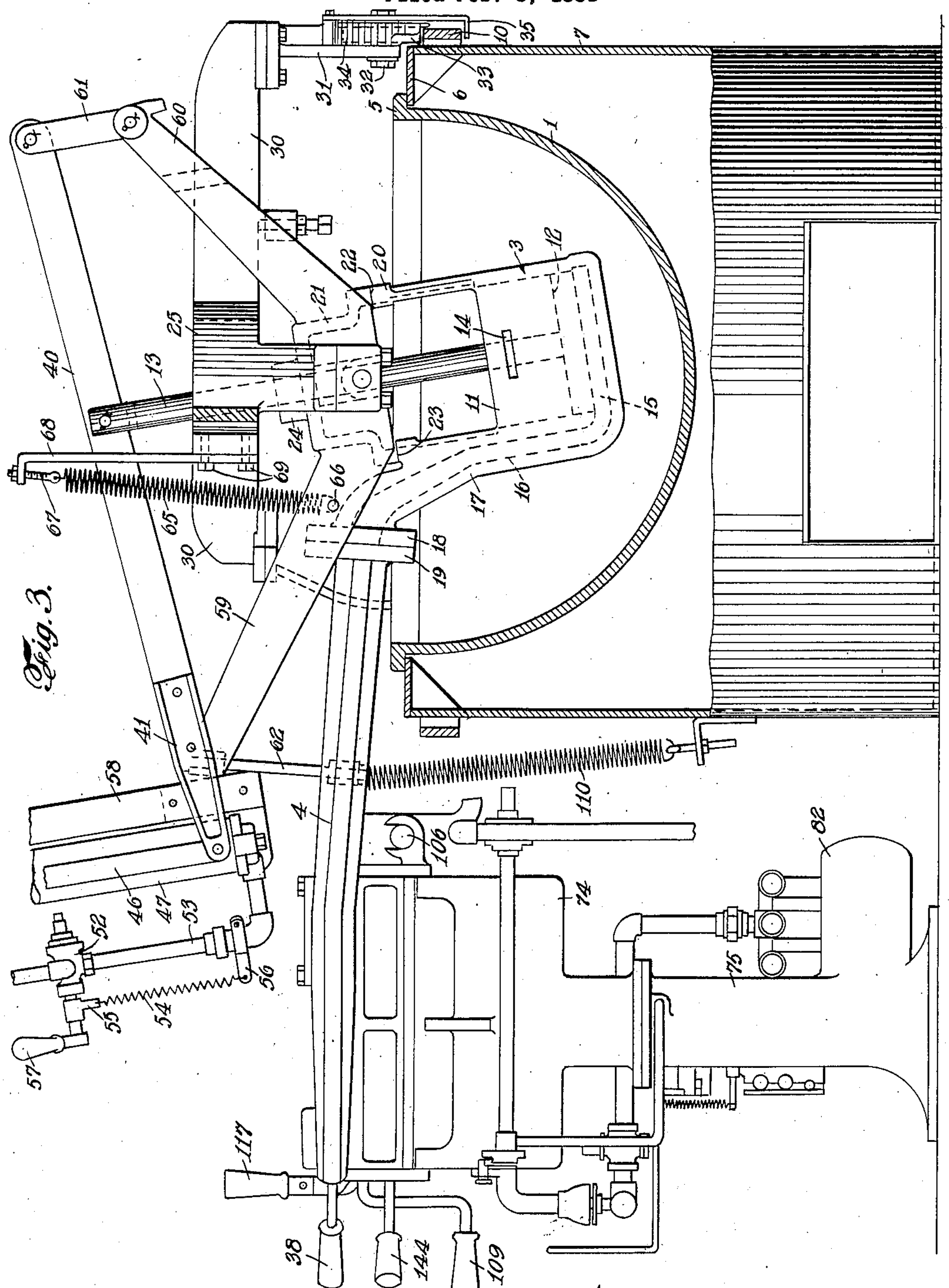

Fig. 3.

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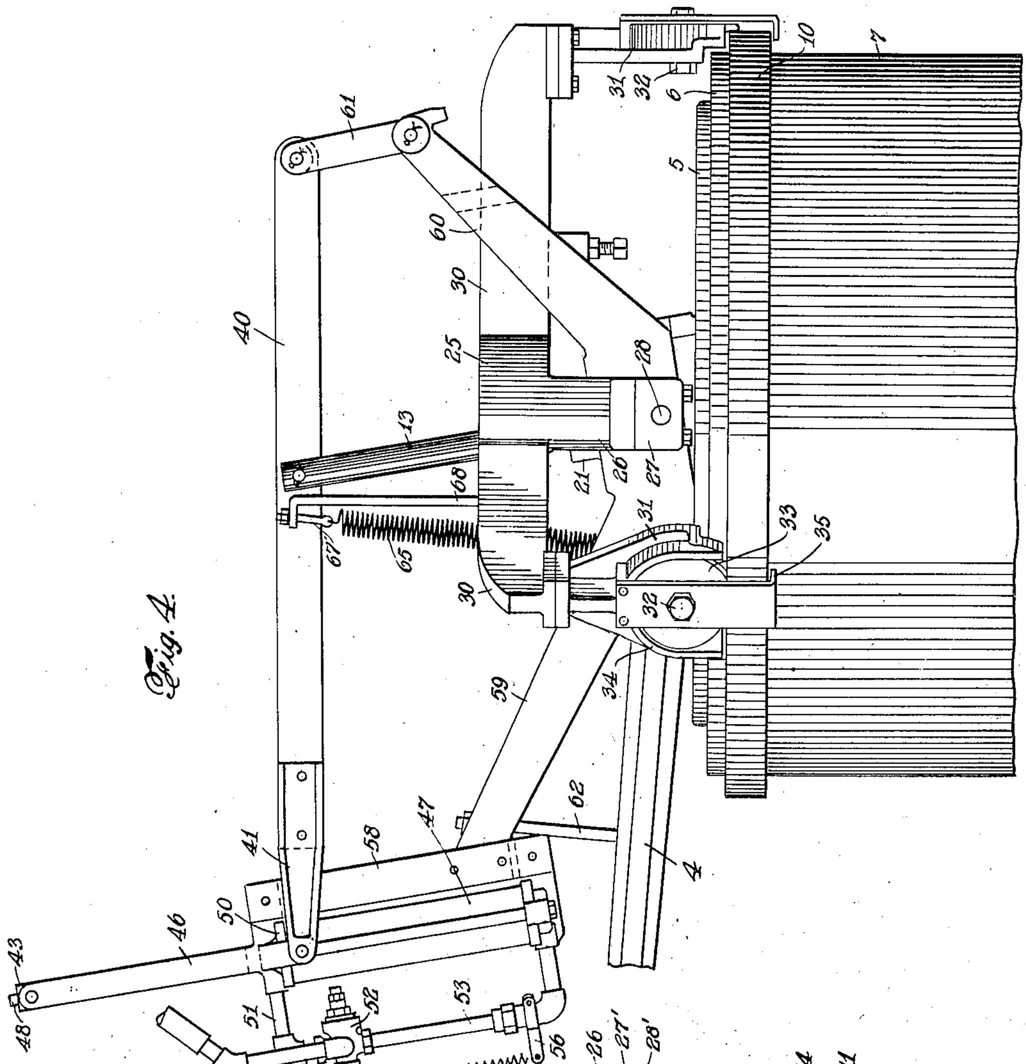

Fig. 4.

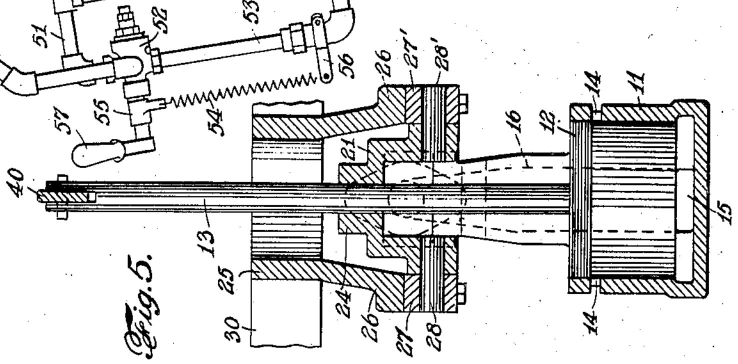

Fig. 5.

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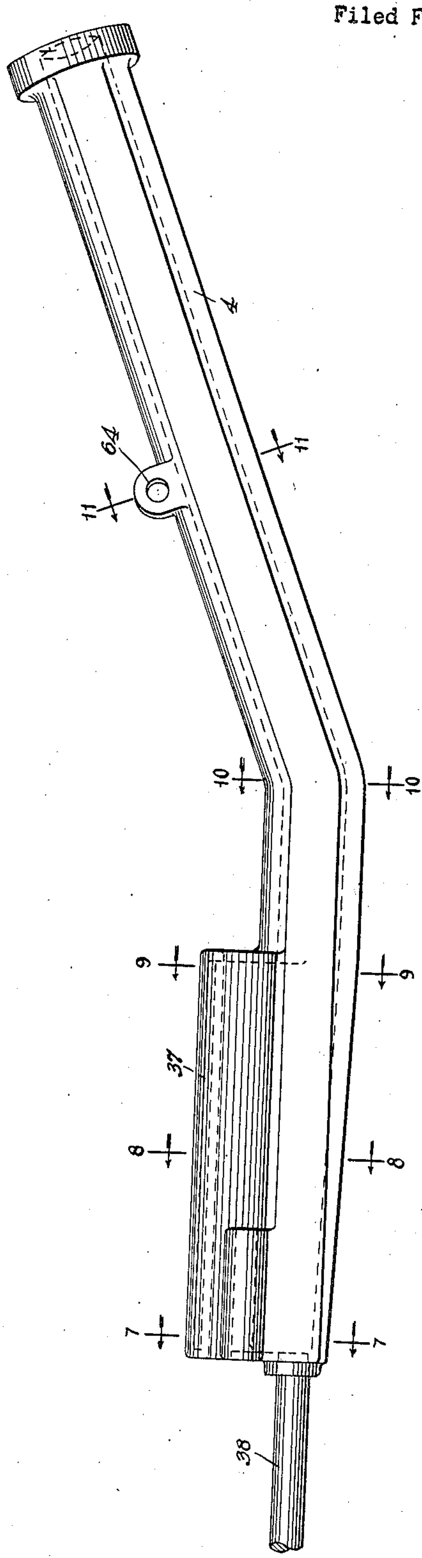

Fig. 6.

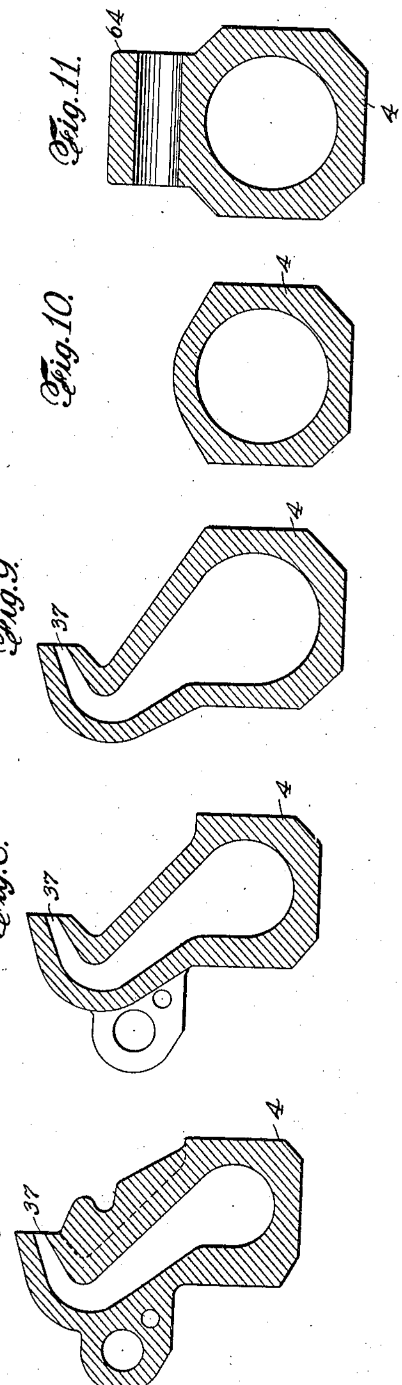

Fig. 11.

Fig. 10.

Fig. 9.

Fig. 8.

Fig. 7.

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Fig. 12.

