

H. A. W. WOOD.
 STEREOTYPE PLATE CASTING AND FINISHING MECHANISM.
 APPLICATION FILED MAR. 4, 1898. RENEWED AUG. 2, 1910.

985,874.

Patented Mar. 7, 1911.

4 SHEETS-SHEET 1.

Fig. 1.

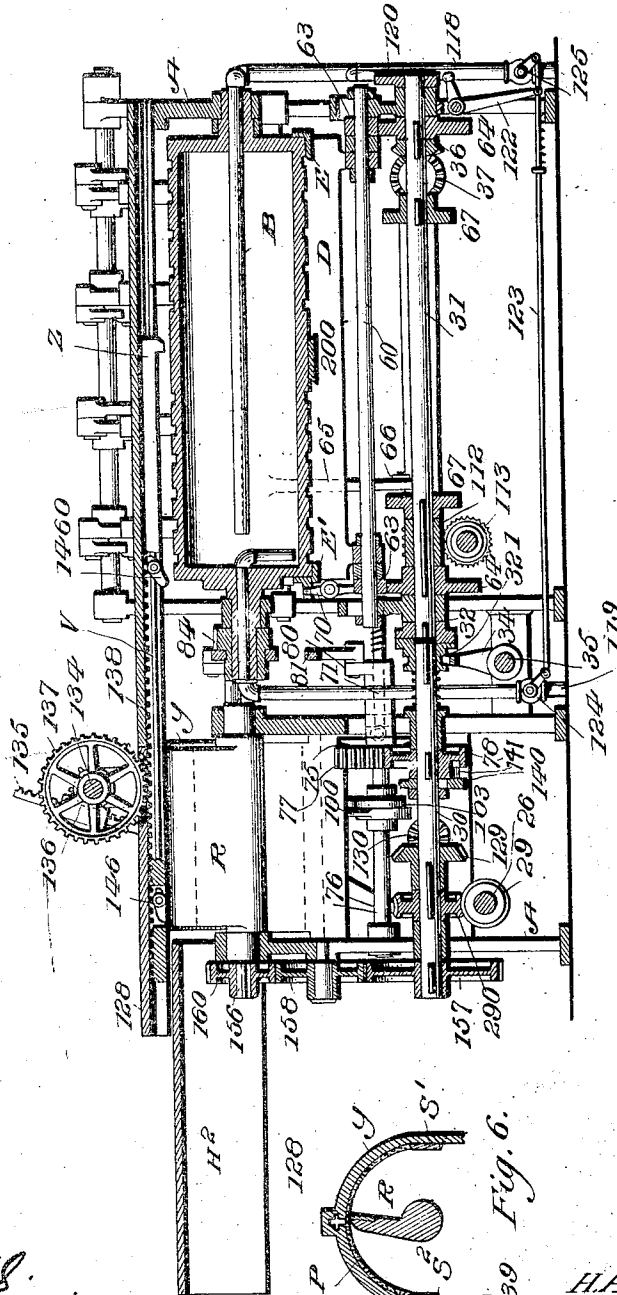
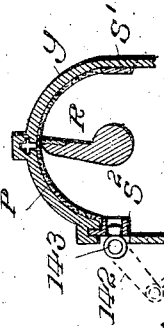


Fig. 6.



Witnesses.

John Smith
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Inventor.

