No. 792,574. PATENTED JUNE 13, 1905.

J. L. FIRM.

CASTING MECHANISM FOR STEREOTYPE PLATES.

APPLICATION FILED FEB. 27, 1903.

3 SHEETS—SHEET 1.

Fig. 1.

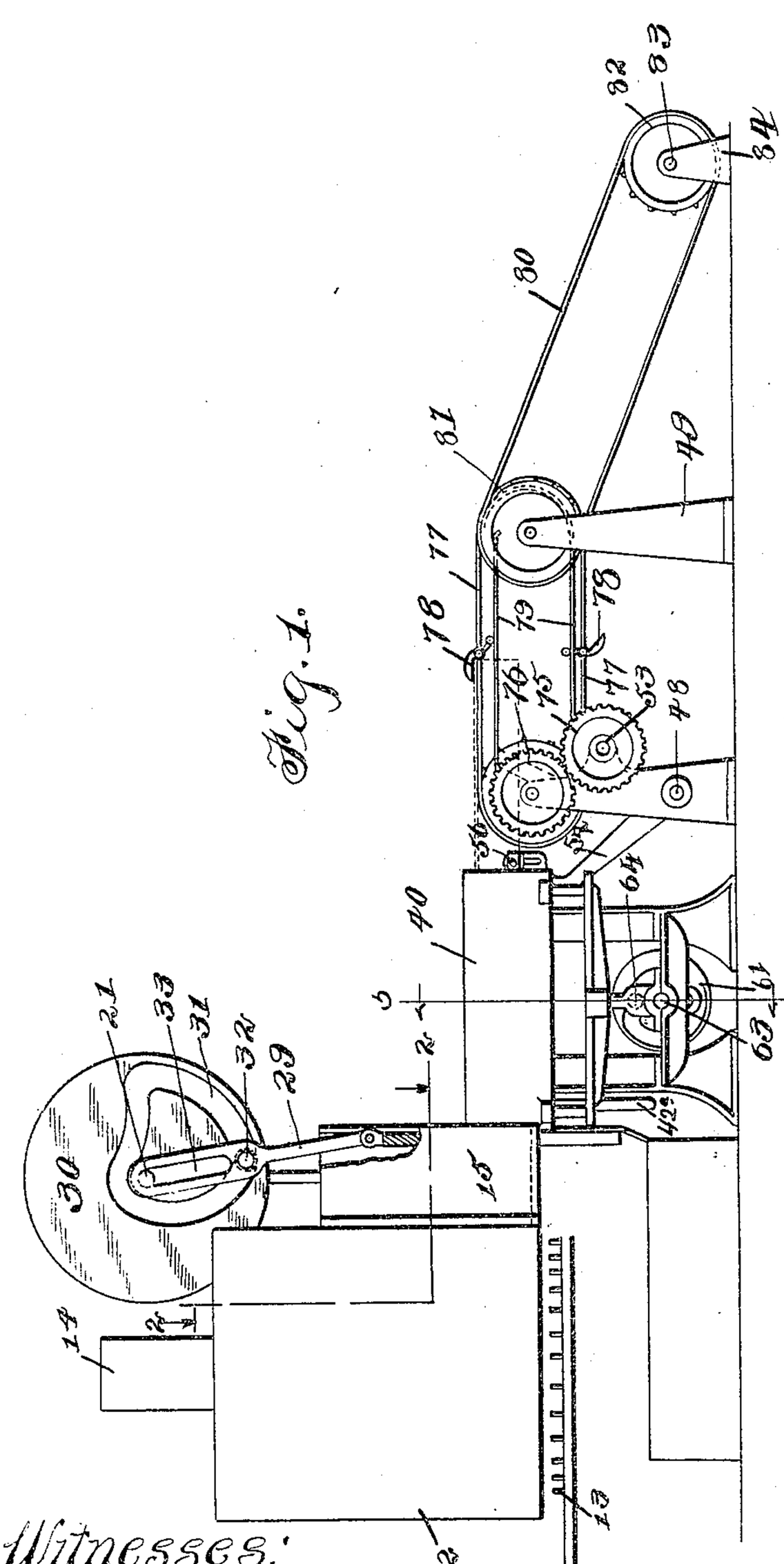
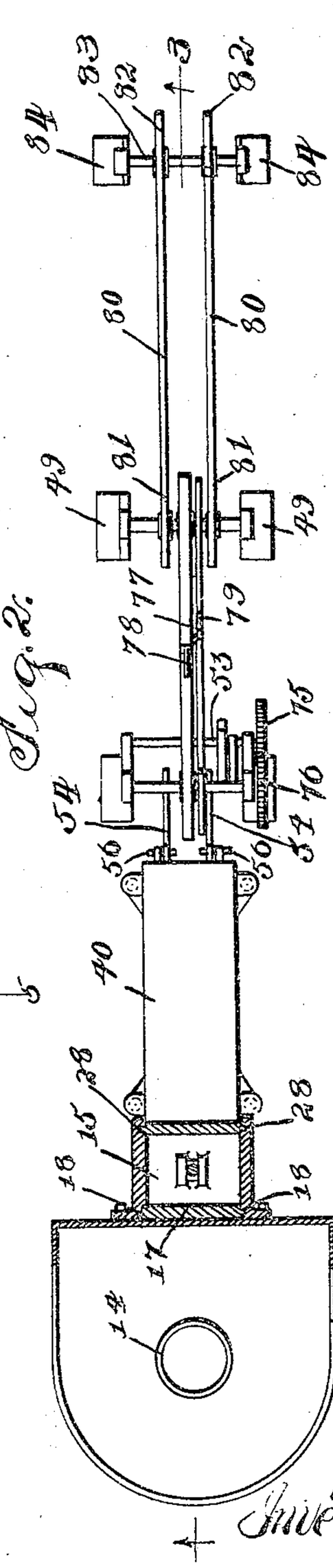