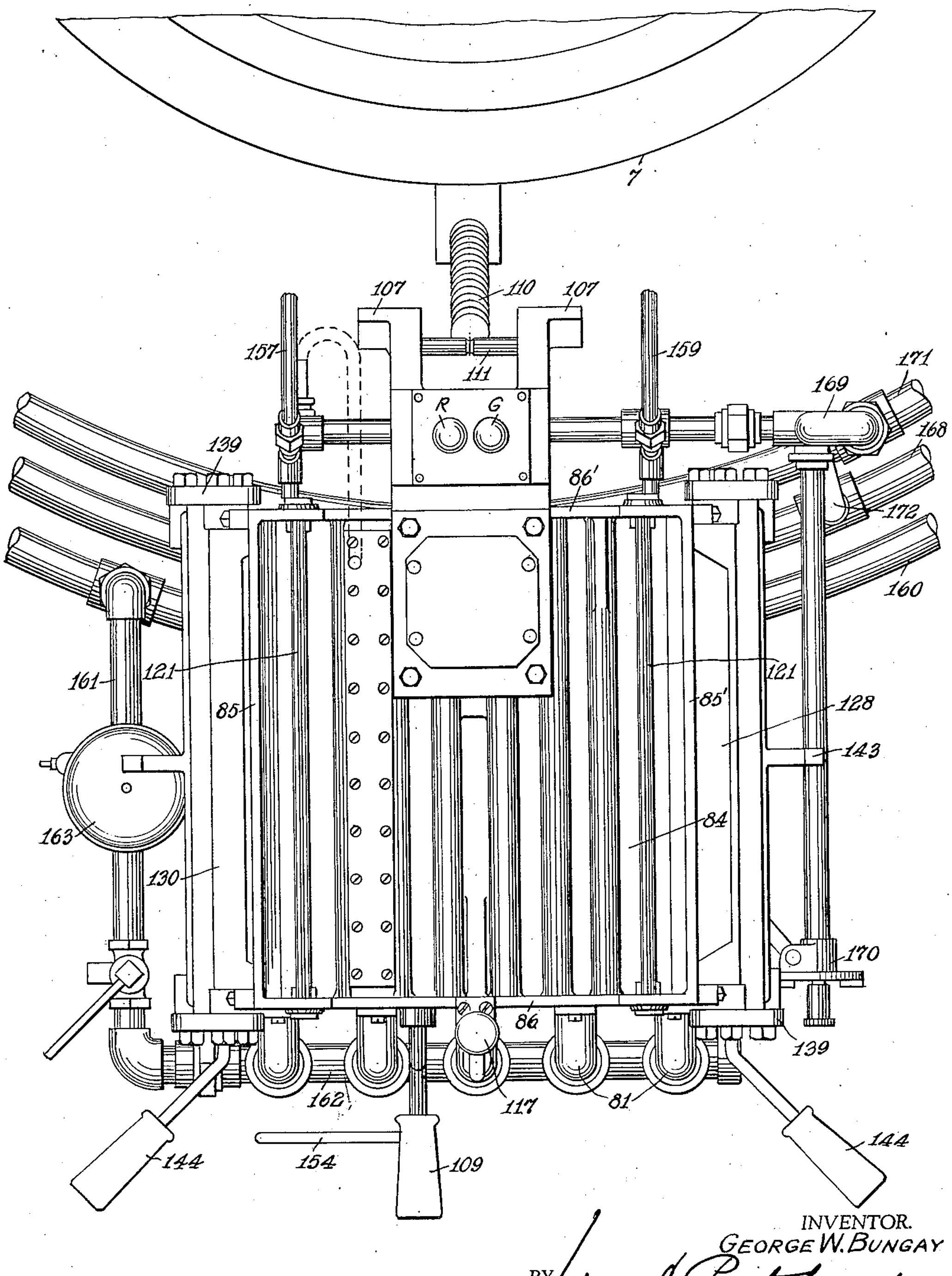

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Fig. 13.

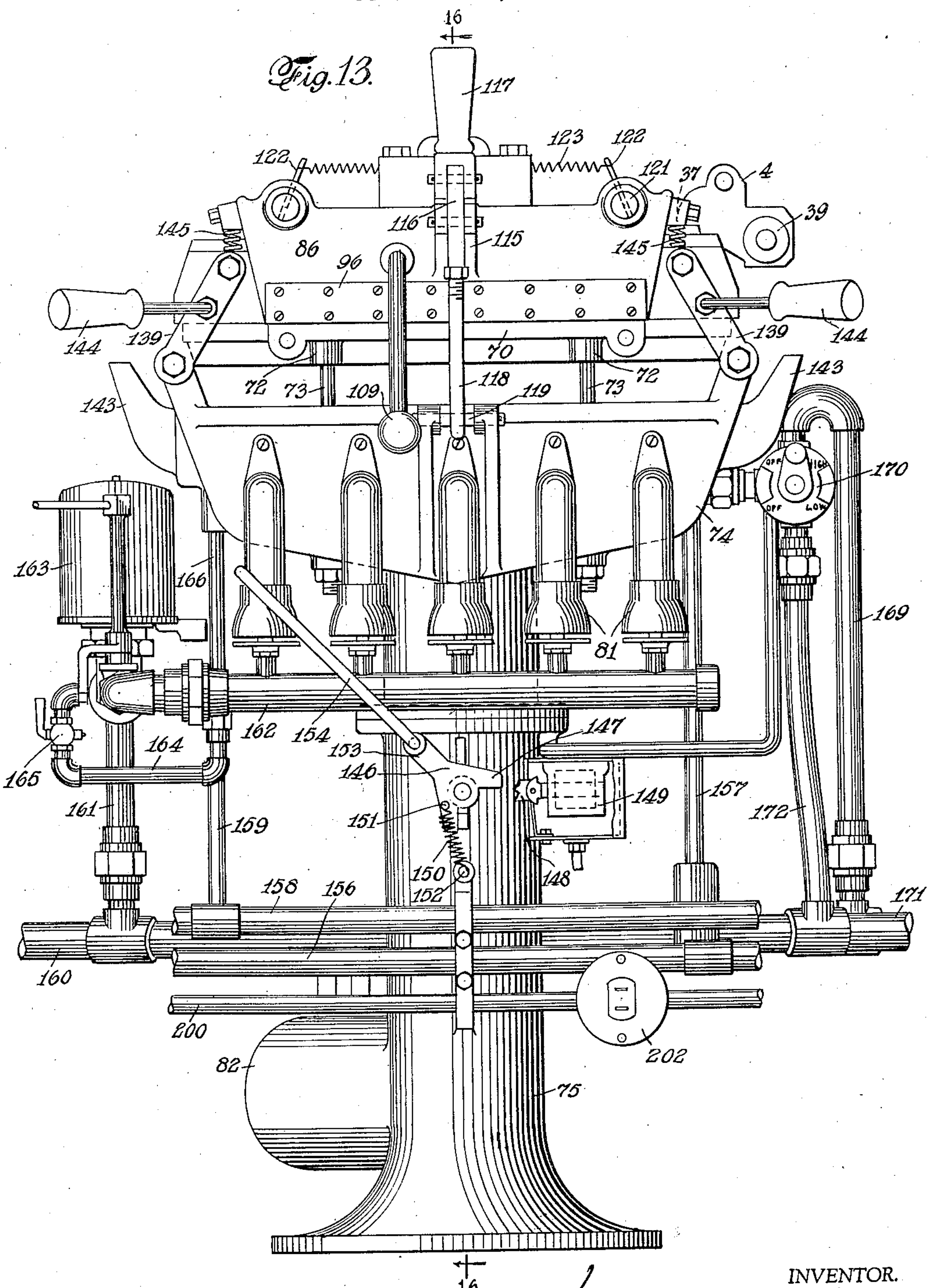

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Fig. 14.

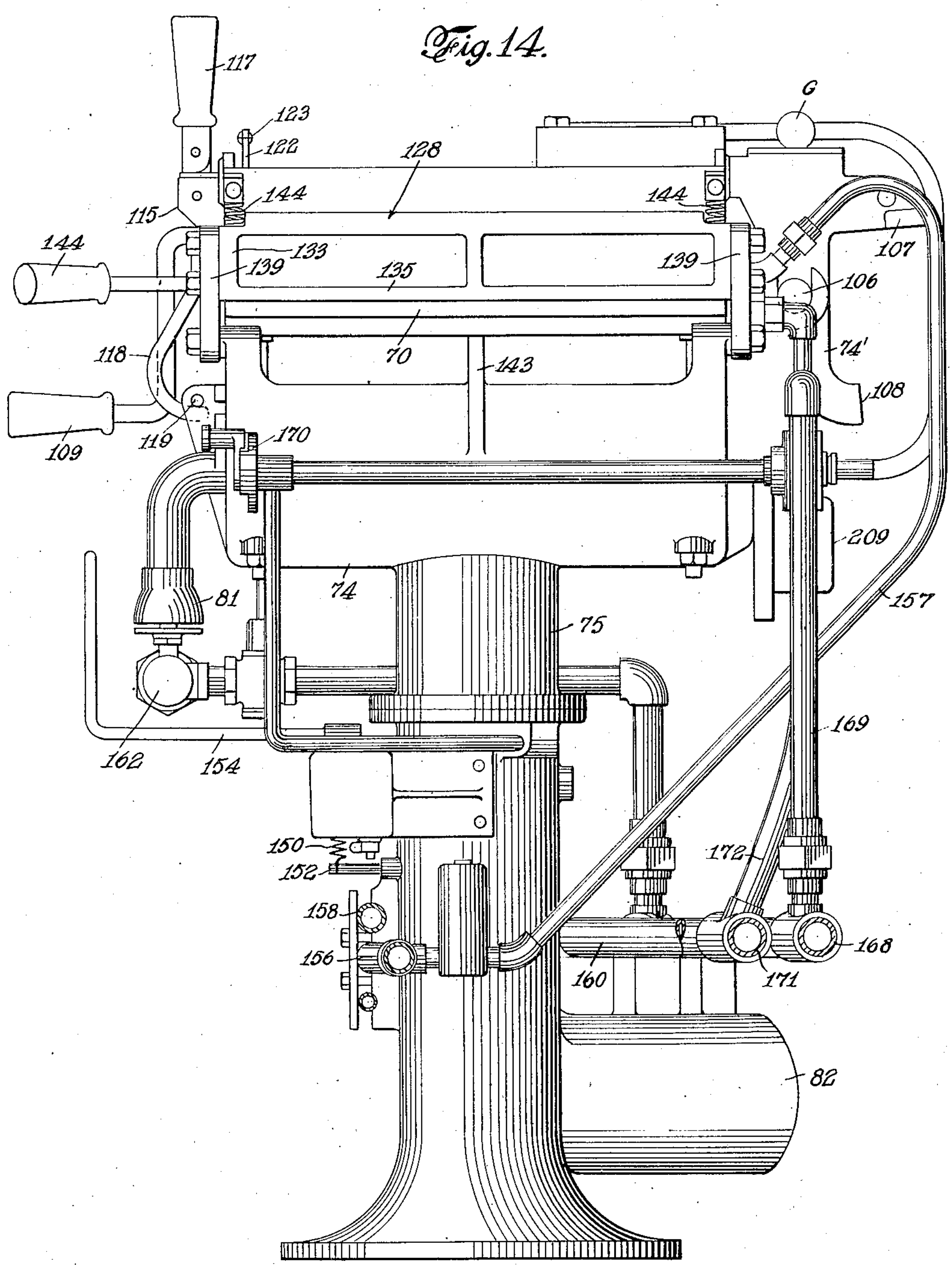

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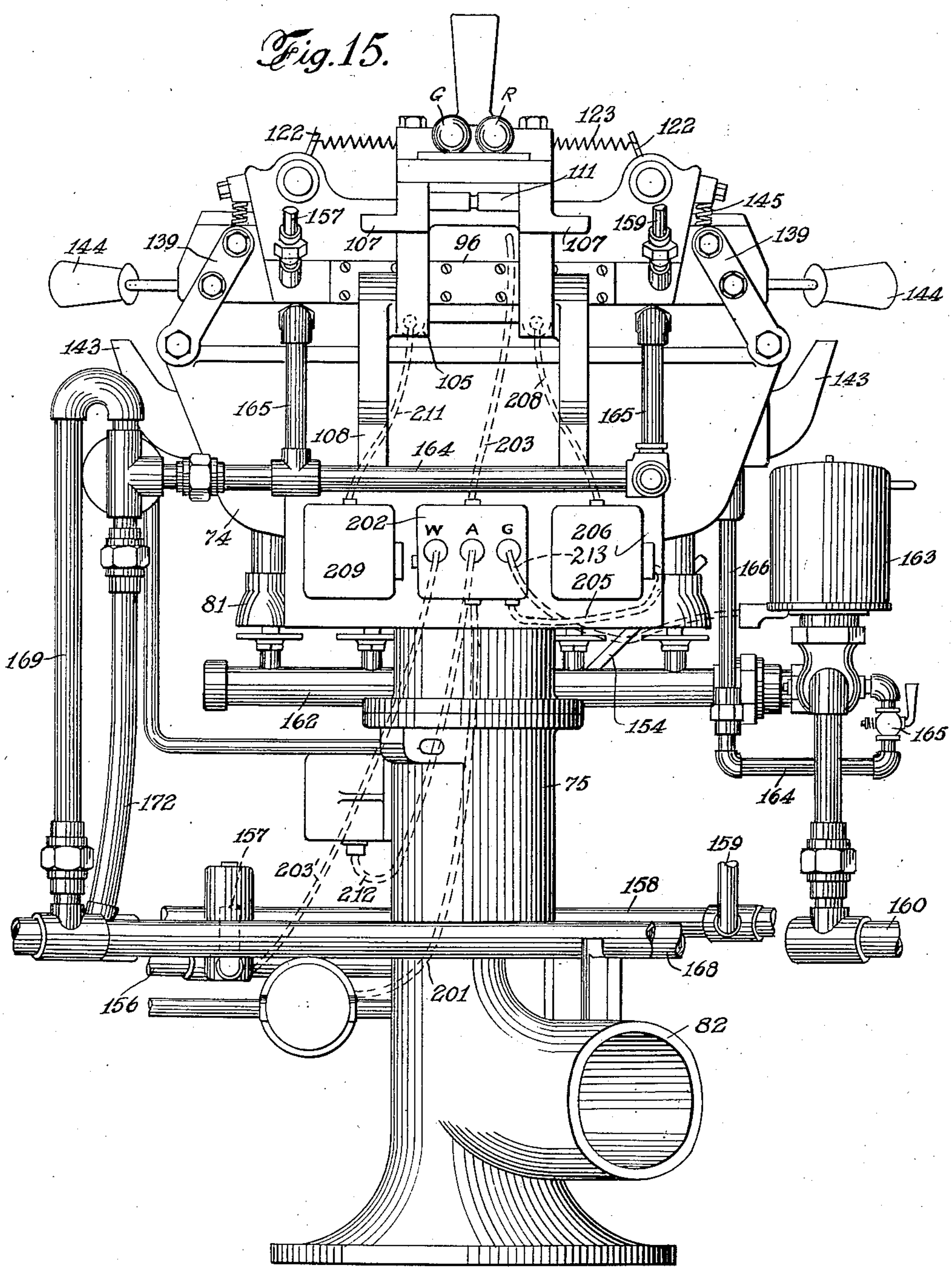
Fig. 15.