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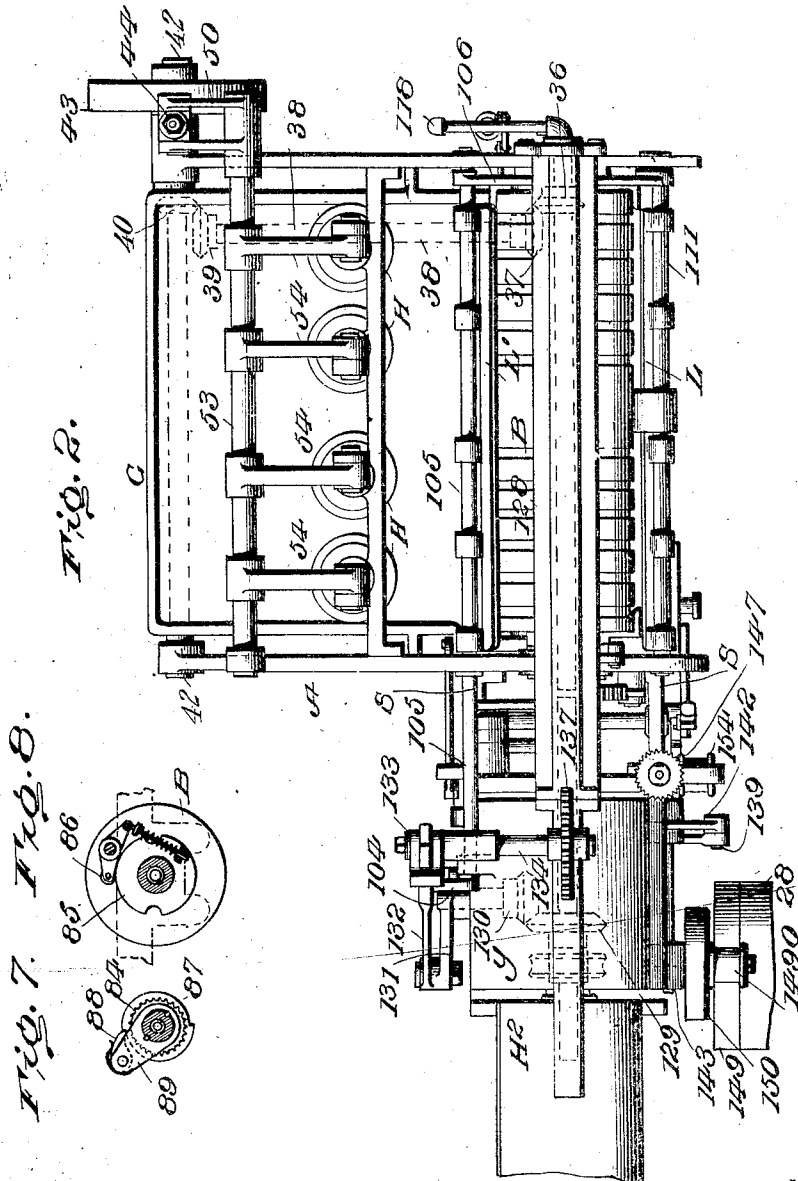
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Witnesses

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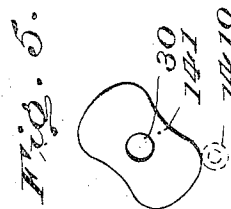
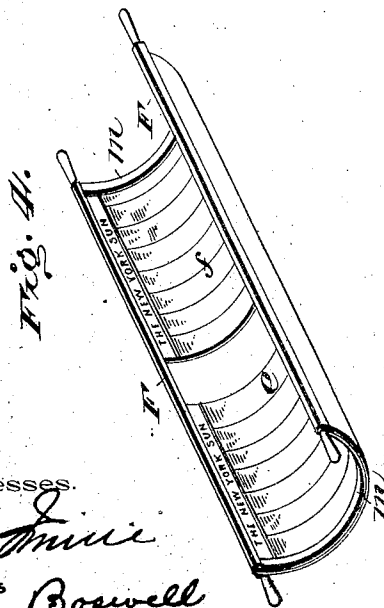
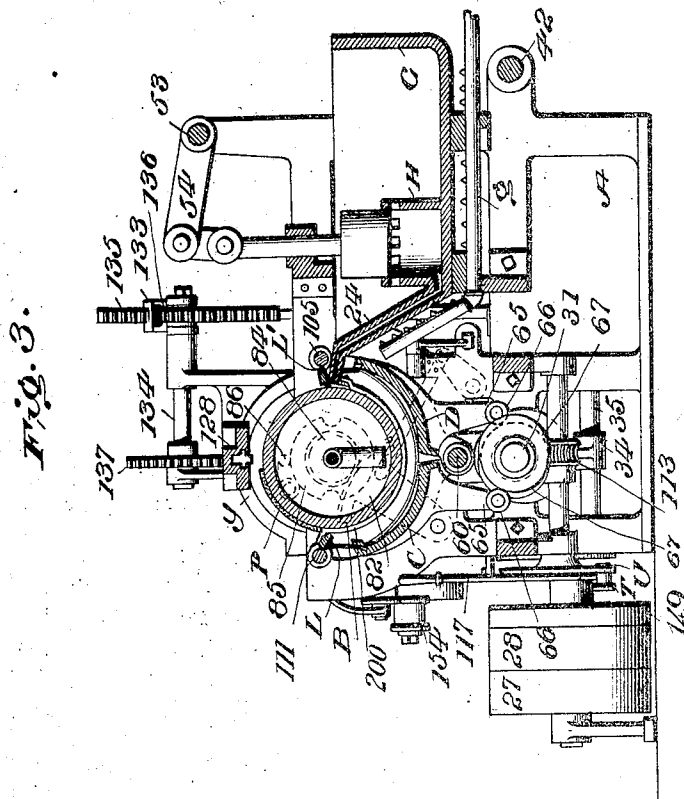
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4 SHEETS—SHEET 3.