Fig. 2.



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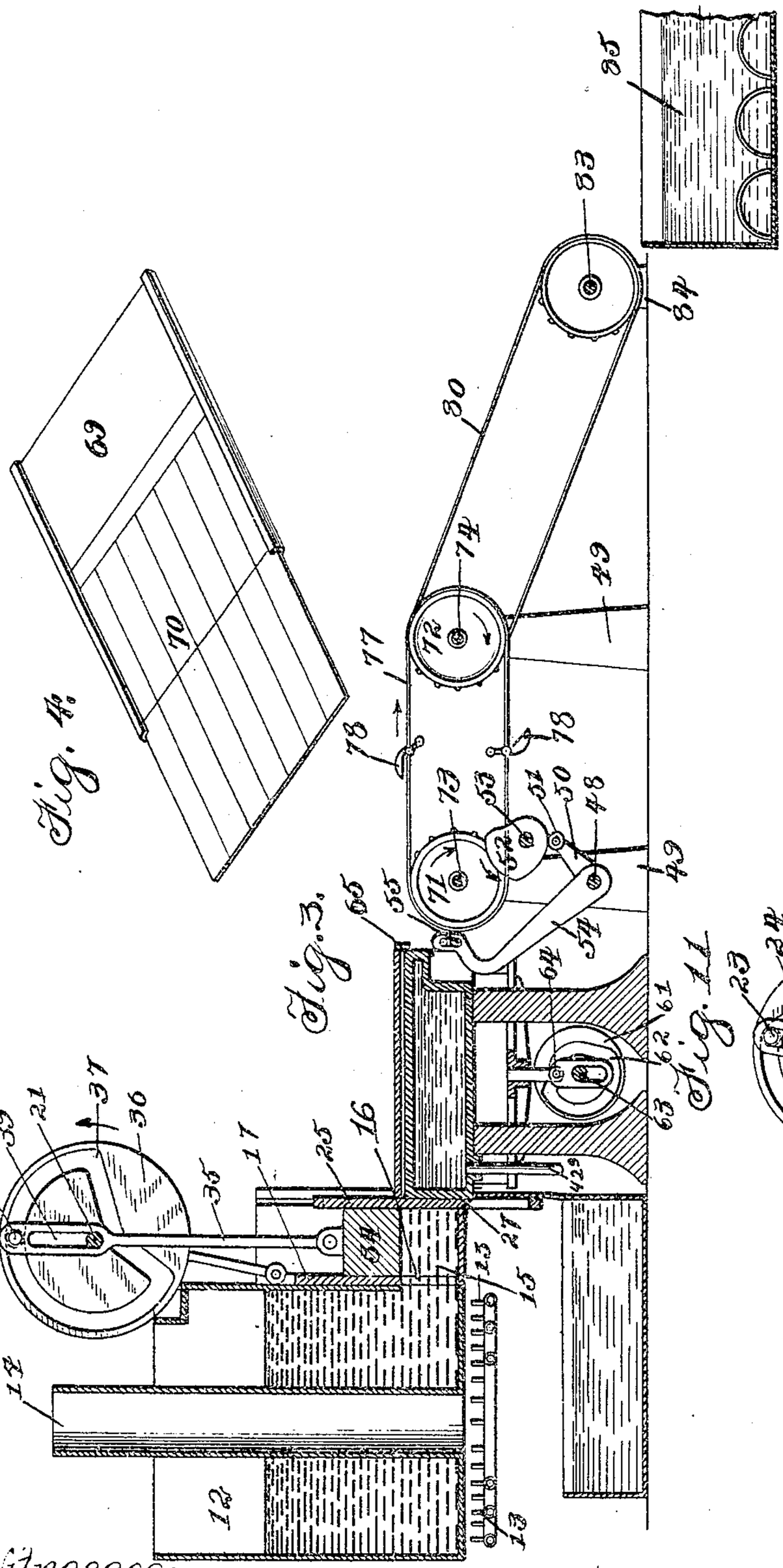
3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 5.