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APPARATUS FOR BACKING ELECTROTYPES

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Fig. 16.

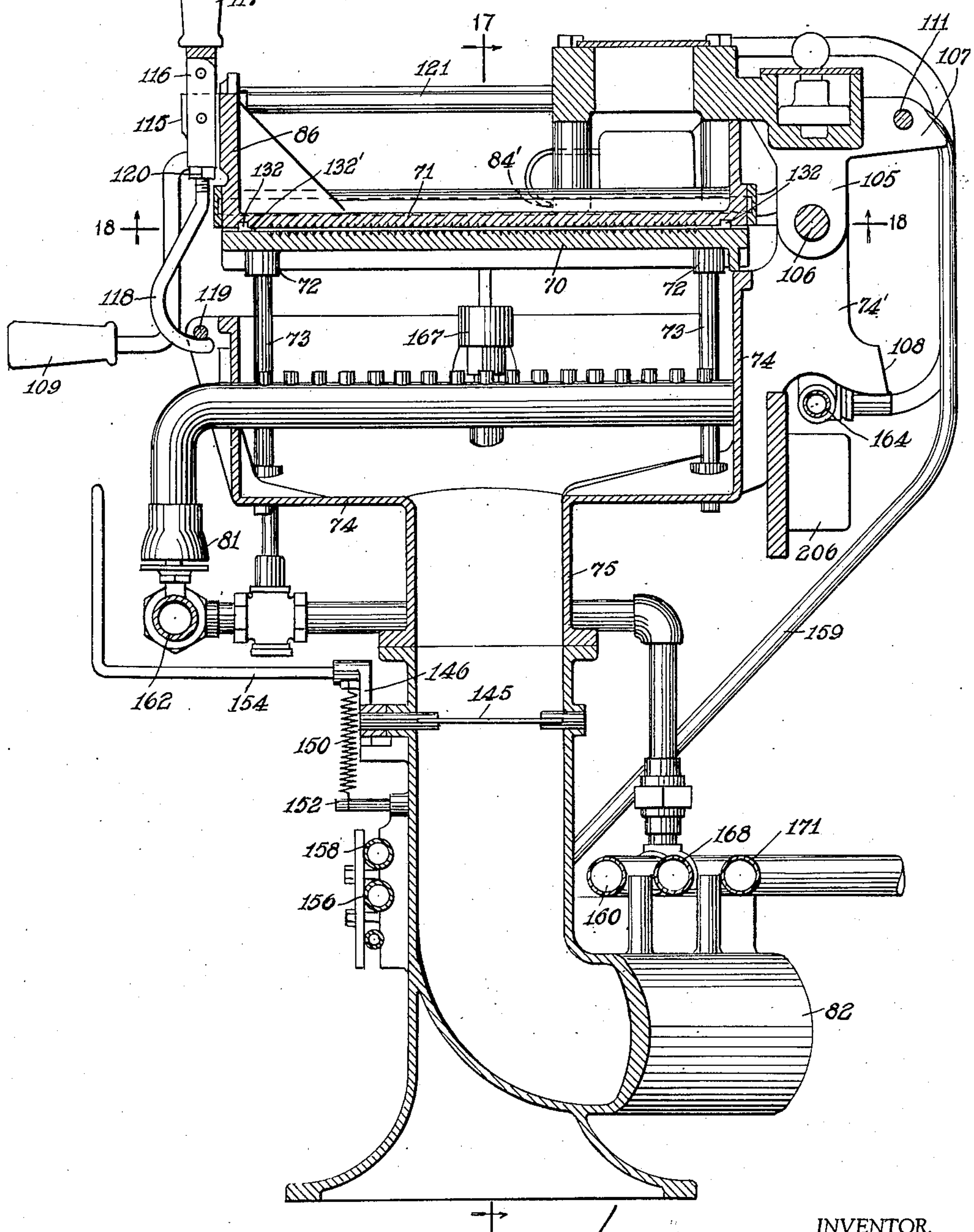

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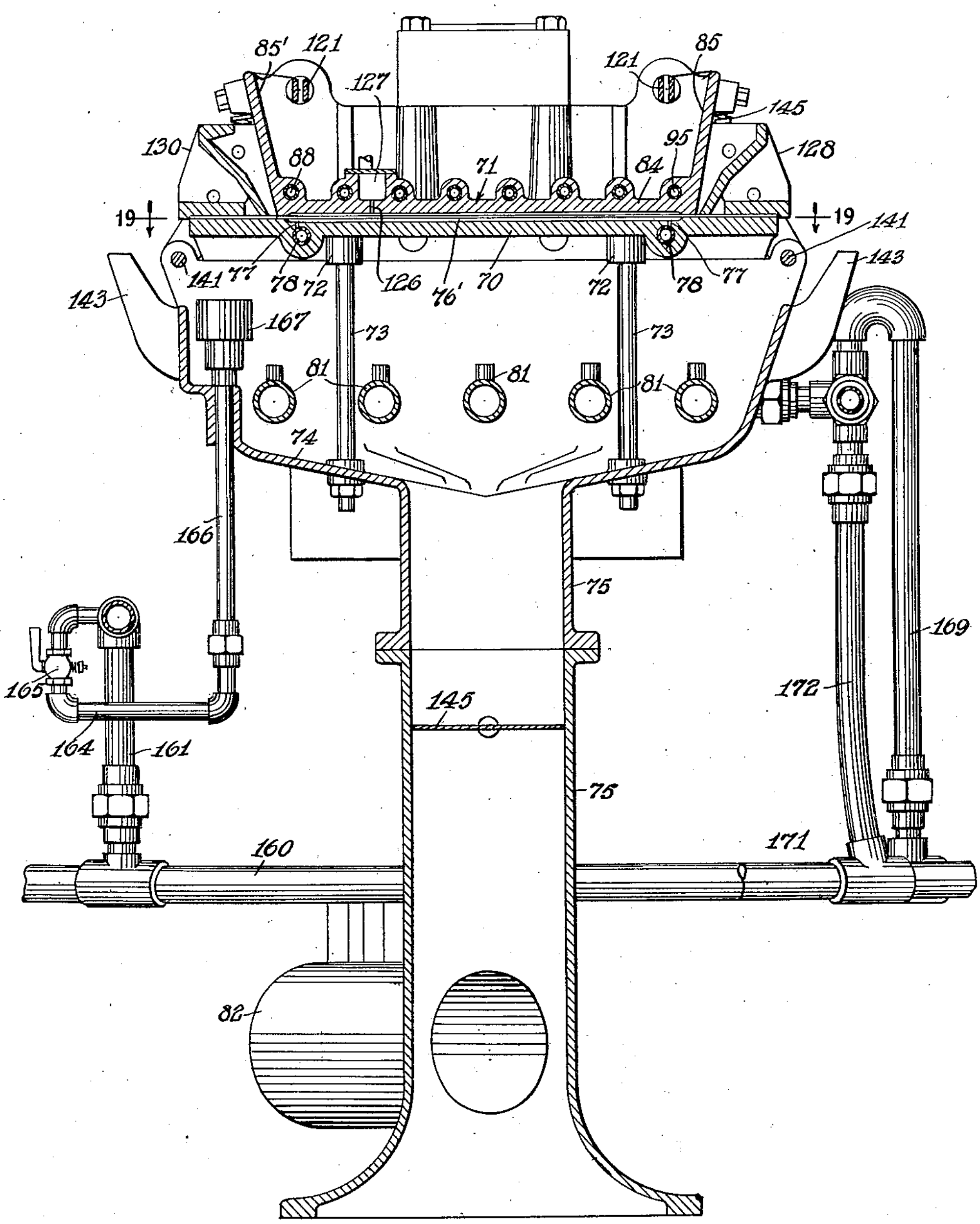
Fig. 17.



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APPARATUS FOR BACKING ELECTROTYPES

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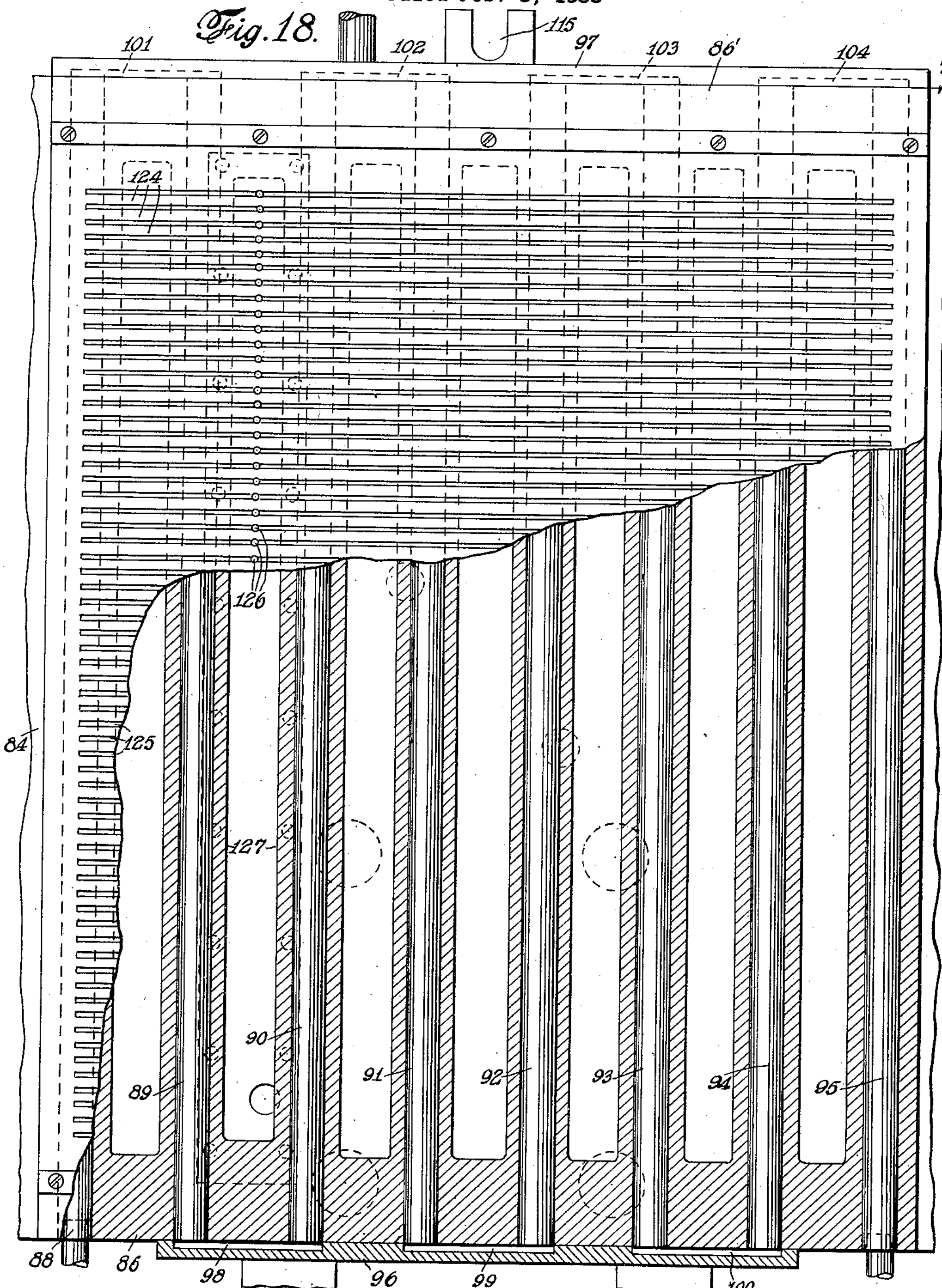
Fig. 18.