Witnesses.

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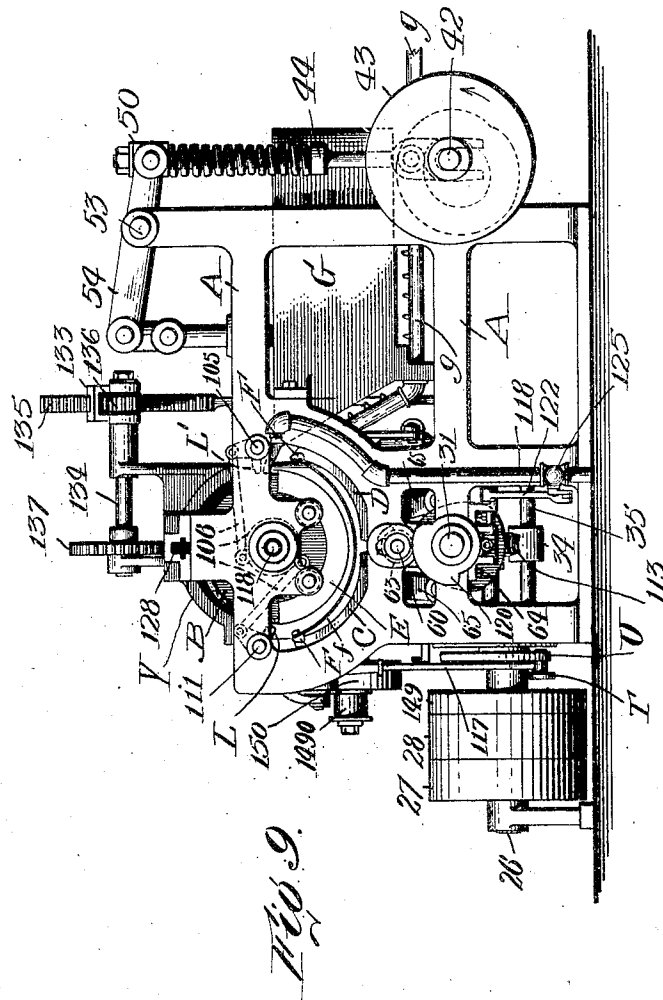
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4 SHEETS-SHEET 4.



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY A. WISE WOOD, OF NEW YORK, N. Y., ASSIGNOR TO CAMPBELL PRINTING PRESS & MANUFACTURING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

STEREOTYPE-PLATE CASTING AND FINISHING MECHANISM.

985,874.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed March 4, 1898, Serial No. 672,554. Renewed August 2, 1910. Serial No. 575,181.

To all whom it may concern:

Be it known that I, HENRY A. WISE WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Stereotype-Plate Casting and Finishing Mechanism, of which the following is a specification.