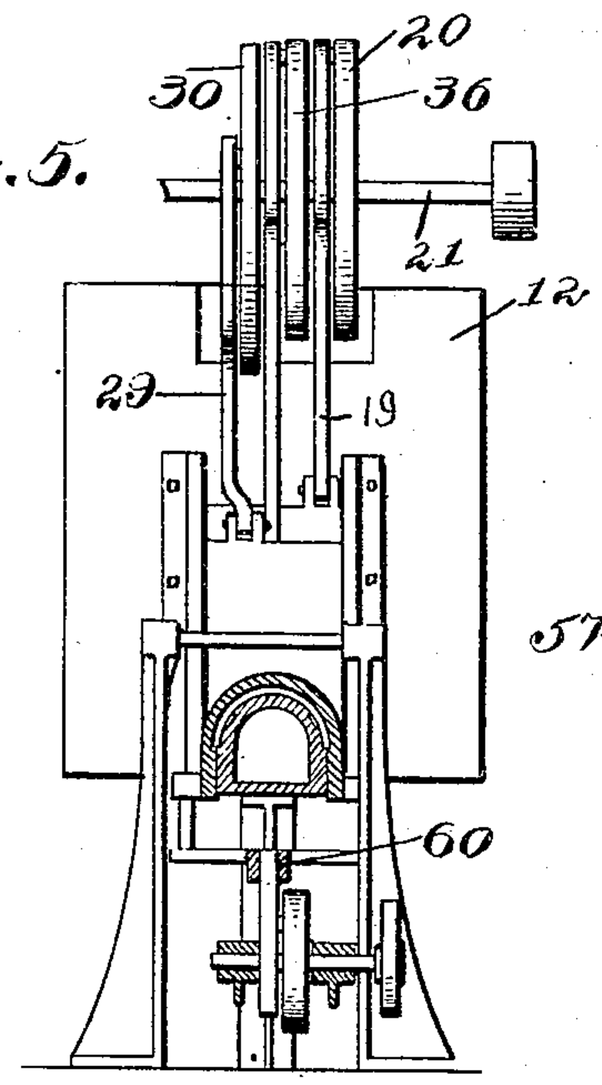


Fig. 6.

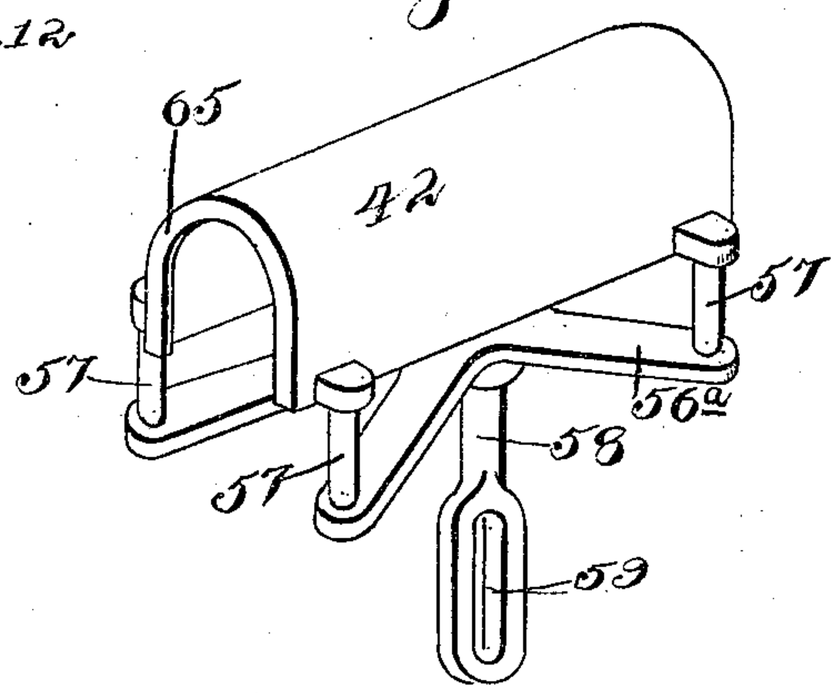


Fig. 7.