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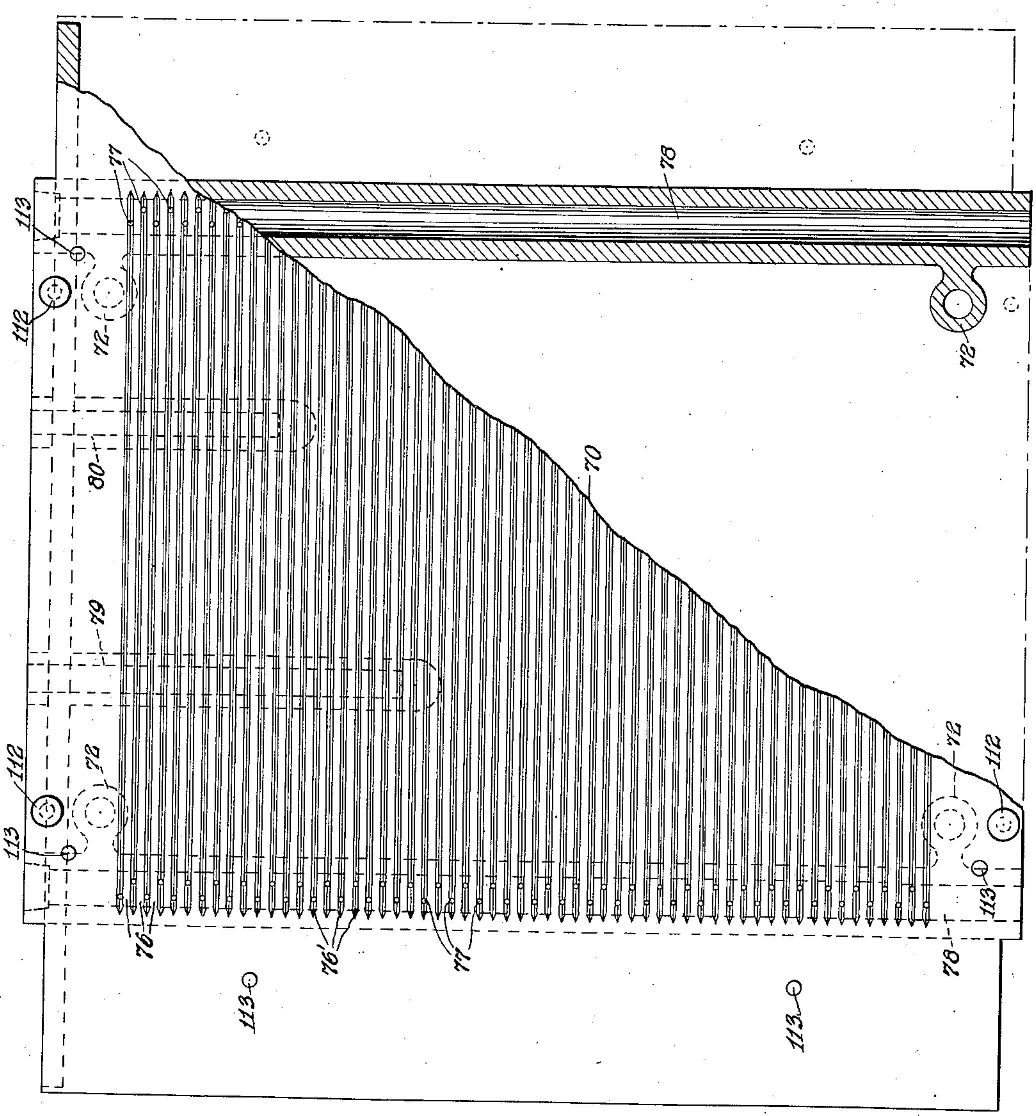

Fig. 19.

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APPARATUS FOR BACKING ELECTROTYPES

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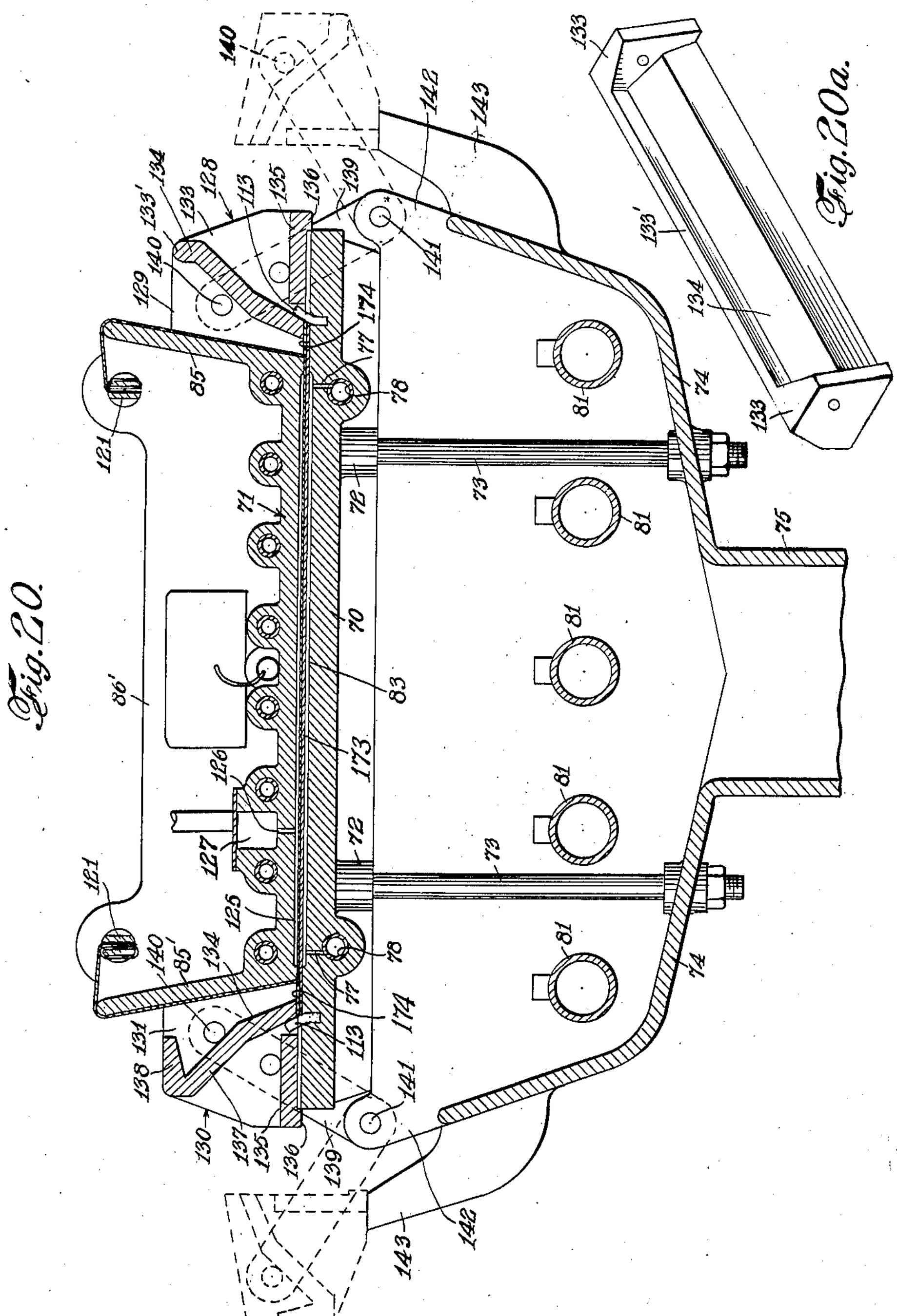

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APPARATUS FOR BACKING ELECTROTYPES

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Fig. 21.

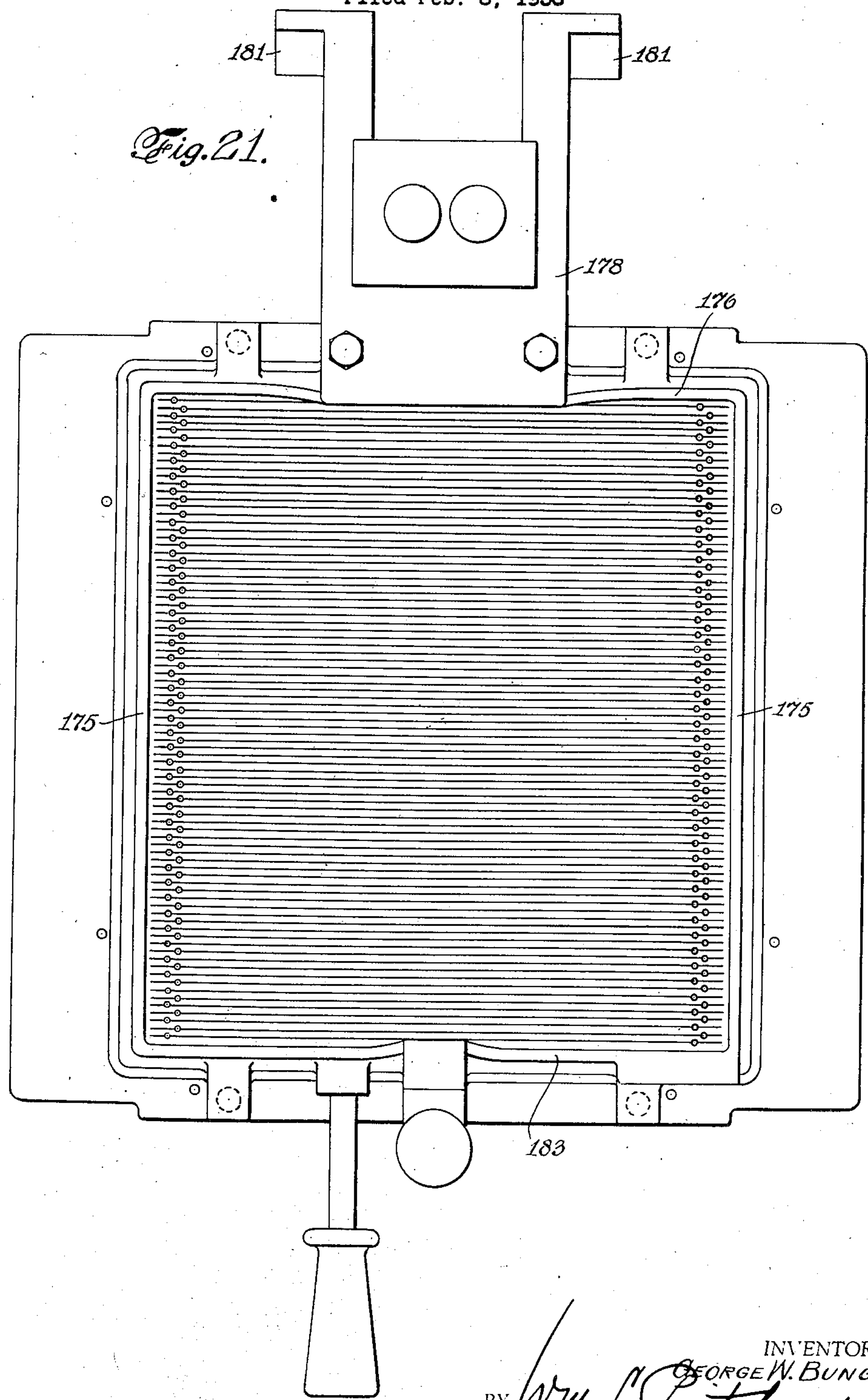

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Fig. 22.

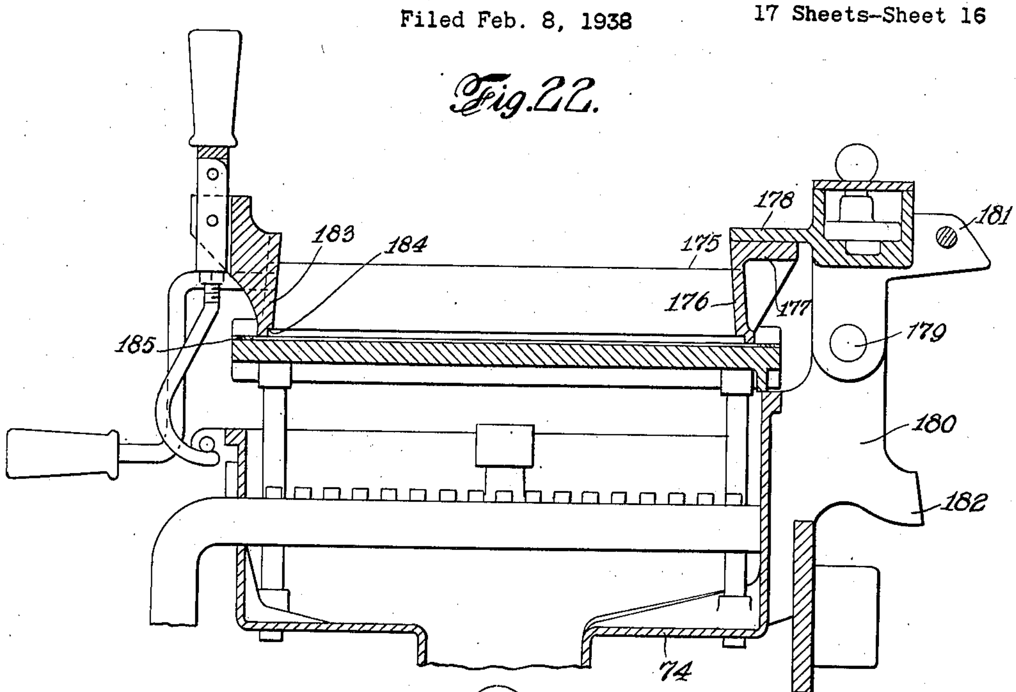

Fig. 23.