The aim of this invention is to improve or further carry out the invention shown, described and claimed in patent granted to me February 17, 1903, No. 721,117, for an automatic stereotype plate casting and finishing machine. In said patent, I show, describe and claim an automatic stereotype plate casting and finishing machine adapted to automatically cast and automatically finish stereotype printing plates. In said machine, one plate is cast at a time.

The principal improvement described and claimed in this application is a stereotype plate casting machine in which two or more plates are simultaneously cast. I preferably arrange this mechanism to work automatically, and arrange in combination therewith a plate finishing mechanism, and by properly speeding the parts I so combine these devices, that a finishing mechanism capacitated to act on a single plate may be used and kept practically in constant operation. In other words, the two plates are cast at one operation by the casting mechanism, and the finishing mechanism is geared to operate twice for each casting operation, and conveying means are provided for carrying one plate and then the other plate through the finishing mechanism.

The device shown in the accompanying three sheets of drawings illustrates the best form of machine now known to me for carrying out the principle of my invention, referring to which,

Figure 1 is a central sectional elevation of the complete device, Fig. 2 is a plan view of the same, Fig. 3 is an end sectional view through the casting mechanism, Fig. 4 is a perspective view of the matrix-carrying frame, Fig. 5 is a detail view of one of the cams, Fig. 6 is a sectional elevation through a part I term the arch, Figs. 7 and 8 are detail views of the mechanism employed for

turning and locking the casting core or cylinder, and Fig. 9 is an end view of the casting mechanism.

The casting mechanism proper consists of a core and a back, with means for holding two or more matrices in position in the casting box thus formed, so that two or more plates will be cast at one casting operation. The core and back are made of a length equal to the width of a stereotype printing plate multiplied by the number of plates to be cast at each operation. The machine specifically illustrated is adapted to cast two plates at each operation, and hence, the core and back are made of a length substantially equal to twice the width of the plate. This form of machine will now be specifically described. To make the two plates, I provide a separating strip which divides the mold into two cavities. I also provide mechanism for operating the casting mechanism. The means for holding a plurality of matrices is preferably arranged so that the matrices will be held upon the same side of the axis of the box. In combination therewith I also preferably arrange a plate-finishing mechanism operating twice for each casting operation, and a conveying mechanism operating twice for each casting operation, and passing one plate at a time through the finishing mechanism.

The practical speed at which a device of this character can be run is that speed at which the plates can be cast. As this necessarily involves several operations, including a cooling operation, the time here employed is practically a constant. To get a larger production from a machine of this class, I therefore arrange the parts as before described, as I have found I can trim and finish the plates at a much higher speed than I can cast the same. Therefore, by casting simultaneously a plurality of plates I can increase the production by only increasing the size of the casting mechanism, and not the size or parts of the finishing mechanism.

Referring to the drawings and in detail, A represents a suitable framing in which are journaled three shafts 30, 31 and 76, a clutch being arranged to connect the shaft 31 to the shaft 30 when desired, and the shaft 76

being geared to turn with the shaft 30 by means of gears 77 and 78. At the rear side of the machine, I arrange a melting pot or tank G, and in this tank, I arrange a pump-
 5 ing mechanism consisting, as shown, of four pumps H, for forcing the molten metal through a suitable spout 24 into the casting chamber. A suitable heating device as a
 10 gas-pipe or gas-pipes *g* with various burners, is arranged under the melting-pot, and also under the spout 24 so as to keep the metal in the melting-pot and channel in a molten condition.

The pumps are operated from the shaft
 15 31 by the following gearing:—Arranged on the shaft 31 is a bevel-gear 36, which meshes with and drives a bevel-gear 37 secured upon a shaft 38 on the outer end of which is mounted a bevel-gear 39, which drives a
 20 bevel-gear 40 secured upon the shaft 42, on which shaft is mounted a cam 43, which cam actuates a rod or link 44, which connects to a yoke 50 mounted on the rock-shaft 53. This rock-shaft 53 is thus oscillated, and the
 25 same carries suitable crank-arms or levers 54, which connect to the pump-pistons as shown and described more particularly in said prior patent. By this connection, one
 30 charge of molten metal will be forced into the casting-chamber for each revolution of the shaft 31, the gearing being properly proportioned to effect this result.