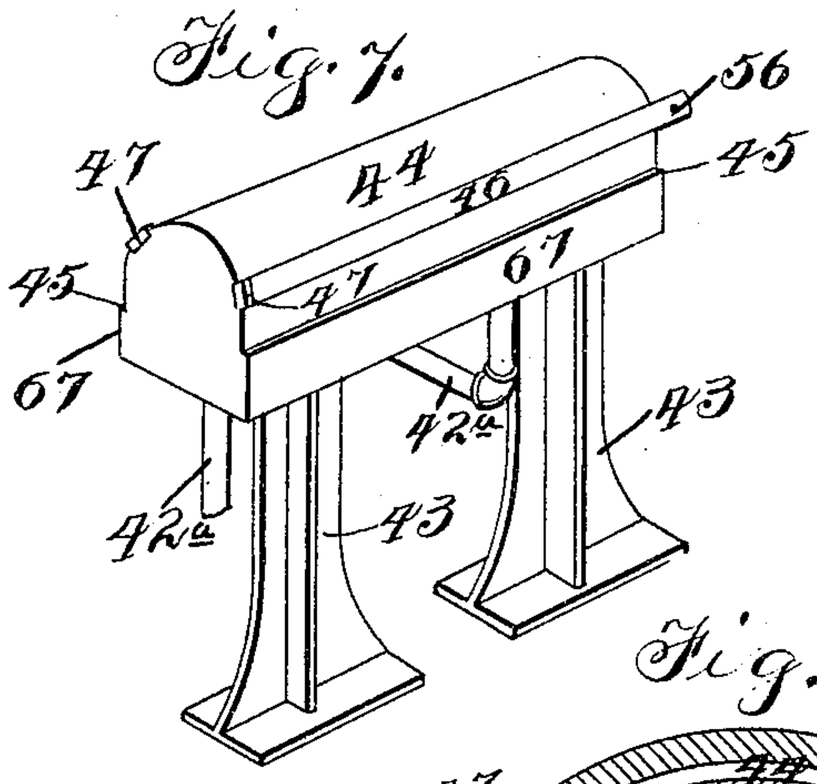


Fig. 8.

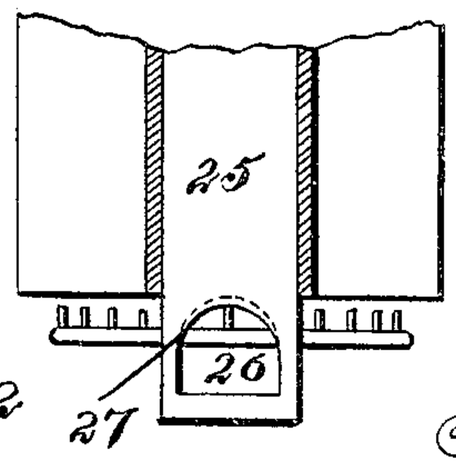


Fig. 9.

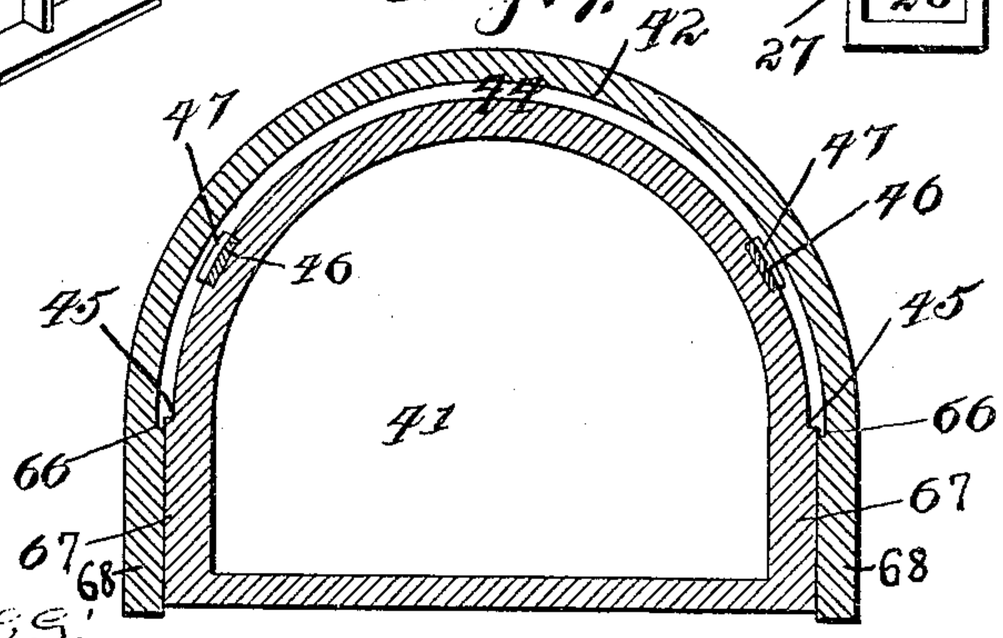
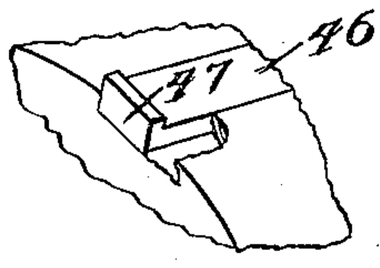