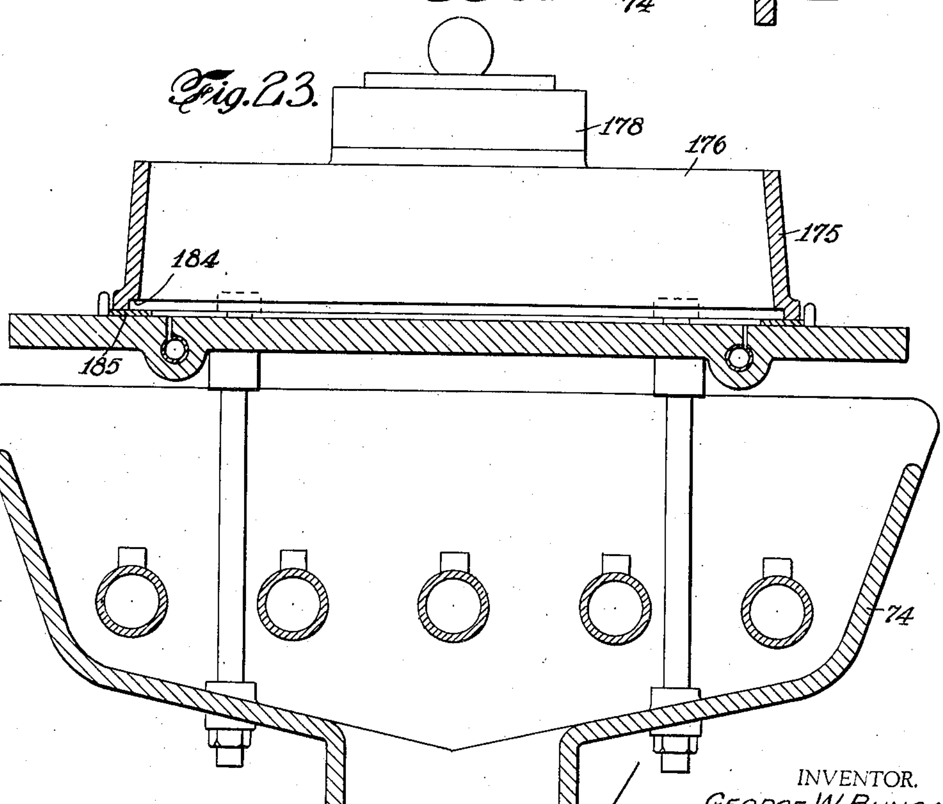

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Fig. 24.

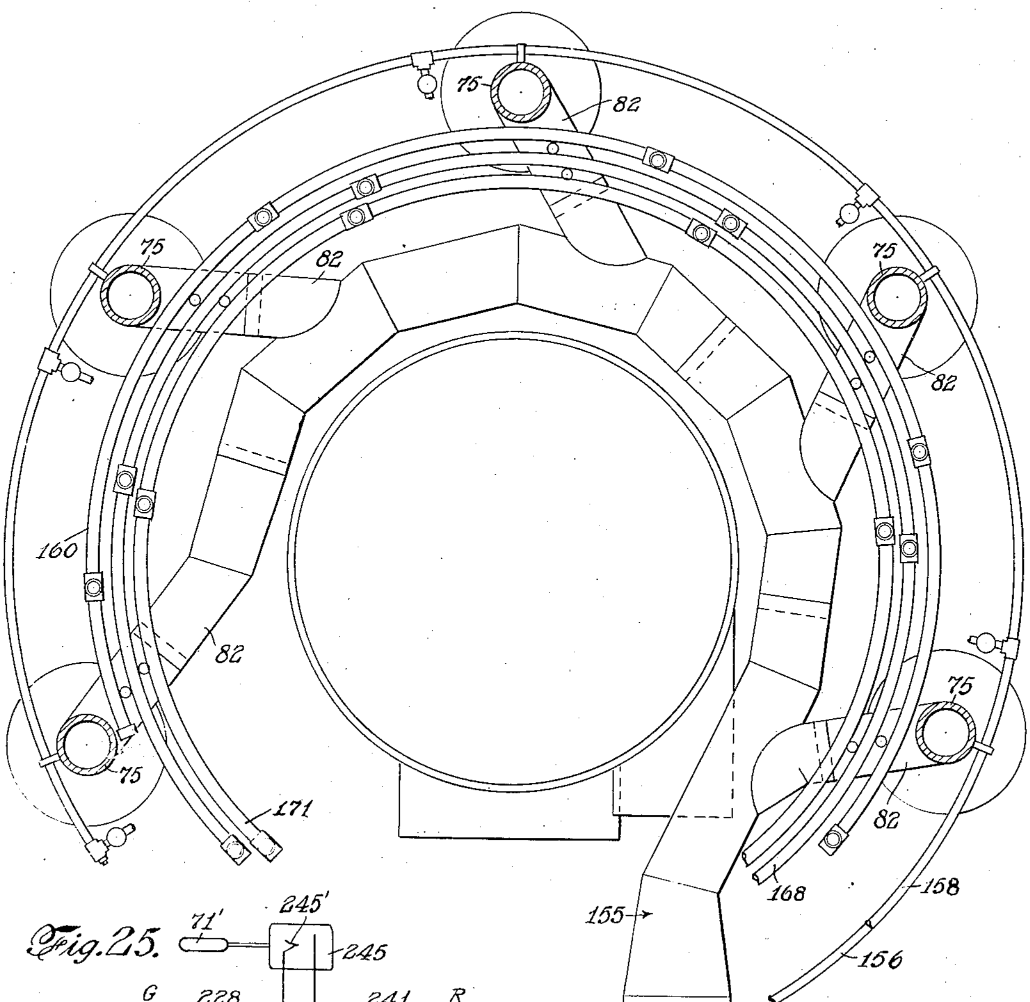
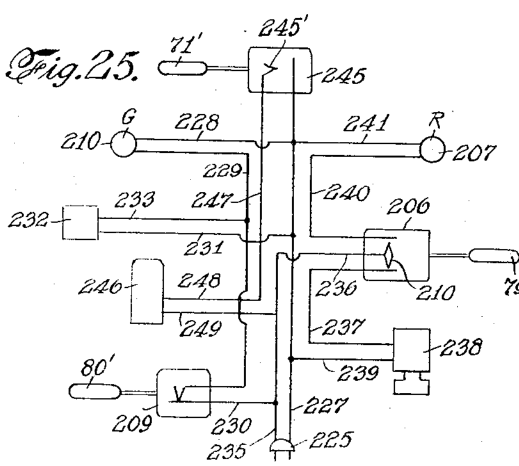


Fig. 25.



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Patented Dec. 5, 1939 **2,182,114**

UNITED STATES PATENT OFFICE

2,182,114

APPARATUS FOR BACKING ELECTROTYPES

George W. Bungay, New York, N. Y.

Application February 8, 1938, Serial No. 189,364

27 Claims. (Cl. 22—58)

This invention relates to electrotypes. More particularly, it relates to an apparatus for backing electrotypes.

The apparatus constituting the instant invention broadly comprises a pot in which the backing metal is melted and maintained in the molten condition, a plurality of backing tables, preferably arranged radially with respect to the pot, and means to feed a predetermined quantity of molten metal from the pot and pour the same on to an electrotype shell positioned on the backing table, as more fully hereinafter described.

Each backing table comprises an upper and lower member designed to be brought in superposed relationship and to form therebetween a chamber of such dimensions as to accommodate the electrotype shell positioned therein and also the desired thickness of the backing metal to be applied thereto. In one form of the invention, both the upper and lower members of the backing table are provided with means whereby a vacuum may be produced on the respective surfaces thereof which constitute the top and bottom of the chamber. Means are also provided whereby the said upper and lower members may be heated or cooled as desired. Means are also provided which cooperate on one side with the top and bottom members to constitute a gate through which the molten backing metal is fed into the molding chamber. On the opposite side, means are provided which cooperate with the molding chamber to form a riser.

The means for feeding the molten backing metal to the molding chamber comprises a spout having a pouring lip which is adapted to be brought into cooperative relationship with the gate. The spout is in cooperative relationship with a pump disposed in the molten metal bath whereby the desired quantity of molten metal may be delivered to the spout, and hence to the molding chamber.

The pump and the spout, together with the other appurtenant elements thereof, are so mounted with relation to the pot that they may be moved with respect to the pot, whereby the molten metal may be delivered and poured to any of the backing tables disposed radially with respect to the pot. A suitable fluid-actuated mechanism is provided to operate the pump whereby the pump feeds a predetermined quantity of the molten metal to and through the spout as desired. An appropriate mechanism is also provided to bring the spout and particularly the lip thereof in position to supply the molten metal to the gate and, when the spout is not in pouring position, to elevate it so that no metal can flow therefrom.

In order to more clearly explain and define applicant's invention, reference will now be made to the accompanying drawings wherein:

Figure 1 illustrates a diagrammatic plan view of the pot, pouring device and backing tables;

Figure 2 is a plan view of the pot and one backing table together with the mechanism for supplying the metal from the pot to the backing table in pouring relationship;

Figure 2*a* is a front elevation of the fluid-actuated mechanism for operating the pump;

Figure 3 is a side elevation of Figure 2, with the pot and its supporting shell in section showing the pump in operative position for feeding the metal;

Figure 4 is a side elevation of the pot-supporting mechanism and showing the mechanism and appurtenant parts in inoperative position;

Figure 5 is a section taken on the line **5—5** of Figure 2;

Figure 6 is a plan view of the pouring spout;

Figures 7, 8, 9, 10 and 11 are sections taken on the lines **7—7**, **8—8**, **9—9**, **10—10** and **11—11** respectively of Figure 6;

Figure 12 is a plan view of one backing table;

Figure 13 is a front elevation of one backing table;

Figure 14 is a side elevation of one backing table as viewed from the right of Figure 12;

Figure 15 is a rear elevation of one backing table;

Figure 16 is a central longitudinal section on the line **16—16** of Figure 13;

Figure 17 is a vertical cross-section taken on the line **17—17** of Figure 16;

Figure 18 is an underside view of the upper member of a backing table partly broken away and taken on the line **18—18** of Figure 16;

Figure 19 is a view of the bottom member of a backing table partly broken away and taken on the line **19—19** of Figure 17;

Figure 20 is an enlarged section of the upper portion of a backing table;

Figure 20*a* is a perspective view of the gate member;

Figure 21 is a top plan view of a modified form of a backing table;

Figure 22 is a central longitudinal section of Figure 21;

Figure 23 is a central vertical section of Figure 22;

Figure 24 is a plan view of the piping and various connections; and

Figure 25 is a circuit diagram.

Referring now to the drawings wherein like reference numerals designate like parts, the reference numeral 1 designates a pot in which any suitable electrotype backing metal is melted and maintained in the molten condition. A plurality of backing tables, each of which is generally indicated by the reference numeral 2, are disposed preferably in a circle about the pot 1. Though five backing tables 2 are shown in Figure 1, it is to be understood that the invention is not restricted to this precise number of backing tables. Any desired number thereof may be used. The means for feeding the molten metal from the pot 1 to any desired unit comprises a pump, generally indicated by the reference numeral 3, to which a spout 4 is appropriately secured.

The pot 1 is heated through the medium of gas burners (not shown) whereby the backing metal is melted and maintained in the molten condition so that it can be poured.

The pot 1 is provided with a peripheral flange 5 which seats on a flange or an angle iron 6 of a cylindrical supporting base or shell 7. Any suitable means for heating the pot 1 to melt the backing metal and maintain it at the desired temperature may be used. In the form shown, the pot 1 is heated by gas burners (not shown) disposed beneath said pot and in the interior of the shell 7. The gas lines and manifolds (also not shown) are covered by a shield 8 positioned adjacent the shell 7. By making the shield 8 of a strong, rugged material, it may also serve as a platform upon which an operator may stand in order to secure access to the interior of the pot 1 when this becomes necessary. The shell 7 is also provided with a flue pipe 9 whereby the gases of combustion may be removed or air introduced in the interior of the shell.

The shell 7 is provided adjacent the upper portion thereof with a rail 10, the purpose of which will become apparent from the following description.

The pump 3 is submerged in the molten metal in the pot 1 and it consists of a cylinder 11 which cooperates with a piston 12 carried on a piston rod 13. As shown in Figures 3 and 5, the cylinder 11 is provided with two openings 14, preferably elongated and oppositely disposed, through which the molten metal in the pot 1 enters into the pump cylinder. The pump in the lower portion thereof is provided with a passage 15 which communicates with another passage 16, the latter being formed in a webbing 17 which is preferably a part of the cylinder casting. The passage 16 constitutes a gooseneck. At its upper end, the passage 16 is provided with a flange 18 which is appropriately secured to the flange 19 carried on one end of the spout 4. The casting containing the cylinder 11 is also provided with a webbing 20. A cap 21 is secured to the upper end 22 of the webbing 20 and onto the lip 23 of the webbing 17. The cap 21 is provided in its upper portion with a bearing 24 through which the piston rod 13 is adapted to be reciprocated.

To support the pump 3 and its appurtenant elements, there is provided a frame structure having a ring 25 provided with a pair of depending arms 26, carrying bearing blocks 27 and 27' in which shafts 28 and 28' respectively are journaled. The cap 21 is mounted on said shafts (see Figure 5).

It is to be noted that the shafts 28 and 28' are in the same horizontal plane and that the cap 21 is secured thereto at diametrically opposite points. As a consequence, the cap 21, and hence also the pump 3, is pivotally mounted on said shafts 28 and 28'.

The ring 25 is one element of a carrier which carries the pump 3, to which the spout 4 is secured, and other elements of the apparatus hereinafter described. Due to the fact that the spout 4 is intended to move in a circular path relative to the pot 1 in order to permit said spout to pour the metal to any of said tables 2, the carrier is so constructed that it is movable in a circular path with respect to the pot. Specifically, the carrier comprises the ring 25 having an appropriate number, such as, for example, three, equally-spaced arms 30 extending radially therefrom. Each arm 30 is provided with a bearing 31 in which a shaft 32 carrying a flanged wheel 33 is mounted. Each of the arms 30 is of such a length that the flanged wheels 33 carried thereby are disposed on and are capable of riding on the rail 10. A shield 34 having an inwardly extending bottom flange 35 is appropriately fixedly secured to each arm 30 and/or to the shaft 32. By virtue of this construction, it is clear that the carrier and hence the portions of the apparatus carried thereby are capable of rotary movement with respect to the pot.