The casting chamber is formed by a core
 35 consisting preferably of part of a cylinder B, a back which consists preferably of two pivoted segments or pieces C and D, and two end rims or pieces E and E'. The segments or pieces C and D carry the matrices, as hereafter described. These segments C
 40 and D are mounted or pivoted upon shaft 60, which is placed in slots cut in the framing, and on this shaft 60 are rolls 63 which bear on cams 64, mounted on the shaft 31. The segment C is provided with an arm 65,
 45 which carries a roll 66, which bears on a cam 67 mounted on the shaft 31 near the outer end of the casting-box, and the segment D is provided with a similar arm 65, which carries a roll 66, which bears on another cam 67 mounted on the shaft 31 near
 50 the inner end of the casting-box. This operating mechanism is so arranged that during the casting operation, the segments will support and bring the matrices in position
 55 close up to the periphery of the cylinder B, so that, as the molten metal is forced into the casting-chamber, a plate of the desired thickness will be cast.

A separating piece or partition 200 is arranged in the casting chamber so that the
 60 two plates will be cast as separate pieces, the molten metal coming from the pump being divided in its course into the two casting chambers separated by the strip 200. This separating piece consists of an inwardly

flared half ring which is supported at one end on the spout 24, and which is hung at its other end on a shaft 111 hereafter referred to. By this arrangement, the separating-piece will be always in the casting-
 70 box or chamber, and will not interfere with the core or cylinder turning with the plates.

After the plates have been cast, the operating mechanism for the same will move, so that the matrices will be stripped or un-
 75 wound from the surface of the cast plates.

The matrices *e* and *f* (see Fig. 4) are secured in suitable handles or bars F—F', which bars F—F' are slid into sockets or secured in any desired way to the ends of the
 80 segments C and D.

The matrices may have suitable steel bands as *m—m* for holding them in a sprung position, as shown.

I generally arrange the rim E rigidly, or
 85 with spring-relief in the framing, and I operate the rim E' to relieve the end of the left-hand plate by the means particularly shown and described in said prior patent, although in some cases, I contemplate oper-
 90 ating both rims; but for most purposes, by relieving one end rim, there will be sufficient clearance to allow the core to turn to carry both plates from the casting chamber. The
 95 mechanism for operating the left-hand rim E' is driven from the shaft 76, as shown in said prior patent. A suitable crank-arm 70 is journaled on a suitable shaft in position to engage said rim E'. This shaft has another crank-arm connected to which is a
 100 sliding rod 71, carrying a roll at the end thereof, bearing on a face-cam 75 mounted on the shaft 76, this mechanism being so timed that the rim E' will be properly actuated.
 105

Cut in the cylinder B are a number of grooves which will form the working or finishing ribs on the inside of the plates, and which will also form a means to help the
 110 movement of the plates from the casting chamber.

By the above mechanism, the casting operation will take place very rapidly. When the casting box is closed, the molten metal
 115 will be forced in to the double casting chamber by the pumps. When the plates are sufficiently cooled, the segments will move away from the periphery of the plates, and the ends of the same will simultaneously move outwardly to accurately and nicely strip or
 120 unwind the matrices from the surface of the cast plates. The rim E' will be lightly moved away from the edge of the left hand plate. When the casting box is opened in
 125 this manner, the separating strip 200 will have considerable spring. By this construction the core can be rotated to turn to deliver the two cast plates from the casting chamber.