The spout, generally indicated by the reference numeral 4, is of the form shown in Figure 6, and the cross-sections thereof at various points are shown in Figures 7 to 11 inclusive. It is to be noted that the spout 4 is provided with a bend intermediate its ends and at one end thereof with a pouring lip 37 which is adapted to be moved into cooperative relationship with the gate of the backing table, as hereafter described. The forward end of the spout 4 is provided with a handle 38 whereby the spout may be moved into pouring relationship and appropriately held in position with respect to the gate. The forward end of the spout 4 is also provided with a plug 39 (see Figure 13) whereby, upon removal thereof, the spout may be cleaned as desired. When the spout is in non-pouring position, the end thereof provided with the lip 37 is maintained in a raised position.

As previously mentioned, the pump 3, in the preferred form of the invention, is operated by means of any known type of fluid-control or actuating mechanism. In the form shown, the piston rod 13 is secured to the arm 40, one end of which is provided with a forked member 41 secured to a slide 43 of the fluid-control mechanism, generally indicated by the reference numeral 45. The slide member 43 is slidably mounted on guide rods 46 and is secured to a piston rod and piston (not shown) operating in the fluid cylinder 47. The slide 43 is provided with bolts 48 whereby, upon proper adjustment thereof, the downward movement of the slide is controlled. It is to be noted that the lower portions of the bolts 48 cooperate with the top 49 of the cylinder 47 which functions as a stop. The top 49 of the cylinder limits the upward movement of the piston in the cylinder 47 and hence limits the upward movement of the slide 43.

A fluid, such as compressed air, water, glycerine, etc., is introduced into the cylinder 47, and preferably at the top thereof, by an appropriate line 51 connected to a suitable source of supply and in which there is provided a valve 52. A line 53, preferably connected adjacent the bottom of the cylinder 47, constitutes an outlet and it is to be noted that the outlet line 53 is also controlled by the valve 52. The valve 52 is a two-way valve and is normally held in an open position with respect to the outlet line 53 and in a closed position with respect to the inlet line 51 by means of a spring 54 which is connected to a link 55 and an ear 56. A handle 57 is provided for actuating the valve 52, as desired.

As shown in Figures 3 and 4, the fluid-control mechanism 45 is provided with a fixed support 58 to which are secured the arms 59 of the cap 21. Oppositely disposed with respect to the arms 59, the cap 21 is provided with a pair of arms 60 which are pivotally connected to one end of a link 61. The other end of the link 61 is pivotally connected to the arm 40.

The cap 21, together with the arms 59 and 60, may be made in a single casting.

By means of an arm 62 secured to the arms 59 and an ear 64 on the spout 4, the latter is connected to the arms 59.

For the purpose of aiding in maintaining the previously described elements in inoperative position, i. e. non-pouring, there are provided springs 65 having one end thereof secured to a pin 66 on the arm 59 and the other ends thereof secured to eye-pins 67 carried in supports 68 secured to the ring 25 by the screws 69. This serves to elevate the lip end of the spout 4 as previously described.

The pump 3 and the fluid-actuated mechanism 45 therefor are designed and constructed so that the pump during operation will deliver a predetermined quantity of molten metal to the spout 4. By appropriate adjustment of the elements of the pump and fluid-actuated mechanisms, different quantities of metal may be delivered to the spout.

From the preceding description it is clear that the pump 3, the spout 4 and the fluid-control means 45 are all mounted on the carrier which is designed to travel in a circular path with respect to the pot 1, and that upon rotation of said carrier the spout 4 can be positioned so that it can supply the metal from the pot 1 to any of said backing tables. Also due to the pivotal mounting of the cap 21 on the shafts 28 and 28', when the spout 4 is brought into pouring position, the pump 3 and the fluid-control apparatus 45 as well as the arms 40, 59 and 60 will be appropriately moved.

Since each of the backing tables is of identical construction and design, only one of them will be described.

As previously mentioned, the backing apparatus in one embodiment of the invention comprises a lower member 70 and an upper member 71 designed to be positioned in a spaced superposed relationship to provide a chamber 83 in which the electrotype shell to be backed is positioned and on which shell the backing metal is applied.

The member 70 is formed of a plate which on the undersurface thereof is provided with a plurality of threaded bosses 72 into each of which one end of a supporting rod 73 is threaded. The other ends of the supporting rods 73 are conveniently and adjustably secured to the base shell 74 which is carried on a vertical hollow support 75. By appropriate adjustment of the supporting rods 73, the member 70 may be positioned so that the upper surface thereof is in a substantially horizontal plane and further it may be raised or lowered with respect to the upper member 71. By mounting the plate 70, as described, on the rods 73 heat radiation from said plate is substantially prevented and allowance for expansion is obtained.

The member 70 is so designed and constructed that when the electrotype shell is placed thereon it will be securely held in substantially horizontal position. Though various means may be used for this purpose, I prefer to hold the electrotype shell in position by means of a vacuum. With this in view, the top surface of the plate 70 is provided with alternate ribs 76 and grooves 76', as shown in Figure 19. Each of the grooves 76' is provided with one or more passages 77 which communicate with pipes 78 cast into the member 70 and which are connected to a suitable source for producing a vacuum. As hereafter explained, a low vacuum when a thin shell is to be backed and a high vacuum when a thick shell is to be backed, can be secured. Though in the form illustrated there are shown two pipes 78, one at each side of the member 70, it is to be understood that the invention is not restricted to this precise number and that any desired number of pipes 78 and communicating passages 77 may be used.

During the carrying out of the process, it is necessary to heat and cool the plate 70. In the embodiment of the invention shown, the plate 70 is heated by gas burners 81 disposed therebeneath and in the base shell 74. Since any type of gas burners may be used, further description thereof is unnecessary.

As previously mentioned, the support 75 is hollow, and the lower end thereof is connected through a branch 82 to the outlet of a suitable blower mechanism whereby, upon actuation of the blower, a cooling fluid, such as air, may be blown upon the under surface of the member 70 to cool the same.

The plate 70 is also provided with passages 79 and 80 into which thermometers or other electrical control or indicating mechanisms may be inserted. For example, in passage 79 there is provided a heat-sensitive mechanism which controls the supply and cut-off of the gas to the burners 81. In passage 80 there is provided a heat-sensitive mechanism which controls the supply and cut-off of the cooling air to the plate.

It is to be noted that the top ends of at least two opposite sides of the shell 74 are spaced from the plate 70. This permits the ingress of air so that substantially complete combustion of the gas by the burners is secured and it also serves to permit an outlet for the cooling air introduced by the blower.

The upper member 71 comprises a plate 84 provided on the top surface adjacent each side thereof, with upwardly extending side walls 85 and 85' connected to each other through the front and rear plates 86 and 86'. The side walls 85 and 85' are preferably inclined with respect to the plate 84 to provide a draft for reasons which will become apparent from the description hereinafter set forth. Though the walls 85 and 85' and the plates 86 and 86' may be formed separately and secured to the plate 84, I prefer to make the plate 84, together with the said walls and plates, in a single casting.

As previously mentioned, the plate 84 is also provided with means for cooling the same. Though various means may be used for this purpose, I have found that satisfactory results can be secured through the use of a fluid, such as cool air or water. With this in view, the plate 84 is provided with a plurality of passages (pipes) through which water is circulated. Referring now to Figure 18 where the construction is more clearly shown, it will be noted that the plate 84 is provided with a plurality of parallel spaced longitudinally extending passages or pipes 88, 89, 90, 91, 92, 93, 94 and 95. In order to have a continuous flow of cooling fluid through the pipes 88–95 inclusive, there are provided cover plates 96 and 97 which are secured to the front and rear plates 86 and 86′ respectively. The plate 96 is provided with a plurality of grooves which, in cooperation with the front plate 86, form passages 98, 99 and 100. The passage 98 connects the passages 89 and 90; the passage 99 connects the passages 91 and 92; and the passage 100 connects the passages 93 and 94. The plate 97 is, similarly to the plate 96, provided with grooves which, in cooperation with the rear plate, form passages 101, 102, 103, 104, whereby the passage 88 is made to communicate with the passage 89, the passage 90 with the passage 91, the passage 92 with the passage 93, and the passage 94 with the passage 95 respectively. By this arrangement it will be noted that water or air entering the pipe 88, in the lower left hand corner of Figure 18, will pass through each of the passages and out of the passage 95, at the lower right hand corner of Figure 18. The passages 88 to 95 inclusive, in the preferred form of the invention, are formed of pipes around which the metal constituting plate 84 is cast.

The upper plate 84 is also provided with heat-sensitive means 71′ which is controlled by the temperature of the plate 84 and which controls the supply and cut-off of the cooling thereto. Red and green lights R and G, respectively, visibly indicate when the top plate is hot or cold.

The upper member 71 is movably mounted with respect to the lower member 70. More particularly, the upper member 71 is pivotally mounted relative to the lower member 70. As an illustrative construction for pivotally mounting the upper plate 71, the latter is provided at its rear edge with a bifurcated member 105 which is pivotally mounted on a pivot shaft 106 carried by a support 74′ on the shell 74. Though the support 74′ may be secured to the shell 74 in the form shown, it is cast integrally therewith. In order to limit movement in an upward direction about the pivot 106, the upper member 71, and preferably the member 105, is provided with a pair of ears 107 which are designed to cooperate with a stop 108 which is preferably formed at the desired place on the support 74′. The relative arrangement of the ears 107 and stop 108 is such that the movement of the upper member about its pivot 106 is 90°. Thus, the upper member 71 may be moved from a position parallel to the lower member 70 until it is at right angles thereto.

The upper member 71 is provided on the front end thereof with a handle 109 whereby an operator, upon gripping the same, may manually move said upper member about its pivot 106. Due to the fact that the upper member 71 is a relatively heavy casting, in order to aid in the lifting operation there is provided a spring 110, one end of which is secured to the shell 7, the other end thereof being secured to a pin 111 mounted between the ears 107. Thus, when the upper plate is in position on the lower plate, the operator, upon gripping the handle 109 and exerting an upward pressure, causes the upper member to move in an upward direction around its pivot. Because of the pull of the spring 110 on its pin 111, the operator does not have to exert too great an upward pressure on the handle 109.

In order to provide a chamber of the desired thickness the plate 70 is provided with appropriately spaced buttons 112 (see Figure 19) projecting upwardly from the face of said plate and adapted to contact with the face of the plate 84. The height of the buttons 112 is such as to provide a chamber of the desired thickness. The buttons 112 allow the shell to have a sliding fit and float more or less during the pouring and cooling operations.

For the proper positioning of the shell on the plate 70, the latter is also provided with means whereby this can be secured. In the form shown (see Figure 19) the plate 70 is provided with dowels 113 appropriately located on the plate so as to position the shell in proper position. As shown in Figure 20, the dowels 113 are curved, preferably outwardly, whereby the shell may be more easily positioned.

During the pouring and cooling operations, it is highly advantageous that the upper member 71 be securely held in spaced superposed position relative to the lower member 70. Though many means may be used to secure this result, satisfactory results are obtained by locking the upper member 71 to the shell 7. In the form shown, the front wall 85 of the upper member 71 is provided with a bifurcated lug 115 in which is pivotally secured a lever 116. A gripping handle 117 is appropriately secured to the top of the lever 116, and a latching element 118 provided at the other end thereof. The latching element 118 is adapted to cooperate with a pin 119 carried by the shell 74. It is to be noted that the latching element 118 is adjustably mounted in the lever 116 and secured in any adjusted position by means of a lock nut 120.

In the process of backing electrotypes, I have found that better results are secured when the upper member 71 is not in direct contact with the backing metal. With this in view, I have provided means whereby a suitable insulating material such as, for example, paper, may be positioned over the surfaces of the member 71 contacting the metal. In the form shown, this is secured by slotted clamping rods 121 carried by front and rear walls 86 and 86′ of the upper member 71. Each of the clamping rods 121 is provided with a pin 122, connected together by means of a spring 123.

To properly position the insulating material, means are provided in the top plate 84 which cooperate with the longitudinal edges of the insulating material. In the form shown in Figure 16, the means comprises a pin 132 secured to the plate 84 as in a slot therein, and having an inwardly extending flange 132′. The flange 132′ and the plate 84 are spaced from each other and cooperate to produce a passage which cooperates with the longitudinal edge of the insulating material. The vertical leg of the pin 132 functions as a stop with respect to the edge of the paper. Any desired number of the aforementioned pins 132 may be used.

The top member 71, and preferably the plate member 84 thereof, is provided with means to provide a vacuum on the under surface thereof, whereby the paper or other material is held in firm contact therewith. To achieve this result, the under surface of the plate 84 is provided with alternate ribs 124 and grooves 125. As shown in Figure 20, each groove 125 is provided with at least one passage 126 which communicates with a passage 127 extending longitudinally of the plate and connected to a suitable source of vacuum. If desired, a plurality of passages 126 and 127 may be provided.