I preferably use a cooling mechanism to
 130

immediately cool the plates after the same are cast. This cooling mechanism consists of a supply pipe 118, which is connected to any suitable source of supply, and which projects through one of the journals into the cylinder B. An outlet pipe 119 is arranged to pass through the other journal of the cylinder B. The inlet pipe is perforated so as to direct the jets of water on to the inner periphery of the cylinder, and the outlet pipe 119 is carried down to near the lower part of the cylinder B to form a siphon. An operating cam 120 is arranged on the end of the shaft 31, engaging which is a bell-crank lever 122, which connects by means of rod 123 to an inlet valve 125 and an outlet valve 124, this mechanism being so timed, that so soon as the plates are cast, the inlet valve will be opened and the outlet valve will be closed. This will spray water on or flood the lower surface of the cylinder so that the periphery of the cylinder which carries the cast plates will be cooled. As the cylinder B is filled with water, the air contained therein, and the steam if any is generated, will place the water under more or less pressure. When enough water has been let into the cylinder to cool the plate, the valve 125 is closed, and the valve 124 is opened by the cam 120 acting through the bell-crank lever 122 to move the rod 123 to the left as shown in Fig. 1. This will start the siphon formed by the outlet pipe 119 into action, and the siphon will rapidly draw the water from the interior of the cylinder.

After the plates are cast in this manner, the cylinder B is turned or rotated to carry the same out of the casting-box. The plates will firmly adhere to the periphery of the cylinder by means of the grooves, so that, as the cylinder is turned, the plates will turn with the same.

The mechanism for rotating the cylinder is driven from the shaft 76 and may be arranged as follows:—A crank 80 is mounted on the end of the shaft 76, and connects by rod 81 to a sector 82, pivoted on a suitable stud, whereby said sector will be vibrated. The sector meshes with a gear 84, which is loosely mounted on the hub of the cylinder D, and turning with this gear is a ratchet-plate 87, which has two teeth cut therein, as shown in Fig. 7. Rigidly secured to turn with the cylinder B is a pawl-arm 89, which carries the spring-actuated pawl 88, with which the teeth of the ratchet-plate may engage. By this means, for every revolution of the shaft 76, the cylinder B will be given half a revolution. It will be seen that the cylinder will remain stationary or substantially so during one-half of a revolution of the shaft 76, and will be turned during the other half revolution of the shaft 76.

I preferably use a locking mechanism consisting of a plate 85 mounted or formed

with the end of the cylinder, and an engaging catch 86 carried by the framing, as is shown in Fig. 8.

After the plates have been delivered from the casting-chamber by the half rotation of the cylinder, the same are lifted or forcibly detached from the periphery of the cylinder by means of lifters L and L¹, the lifter L being mounted on the rock-shaft 111 and the lifter L¹ on the shaft 105. The two shafts are connected to oscillate oppositely by means of any suitable connections as 106, connected to arms extending up from said shaft and the shaft 105 may be properly operated by the following mechanism:—A rod 100 has a roller set to engage a cam 103 mounted on the shaft 76, and this rod connects to a crank-arm 104 mounted on the end of the shaft 105, this mechanism being shown and described more particularly in my prior patent. After the plates are lifted from the periphery of the cylinder B in this manner, they are shifted from the lifters L and L¹ on to skids or ways S, S by the following mechanism:—Mounted in a guide-way 128 is a traveler or conveyer V, which has a lip at the end thereof, and two gravity pawls 146 and 1460, and this traveler may be reciprocated by the following gearing from the shaft 30: A bevel gear 129 is mounted on said shaft 30, and meshes with and engages a bevel-pinion 130 secured upon a short, transverse shaft. The gear 129 is made twice the size of the pinion 130. On the end of this short, transverse shaft is mounted a crank 131, connected to which is a crank-rod 132, the free end of which passes through a yoke 133 journaled on the end of a shaft 134. The rod 132 is formed with a rack 135 at its upper end, which meshes with a pinion 136 secured upon said shaft 134. On the other end of said shaft 134 is arranged a gear 137 which meshes with a rack 138 formed on the back of the traveler V.

By this mechanism, the traveler V will be given two reciprocations for each rotation of the shaft 30. The first movement to the left (Fig. 1) of the traveler V will carry the left-hand plate into a part I hereafter term the arch, and bring the right-hand plate to a position between said arch and the cylinder B, and the next movement to the left of the traveler V will carry the right-hand plate into the arch, and move the left-hand plate out on to a horse or delivery guide-way H², the pawls 146 and 1460 being properly arranged for this purpose.

As the plates are moved along the skids S, S from the casting mechanism, into the arch, the front or rough edge of the same will be trimmed or sawed off by a cutter 147 set in proper position to do this.

When the plates pass into the arch, the same are supported by a stationary way S¹ and a clamping jaw S², which is moved up-

wardly to tightly clamp the plate in the arch. When in this clamped position, the inner surface of the plate is trued out by the knife R. This knife R is mounted upon a shaft 156, and is driven from the shaft 30 by means of gear 157, intermediate 158, and pinion 160, the pinion 160 being half the size of the gear 157, so that the knife R makes two turns for each revolution of the shaft 30. By providing this cutter R, as shown in my patent referred to, with small projections, the ends of the plates may be trued off, but as these ends are generally accurately cast by means of the rims E, E' and the separating piece 200. I generally omit this operation. So soon as the plate is trued out, the clamping mechanism will release the plate, and, at the next movement of the traveler V, the gravity pawl 146 will move the plate out of the arch on to the horse H², and, as successive plates are completed and delivered, they will be pushed out on the horse H².

The mechanism for actuating the clamping jaw S² consists of a cam 141 mounted on the shaft 30. This cam has two high places and two low places, as shown in Fig. 5, so that the clamp will be actuated twice for each rotation of the shaft 30. 140 designates a yoke, which carries a roller 1410, which bears on said cam, which may be either an open or face-cam. This yoke 140 connects by an operating rod 139 to a crank-arm 142 mounted on a rock-shaft 143, which rock-shaft has small arms engaging the clamping-jaw S², as shown in Fig. 6. A plate P is shown in position in the arch in said Fig. 6.

Thus, the entire plate will be cast, finished and delivered without any manual operation, and the finishing mechanism is kept in substantially constant operation.

It will be seen that the pumping mechanism, the matrix manipulating mechanism and the cooling mechanism are actuated entirely from the shaft 31, so that two plates will be produced for each complete revolution of said shaft 31.

The remaining mechanisms are driven either from the shaft 30 or the shaft 76.

The gearing for driving the shaft 30, and from the shaft 30 the shaft 31 may be arranged as follows:—26 designates a power shaft, which carries tight and loose pulleys 27 and 28 by which power may be applied to the machine. Turning with the tight pulley is a pulley 149, which is belted to a small pulley 1490 turning with which is a pulley 150, which is belted to a small driven pulley 154, which, by means of suitable bevel-gears, imparts power to the cutter 147. Mounted on the shaft 26 is a worm 29, which meshes with a worm-wheel 290 secured upon the shaft 30, and by this means, the shaft 30 will be driven. On the end of the shaft 31 is keyed a section 32 of a single-tooth clutch,

and on the adjacent end of the shaft 30 is keyed the other section 321 of said clutch, which latter section may be moved forward and backward on the shaft 30, a spring being provided to keep the same normally in position with the section 32. A yoke 34 engages the movable section 321, which yoke is mounted on a shaft 35 on the end of which shaft is arranged a suitable operating lever 117, by which the operator can start the shaft 31 and the mechanisms driven thereby into operation. I may arrange with this handle an automatic stopping mechanism, which may be timed so that, after a desired number of plates have been cast, the shaft 31 will be stopped. To do this, I arrange on the shaft 31 a worm 112, which meshes with a worm-wheel 113 secured on a short transverse shaft, on the outer end of which is arranged a disk U. A number of holes are formed in the disk U and a pin T may be placed in proper position in said holes. This pin is so arranged that, when the desired number of plates have been cast, the same will strike on the handle 117, or rather, on an arm projecting therefrom, and will thus disconnect the clutch as is more fully illustrated in my patent referred to. Thus, by the means before described, it will be seen that plates will be rapidly cast, finished and delivered.

As the details of the various mechanisms have been so fully described, it is not thought necessary to describe the operation of the machine as a whole.

Obviously my invention may be still further carried out by casting more than two plates at a time.

The machine herein shown may be greatly varied by a skilled mechanic without departing from the broad scope of my invention, as expressed in the claims.

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

1. A curved stereotype printing plate casting apparatus consisting of a core of a length substantially equal to twice the width of a stereotype printing plate, a back cooperating therewith, and a partition arranged in the chamber between the back and core.