As previously described, the side walls 85 and 85′ of the upper member are inclined so as to provide a draft to permit easy removal of the upper plate after the backing metal has been applied in position. Further, a member, generally indicated by the reference numeral 128 (see Figure 20), cooperates with the wall 85 of the member 71, and the two form a gate, designated by the reference numeral 129, into which the lip 37 of the spout pours the metal. The opposite wall 85′ cooperates with a member, generally designated by the reference numeral 130, to produce a riser, generally indicated by the reference numeral 131. The gate 129 and the riser 131 are in communicative relationship with the chamber formed between the lower member 70 and the upper member 71. Thus, when molten metal is poured by the spout 4 into the gate 129, the metal will pass into the chamber and fill the same. To ensure complete filling of the chamber, excess metal is supplied thereto, with the result that a portion thereof will pass into the riser 131 to a level substantially the same as that of the metal in the gate 129.

The member 128, as shown in Figure 20*a*, comprises a pair of oppositely disposed end plates 133 connected at the top by the member 133′, between which is carried a gate member 134. The gate member 134 is disposed at an angle with respect to the end plates 133, whereby the gate 129, formed by the wall 85 and the gate member 134, is substantially triangular in section. The end plates 133 are further secured together by a plate 135 disposed between the end plates and at the bottom thereof, and in advance of the gate member as shown in Figure 20. The plate 135 is spaced from the gate member 134 and provided with a lip 136 which cooperates with the lower plate 70. In the form shown in Figure 20*a* the end plates 133, the gate member 134 and plate 135 are formed of a single casting.

The member 130 is constructed similarly to the member 128, except that the riser member 137 is provided with a lip 138 to prevent splashing of the metal. In all other details, the members 130 and 131 are the same and are so indicated on the drawings by the use of like reference numerals. The riser member 137 cooperates with the wall 85′ to form the riser 131.

Both of the members 128 and 130 are similarly mounted so that each or both may be brought into operative relationship to perform the desired functions, i. e. provide a gate and riser respectively, when pouring is to be done. When no pouring is to take place, each may be moved out of operative relationship.

In the form shown (see Figure 20), a link 139 is pivotally secured at one end, as at 140, to the end plate 133, and the other end thereof is pivotally mounted on a shaft 141, carried in an arm 142, on the shell 74. The rear edge of the plate 135 is adapted to cooperate with a stop 143 carried by the shell 74. A gripping handle 144 is secured to the member 128 whereby the gate member may be moved into and out of operative position. The member 130 is similarly mounted. In Figure 20, the members 128 and 130 are shown in operative position and by dotted lines in inoperative position resting on the stop 143.

Springs 144 are carried by walls 85 and 85′ which cooperate with the members 128 and 130 to provide a cushioning effect when said members are in operative position. These springs 144 also serve to aid in holding the members 128 and 130 in operative position, though the method and means for mounting said members will of themselves produce this result.

Since there is a battery or plurality of backing tables, the operation on one table will be carried out at different times on another table. Thus, the apparatus is provided with means controlling the operations performed on each table irrespective of the operations being performed on any of the other tables.

To control the flow of cool air so that it may contact with the lower plate 70 at the desired time, a damper 145 is provided in the hollow support 75. The damper 145 is operatively connected to a link 146. At one corner thereof, the link 146 is provided with a latch member 147 which cooperates with a locking member 148 operated by a solenoid 149, the action of which is controlled by the temperature of the lower plate through the mechanism positioned in passage 80 of the plate. A spring 150 connected to the link 146, at 151, and to a support 152 normally urges the link to move in a counter-clockwise direction and thereby close the damper. The other corner 153 of the link 146 is connected to a handle 154. In normal operation, the damper 145 is in closed position. After the pouring operation and when the plate has reached a predetermined temperature, the operator grips the handle 154 and moves it to the right in Figure 13, whereby the latch member 147 is secured in locked position by the locking member 148 and the damper is in open position, permitting the supply of cool air to pass into the shell and contact the under surface of the bottom plate 70. When the temperature of the lower plate has reached the temperature to which the lower plate 70 is to be cooled, the solenoid is actuated whereby the locking member 148 is pulled away from the latch member 147, with the result that the spring 150 causes the link 146 to move counter-clockwise and move the damper 145 to closed position, thereby cutting off the supply of cool air.

In Figure 24, there is illustrated the general arrangement of the means for supplying the air, water, gas and vacuum to the respective backing tables 2. For supplying the cooling air to the lower plate 70 of each table 2, the respective branches 82 are connected to a manifold 155, which is connected to the outlet of a suitable blower (not shown). It is to be noted that the manifold 155 terminates by directly supplying the last table 2 served by it.

A line 156 appropriately carried on the supports 75 (see Figure 16) is suitably connected to a water supply (not shown) and constitutes the water supply for the upper plate member 84. The line 156 is provided with valve-controlled branches (not shown), one for each table. A piping, preferably a rubber hose 157, connects each branch to the respective water inlet 88 of the top plate 84 (see Figure 15).

A line 158 is also carried by the supports 75 and is directly above the water inlet line 156 (see Figure 16). The water outlet 95 of each plate 84 is appropriately connected by a line, preferably a rubber hose 159, to the line 157 which constitutes the main water outlet (see Figure 15).

A line 160 (see Figure 24) appropriately connected to a suitable source of gas (not shown) constitutes the main gas supply.

As shown in Figure 13, the gas supply 160 is provided with branches 161, each of which is connected to a respective manifold 162 carrying the gas burners 81 of each backing table 2. The gas burners 81 are of the usual type and therefore a specific description is not necessary. The supply of gas from the main supply 160 to the burners 81, through the connections 161 and 162, is controlled by a Honeywell gas-control valve 163. A shunt-line 164 controlled by a valve 165 supplies gas through the line 166 to a pilot light 167. The Honeywell gas-control valve 163 for the gas is of the well-known type and is appropriately connected to the lower plate so that, when the desired temperature is secured in the lower plate, the gas supply to the burners 81 will be cut off.

A line 168 appropriately carried on the branches 82 is connected to a source for producing a high vacuum (not shown). By an appropriate branch line 169 for each table, the high vacuum is connected to a two-way valve 170 which is appropriately connected to the vacuum passage 78 in the lower member 70 and also to the vacuum passage 127 of the upper plate 84.

A line 171 adjacent the line 168 and appropriately carried by the branches 82 is connected to a suitable source for producing a low vacuum (not shown). By an appropriate branch 172 for each table, the low vacuum line is connected to the two-way valve 170. Thus, upon proper manipulation of the valve 170, high or low vacuum may be supplied to the plate 70 and the plate 84 as desired.

As previously indicated, the supply and cut-off of gas, water, vacuum, air, as well as actuation of the solenoid 149 are all automatically controlled by the temperature of the top and bottom plates through various electrical circuits.

With this in view a source of power is supplied to each table through the power line 200 which is connected through the line 201 to a junction box 202. The junction box is in turn connected to the various parts to be automatically controlled as shown in Figure 15. Thus, the junction box 202 is connected through line 203 to the water-control device in upper plate 84 and through line 203' to the water valve. Through line 205 the junction box is connected to the gas and red light control 206, the latter being connected to the red light 207 and actuated by the capillary tube 208. The junction box is connected to the air and green light control 209, the latter being connected to the green light 210 and actuated by the capillary tube 211. Through line 212 the junction box is connected to the solenoid 149. Line 213 is connected to the gas-control valve. The letters W, A and G in the junction box designate water, air and gas respectively.

Figure 25 diagrammatically illustrates the various circuits in the apparatus at the beginning of the operation with the power plug connection 225 inserted into the main power line 200.

Since the bottom plate 70 at this stage of the process is cold, the bulb 80' in passage 80 will operate the air and green light control 209 to close circuits whereby the green lamp will be lit and the air valve will be closed so that no air will be supplied to the lower plate 74. The green lamp circuit is as follows: Conductors 227, 228, green lamp 210, conductor 229, control 209, and conductor 230. The air control circuit is as follows: Conductors 227 and 231, and a device 232 containing the solenoid 149 and appurtenant mechanism cooperating with the latch 147, conductors 233, 229, control 209, and conductor 230.

The control 209 is normally closed. At a predetermined temperature, for example, 350° F. it opens and turns off the green light 210 and closes its air valve 232.

It is now necessary to heat the lower plate. The control 206 is operated through the bulb 79' in the passage 79 of vacuum plate 70. The control 206 has a two-way switch 210. Normally the switch 210 is open with respect to one circuit and designed to close at a predetermined temperature such as 475° F. to light the red light 207. The switch 210 is normally closed with respect to the other circuit to operate the gas valve and designed to shut off the gas valve when the temperature reaches 475° F. In the form shown, the red light circuit is open and the circuit controlling the gas valve open. This latter circuit is as follows: Conductors 235, 236, switch 210, conductor 237, gas valve 238, conductors 239 and 227.

When the temperature of the lower plate 70 has reached 475° F., the bulb 79' throws the switch 210 to open the gas circuit and close the red light circuit. The red light circuit is as follows: Conductors 235, 236, switch 210, conductor 240, red light 207, conductor 241, and conductor 227.

The cooling water to the top plate 84 is controlled through the bulb previously generally indicated by the reference numeral 71'. When the temperature of the top plate is such as to require cooling water, the control 245 inside the plate 84 is operated to close the switch 245' with the result that the water valve 246 is operated. This circuit when closed is as follows: 227, switch 245', conductors 247, 248, valve 246, conductors 249 and 235. The control 245 is normally open and is closed at 150° F.

When cooling air is desired to be supplied to the lower plate 70, the handle 154 is operated as previously described to open the damper 145.

It is to be noted that the water, gas and cooling air circuits include plugs W, G and A.

Hereafter is set forth the mode of operation of the apparatus.

At the beginning of the operation, the green light 210 is illuminated and the cooling air supply to the lower plate is cut off. The water supply to the top plate 84 is also cut off.

Also, at the beginning of the operation, the upper member 71 is disposed at right angles to the lower plate 70 and the members 128 and 130 rest on their respective stops 143. The insulating material, such as paper, is positioned around the bottom and side walls of the upper plate 71 and secured in place through the medium of the clamping rods 121.

The bulb 79' operates the control 206 whereby gas or other fuel is fed to the burners 81 where the gas is ignited. When the temperature of the lower plate has reached 350° F. the circuit which includes the green light is opened with the result that the green light is extinguished. When the temperature has reached for example, 475° F. the circuit including the red light is closed. Prior to or subsequent to the disposition of the electrotype shell 173 in position on the lower plate 70, the vacuum valve 170 is manipulated to supply high or low vacuum as desired to both the lower plate 70 and the upper plate 84. An insulating gasket 174 is then placed on the marginal edge of the shell which has been positioned on the lower plate 70. The gasket is held in place by the vacuum produced in the plate 70 and room left to allow gasket and shell to float during the pouring and cooling period. The gasket maintains a flexible joint around the marginal edge during pouring and cooling. The upper member 71 is then moved on its pivot so that the plate 84 thereof is in superposed relationship with respect to the lower member 70. The latching element 118 is then forced to co-operate with the pin 119, whereby the upper member 71 is securely locked in position. The members 128 and 130 are then moved from the inoperative position to the operative position, whereby the gate 129 and the riser 131 are produced.

The carrier on the pot is rotated so that the lip 37 of the spout 4 is in cooperative relationship with the gate of the table 2 to which the molten metal is to be supplied. The operator grips the handle 38 carried by the spout and urges the spout, and hence the lip thereof, downwardly. By a suitable means (not shown) the handle is locked so that the spout 4 will be maintained in the desired position.

At this stage of the operation, due to lowering of the spout as described, the pump 3 has been tilted on its pivots 28 and 28'. However, the piston rod 13 is in raised position (see Figure 4) and the metal in the pot which has been reduced to the molten condition enters the pump cylinder 11, through the ports 14, and fills the passages 15 and 16 up to the level of the molten bath. The valve 52 of the fluid-control mechanism 45 is turned on so that compressed air or the like enters the cylinder and urges the piston therein downwardly, with the consequence that the slide 43 is urged downwardly. Since the lever 40 is connected to the slide and to the piston rod 13, the piston rod 13 is urged downwardly, with the result that the piston 12 forces the molten metal into the spout 4 and through the pouring lip 37 into the gate. By the arrangement of the levers 40, 59 and 60, the pump is maintained in the desired position.

The molten metal entering the gate flows therefrom into the chamber formed by the lower and upper plate members 70 and 84 respectively, and thence to the riser. The pump delivers a predetermined quantity of metal which is in excess of that required to back the plate. As a consequence, a certain amount of metal will remain in the gate and a certain amount of metal will be forced into the riser.

After the piston 12 in the fluid-control mechanism 45 has reached the limit of its path, the spring 54 turns the valve 52, with the result that further fluid is not introduced into the cylinder, but, on the contrary, the fluid in the cylinder is permitted to pass therefrom.

When the lower member 70 has reached the desired temperature, the control 206 operates the Honeywell gas-control valve 163 to cut off the gas whereby the burners are extinguished. If desired, prior to pouring the metal, the temperature of the electrotype may be raised to that desired and the gas supply to the burners is cut off by the Honeywell mechanism. When the lower plate has reached a predetermined temperature, the control 232 is de-energized whereby the solenoid 149 is actuated to withdraw the member 148 from locking engagement with the member 147. As a consequence, the spring 150 acts on the link 146, whereby the damper 145 is moved to open position permitting cool air to pass through the support 75 and under the lower plate.

In the meantime and after the pouring operation, when the upper plate 84 has reached a temperature of 150° F. the control 245 closes a circuit whereby cooling water is circulated through the passages therein.

After the temperature of the electrotype shell has fallen to that desired, the spout is raised from its pouring position and the elements 128 and 130 moved into their inoperative position, i. e. onto their respective stops. The top member 71 is then moved clockwise about its pivot and the backed electrotype removed from the apparatus and appropriately finished.