2. A stereotype printing plate casting apparatus having parts constructed to cast two curved plates at one operation upon the same side of its core, mechanism for operating the same, and a plate finishing mechanism arranged in combination therewith.

3. The combination of a stereotype printing plate casting apparatus having parts constructed to cast simultaneously two plates, a finishing mechanism geared to operate twice for each casting operation, and conveying means for carrying the plates through the finishing mechanism.

4. The combination of a stereotype print-

ing plate casting apparatus having parts constructed to cast a plurality of printing plates at each operation, conveying mechanism, and edge finishing devices.

5 5. The combination of a stereotype printing plate casting apparatus having parts constructed to cast a plurality of plates at each operation, conveying mechanism and devices for finishing the back surfaces of the
10 plates.

6. The combination of a stereotype printing plate casting apparatus having parts constructed to cast a plurality of plates at each operation, conveying mechanism, edge-finishing devices, and devices for finishing
15 the back surfaces of the plates.

7. In stereotype printing plate-making machinery, a casting box, consisting of a core, a back, rims, and a separating strip
20 acting in connection therewith, forming a number of independent compartments in the casting box, in each of which a plate may be separately cast.

8. In stereotype printing plate-making machinery, a source of supply for the material, a casting box having parts constructed to cast simultaneously a plurality of plates, a connection between the source of supply and box, finishing devices, and a traveler
30 which is arranged to receive the plates from the casting box and carry the said plates in position to be acted upon by the finishing devices.

9. In stereotype printing plate-making machinery, a source of casting material, constructed to supply simultaneously metal for a plurality of plates, a casting box, a connection between the supply and the box, finishing devices, a traveler arranged to receive the cast plates from the casting box and carry the said plates in position to be acted upon by the finishing devices, and means for operating all of the said parts at pre-determined intervals of time.

45 10. In stereotype printing plate-making machinery, the combination of a casting box having parts constructed to cast two plates simultaneously and having a core of a length substantially equal to twice the width
50 of the stereotype plate, a segmental back cooperating therewith, means for opening and closing the casting chamber formed between said core and back, means for turning the core to deliver the plates from the chamber, a plate finishing mechanism, and a conveyor device for conveying the plates cast at one operation in the casting chamber through the finishing mechanism.

11. In stereotype printing plate making

machinery, the combination of a casting box
60 having parts constructed to cast two plates simultaneously and having a core of a length substantially equal to twice the width of the stereotype plate, a segmental back cooperating therewith, means for opening and
65 closing the casting chamber formed between said core and back, means for turning the core to deliver the plates from the chamber, a continuously operating plate finishing mechanism, and a conveyor device for conveying one plate and then the other plate
70 cast at one operation in the casting chamber through the finishing mechanism.

12. In stereotype printing plate-making machinery, the combination of a casting
75 box having a core of a length substantially equal to twice the width of a stereotype printing plate, a back and parts cooperating therewith to form two casting chambers, means for opening and closing the casting
80 chambers thus formed, means for turning the core to deliver the two plates from the casting chambers, means for separating the plates from the core, a plate finishing mechanism, and a conveyor for moving one plate
85 and then the other plate through the plate-finishing mechanism.

13. In a stereotype printing plate casting apparatus the combination of parts forming a casting box having parts capacitated to cast two stereotype printing plates simultaneously, a stereotype plate finishing mechanism, a traveler having an ear and two pawls, and means for reciprocating said traveler, whereby one plate and then the
90 other plate will be carried through the finishing mechanism.

14. In a stereotype printing plate making apparatus the combination of a casting-box
100 having a core of a length substantially equal to twice the width of a stereotype printing plate, a back and parts cooperating therewith to form two casting chambers, means for opening and closing the casting-chambers thus formed, means for turning the
105 core to deliver the two plates from the casting chambers, a plate finishing mechanism, a traveler having an ear and two pawls, and means for reciprocating said traveler, whereby one plate and then the other plate will
110 be moved through the finishing mechanism.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

H. A. WISE WOOD.

Witnesses:

HENRY W. COZZENS, Jr.,
LOUIS W. SOUTHGATE.