In Figure 3 the relationship of the various parts in pouring operation is shown.

In Figure 4 the relationship of the parts of the pump-control mechanism are shown in inoperative position.

For some work it is not essential to have the top plate 84 of the form and construction described above. For some work it is only necessary to provide a dam to control the area of the back of the electrotype plate. Such a modification is disclosed in Figures 21 to 23 inclusive.

In this modification, instead of the upper member 71 and the element appurtenant thereto as hereinbefore described, there is provided a dam 175, the walls of which are inclined to provide a draft. The wall 176 of the dam 175 is provided with a flange 177 to which is secured the member 178. The member 178 is pivotally mounted on the pivot 179 carried by a support 180 on the shell 74, and is also provided with ears 181 which cooperate with the stop 182 also carried by the shell. The wall 183 is provided with a locking mechanism similar to that previously described. The dam 175, at its lower end, is provided with an undercut portion 184. In all other respects the apparatus illustrated in Figures 21 to 23 is similar to that previously described. In operation, the gasket 185 is disposed beneath the lower edge of the dam 175 and the backing metal supplied as previously described.

When this modification is employed, the water connection and the upper vacuum connections as shown on the diagrams are not necessary. The water connection W need not be plugged in and the upper vacuum connection removed.

In this embodiment, as in the previous embodiment, in operation a gasket is disposed on the shell to be backed and beneath the undercut portion 184. The gasket extends inwardly. When metal is poured into the chamber a portion thereof contacting with the space between the undercut portion and the gasket becomes chilled and forms a fluid-tight joint therebetween. The gasket functions as a means for forming a flexible joint. Buttons, similar to those designated by the reference numeral 112, serve to provide the shell with a sliding fit, as explained previously in connection with Figure 19.

Since it is obvious that various changes and modifications may be made in the above description without departing from the nature or spirit thereof, this invention is not restricted thereto except as set forth in the appended claims.

I claim:

1. An apparatus for backing electrotype shells comprising a plurality of backing tables, a pot containing molten backing metal, a pivotally mounted pump immersed in said molten metal to deliver a predetermined quantity of said metal, fluid-actuated means to operate said pump,

a pouring spout connected to said pump, said spout having a pouring lip which is maintained in a raised position when the spout is in non-pouring position, and a carrier rotatably mounted relative to said pot and carrying said pump.

2. An apparatus for backing electrotype shells comprising a plurality of backing tables, a pot containing molten backing metal, and means to feed molten metal from said pot to any of said tables, said means including a carrier disposed above and rotatably mounted relative to said pot, a pump to deliver a predetermined quantity of said molten metal pivotally mounted on said carrier and immersed in said molten metal, and a pouring spout connected to said pump.

3. An apparatus for backing electrotype shells comprising a plurality of backing tables, a pot containing molten backing metal, and means to feed molten metal from said pot to any of said tables, said means including a carrier disposed above and rotatably mounted relative to said pot, a pump to deliver a predetermined quantity of said molten metal pivotally mounted on said carrier and immersed in said molten metal, fluid-actuated means to operate said pump, and a pouring spout connected to said pump.

4. An apparatus for backing electrotype shells comprising a plurality of backing tables, a pot containing molten backing metal, and means to feed molten metal from said pot to any of said tables, said means including a rail around said pot, a carrier rotatably mounted on said rail, a pump pivotally mounted on said carrier and immersed in said molten bath, a pouring spout connected to said spout, and fluid-actuated means to operate said pump.

5. An apparatus for backing electrotype shells comprising a plurality of backing tables, a pot containing molten backing metal, and means to feed molten metal from said pot to any of said tables, said means including a rail around said pot, a carrier rotatably mounted on said rail, a pump pivotally mounted on said carrier and immersed in said molten bath, a pouring spout connected to said spout, fluid-actuated means to operate said pump, and means to support said fluid-actuated means on said carrier.

6. An apparatus for backing electrotype shells comprising a plurality of backing tables, a pot containing molten backing metal, and means to feed molten metal from said pot to any of said tables, said means including a rail around said pot, a frame rotatably mounted on said rail, a pump pivotally mounted on said frame and immersed in said molten metal, a pouring spout connected to and carried by said pump, fluid-actuated means to operate said pump, and means to pivotally mount said fluid-actuated means on said frame.

7. An apparatus for backing electrotype shells comprising a plurality of backing tables, a pot containing molten backing metal, and means to feed molten metal from said pot to any of said tables, said means including a rail around said pot, a frame movably positioned on said rail, a cap pivotally mounted on said frame, a pump secured to said cap and immersed in said molten bath, a pouring spout connected to said pump, and fluid-actuated means to operate said pump, said cap being provided with means to carry said fluid-actuated means.

8. An apparatus for backing electrotype shells comprising a plurality of backing tables, each of said tables being provided with a chamber to which the molten metal is to be supplied and a gate and riser communicating with said chamber, a pot containing molten backing metal, a pouring spout having a lip adapted to cooperate with said gate, means to deliver a predetermined quantity of metal from said pot to said spout, and means to rotatably mount said spout relative to said pot, whereby molten metal can be supplied to any of said backing tables.

9. An apparatus for backing electrotype shells comprising a backing table having a horizontally disposed plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted with respect to the first plate and adapted to be superposed on the first plate and form a chamber in which the electrotype shell is disposed and to which backing metal is to be supplied, means cooperating with said plates to form a gate communicating with said chamber, and means cooperating with said plates to form a riser communicating with said chamber.

10. An apparatus for backing electrotype shells comprising a backing table having a horizontally disposed plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted with respect to the first plate and adapted to be superposed on the first plate and form a chamber in which the electrotype shell is disposed and to which backing metal is to be supplied, pivotally mounted means adapted to be positioned adjacent one edge of the superposed plate to form a gate communicating with said chamber during the pouring operation, and pivotally mounted means adapted to be positioned adjacent the opposite edge of the superposed plate to form a riser communicating with said chamber during the pouring operation.

11. An apparatus for backing electrotype shells comprising a backing table having a horizontally disposed plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted with respect to the first plate and adapted to be superposed on the first plate and form a chamber in which the electrotype shell is disposed and to which backing metal is to be supplied, pivotally mounted means adapted to be positioned adjacent one edge of the superposed plate to form a gate communicating with said chamber during the pouring operation, pivotally mounted means adapted to be positioned adjacent the opposite edge of the superposed plate to form a riser communicating with said chamber during the pouring operation, and means to support each of said pivotally mounted means respectively out of cooperative relationship with said chamber when metal is not poured.

12. An apparatus for backing electrotye shells comprising a support carrying a horizontally disposed plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted relative to the first plate and adapted to be superposed on the first plate and form a chamber in which the electrotype shell is disposed and to which backing metal is to be supplied, means pivotally mounted on said support and adapted to be positioned relative to said plates to form a gate communicating with said chamber during the pouring operation, means pivotally mounted on said support and adapted to be positioned relative to said plates to form a riser communicating with said chamber during the pouring operations, and means on said support to support each of said pivotally mounted means out of cooperative relationship with said plates and chamber when metal is not poured.

13. An apparatus for backing electrotype shells

comprising a support carrying a substantially horizontal plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted relative to the first plate and adapted to be superposed on said first plate and form a chamber in which the electrotype shell is disposed and to which backing metal is to be supplied, means to supply a vacuum to the opposed surfaces of both of said plates, means to heat the first-named plate, and separate means to cool each of said plates respectively.

14. An apparatus for backing electrotype shells comprising a support carrying a substantially horizontal plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted relative to the first plate and adapted to be superposed on said first plate and form a chamber in which the electrotype shell is disposed and to which backing metal is to be supplied, means to supply a vacuum to at least the surfaces of the first-named plate, means to heat the first-named plate without moving said plate, and separate means to cool each of said plates respectively without moving said plates.

15. An apparatus for backing electrotype shells comprising a support carrying a substantially horizontal plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted relative to the first plate and adapted to be superposed on said first plate and form a chamber in which the electrotype shell is disposed and to which backing metal is to be supplied, a protective covering on the under surface of said second plate, means to supply a vacuum to the opposed surfaces of both of said plates, means to heat the first-named plate without moving said plate, and separate means to cool each of said plates respectively without moving said plates.

16. An apparatus for backing electrotype shells comprising a support carrying a substantially horizontal plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted relative ot the first plate and adapted to be superposed on said first plate and form a chamber in which the electrotype shell is disposed and to which backing metal is to be supplied, a protective covering on the under surface of said second plate, means to hold said protective covering in position, means to supply a vacuum to the opposed surfaces of both of said plates, means to heat the first-named plate, and separate means to cool each of said plates respectively.

17. An apparatus for backing electrotype shells comprising a support carrying a substantially horizontally disposed plate having alternate ridges and grooves on which the electrotype shell is positioned, means to supply a vacuum to said grooves to securely hold said electrotype shell in position, means to heat said plate, means to cool said plate, a second plate pivotally mounted relative to the first plate and adapted to be superposed on said first plate to form a chamber in which the electrotype shell is disposed and to which metal is to be supplied, and means to cool said second plate.

18. An apparatus for backing electrotype shells comprising a support carrying a substantially horizontal plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted relative to the first plate and adapted to be superposed on the shell disposed on said first plate and forming a chamber in which the electrotype shell is disposed and in which the backing metal is to be supplied, means to form a flexible fluid joint between said shell and top plate, means to apply a vacuum to the opposed surfaces of both of said plates, means to heat the first plate, and separate means to cool each of said plates respectively.

19. An apparatus for backing electrotype shells comprising a support carrying a substantially horizontal plate on which the electrotype shell to be backed is positioned, a second plate pivotally mounted relative to the first plate and adapted to be superposed on said first plate and forming a chamber in which the electrotype shell is disposed and in which the backing metal is to be supplied, means to supply a vacuum to the opposed surfaces of both of said plates, means to heat the first plate, means to cool the top plate, means to cool the bottom plate, and means controlled by the temperature of the upper plate to operate the cooling means therefor, and means controlled by the temperature of the lower plate to operate the heating and cooling means therefor.

20. An apparatus for backing electrotype shells comprising a support carrying a substantially horizontal plate on which the electrotype shell to be backed is disposed, means to position said shell on said plate, a second plate pivotally mounted relative to the first plate and adapted to be superposed on said first plate and forming a chamber in which the electrotype shell is disposed and in which the backing metal is to be supplied, means on the first plate to space the second plate therefrom, means to supply a vacuum to the opposed surfaces of both of said plates, means to heat the first plate, and separate means to cool each of said plates respectively, each of said cooling means being controlled by the temperature of the respective plates.

21. An apparatus for backing electrotype shells comprising a support carrying a substantially horizontal plate on which the electrotype shell to be backed is disposed, means to position said shell on said plate, a second plate pivotally mounted relative to the first plate and adapted to be superposed on said shell on said first plate and forming a chamber in which the electrotype shell is disposed and in which the backing metal is to be supplied, means on the first plate to space the second plate therefrom, means to form a flexible fluid-tight joint between said shell and the second plate, means to apply a vacuum to the opposed surfaces of both of said plates, means to heat the first plate, and separate means to cool each of said plates respectively.

22. In an apparatus for backing electrotype shells, a support, a substantially horizontal plate on which the electrotype shell to be backed is positioned, a plurality of rods mounting said plate on said support whereby heat radiation therefrom is substantially eliminated and expansion thereof permitted, means to heat said plate, means to cool said plate and means controlled by the temperature of said plate to operate said cooling means.

23. An apparatus for backing electrotype shells comprising a support carrying a substantially horizontal plate on which the electrotype shell to be backed is placed, means on said plate to position said shell in position, means to heat said plate, means to cool said plate, means controlled by the temperature of said plate to operate the heating and cooling means, a frame pivotally mounted with respect to said plate and adapted to be superposed on said plate to form a dam having a draft, means to provide a flexible

fluid-tight joint between same frame and plate, means to lock said frame in position, and means to supply molten metal to the interior of said dam.

24. An apparatus for backing electrotype shells comprising a support carrying a horizontal plate on which the electrotype shell to be backed is placed, a member pivotally mounted relative to said plate and adapted to be superposed on the shell and form a chamber in which the backing metal is to be poured, means to form a flexible fluid-tight joint between said shell and member and means to space the said plate and member from each other to permit the shell to have a sliding fit in said chamber.

25. An apparatus for backing electrotype shells comprising a support carrying a horizontal plate on which the electrotype shell to be backed is placed, a member pivotally mounted relative to said plate and adapted to be superposed on the shell and form a chamber in which the backing metal is to be poured, a gasket disposed on the marginal edges of said shell and beneath said member, and means to space the said plate and member from each other to permit the shell to have a sliding fit in said chamber.

26. An apparatus for backing electrotype shells comprising a support carrying a horizontal plate on which the electrotype shell to be backed is placed, a member pivotally mounted relative to said plate, and adapted to be superposed on the shell and form a chamber in which the backing metal is to be poured, said member having an undercut portion in the lower part thereof, a gasket disposed beneath said undercut portion, and means to space said member from said shell to provide the latter with a sliding fit.

27. An apparatus for backing electrotype shells comprising a support carrying a horizontal plate on which the electrotype shell to be backed is placed, a member pivotally mounted relative to said plate, and adapted to be superposed on the shell and form a chamber on which the backing metal is to be poured, said member having an undercut portion in the lower part thereof, a gasket disposed beneath said undercut portion, said gasket extending inwardly and beyond the undercut portion, and means to space said member from said shell to provide the latter with a sliding fit.

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