Fig. 10.



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No. 792,574. Patented June 13, 1905.

UNITED STATES PATENT OFFICE.

JOSEPH L. FIRM, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GOSS PRINTING PRESS COMPANY, OF CHICAGO, ILLINOIS.

CASTING MECHANISM FOR STEREOTYPE-PLATES.

SPECIFICATION forming part of Letters Patent No. 792,574, dated June 13, 1905.

Application filed February 27, 1903. Serial No. 145,396.

To all whom it may concern:

Be it known that I, JOSEPH L. FIRM, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Casting Mechanism for Stereotype-Plates, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to casting-boxes, and particularly to casting-boxes for the casting of semicylindrical stereotype-plates for use in rotary printing-machines; and its object is to provide new and improved mechanism by which such plates may be automatically cast and automatically removed from the casting-box successively.

It has for a further object to provide new and improved mechanism by which a single charge of metal may be forced into a casting-box to form a stereotype-plate automatically and at suitable intervals.

It has for a futher object to provide a new and improved casting-box into which charges of metal may be successively and automatically forced to form stereotype-plates and from which the cast plates may be successively and automatically removed.

I accomplish these objects as hereinafter described and as illustrated in the accompanying drawings.

That which I regard as new is set forth in the claims.

In the accompanying drawings, Figure 1 is a side elevation. Fig. 2 is a top or plan view. Fig. 3 is a vertical section on line 3 3 of Fig. 2. Fig. 4 is a detail showing the matrix-holding plate. Fig. 5 is a section on line 5 5 of Fig. 1. Fig. 6 is an enlarged detail, being an isometric view of the matrix-holding cope of the casting-box. Fig. 7 is an enlarged detail, being an isometric view of the core or drag of the casting-box. Fig. 8 is an enlarged detail, being a partial section on line 8 8 of Fig. 1, showing a knife for severing the metal. Fig. 9 is an enlarged detail, being a cross-section of the casting-box. Fig. 10 is an enlarged detail, being a portion of one end of the core or drag, showing the end of one of the devices by which the plate is slid off the box; and Fig. 11 is an enlarged detail, being a view of the cam which operates the valve.

Referring to the drawings, 12 indicates a melting-pot adapted to contain stereotype-metal heated by a suitable heating device 13.

14 indicates a hollow cylindrical passage which leads through the melting-pot 12 in order to more effectively heat the metal.

15 indicates a chamber adapted to contain below the piston hereinafter described a charge of stereotype-metal. The chamber 15 communicates by an opening 16 with the melting-pot 12 at the bottom of the melting-pot. The bottom of the chamber 15 and the melting-pot are upon the same level.

17 indicates a valve which slides in suitable grooves 18, formed in the sides of the chamber 15, and moves up and down against the front surface of the melting-pot 12 and is adapted by its reciprocation to open and close the passage 16, so as to alternately admit melted metal into the chamber 15 and shut off communication with the melting-pot. The valve 17 is actuated by a link 19 and cam 20, mounted upon a driving-shaft 21. The cam 20 is provided with a cam-groove 22, in which moves a roller 23, which is journaled upon the end of the link 19.

24 indicates a slot at the upper end of the link 19, through which passes the driving-shaft 21, as shown in Fig. 11.

25 indicates a sliding plate which is provided with an opening 26 (see Fig. 8) semicircular at the top and provided upon its semicircular edge with a knife-edge 27. The plate 25 slides in grooves 28 (see Fig. 2) in the sides of the chamber 15 and is operated by a link 29 and cam 30, mounted upon the shaft 21. The cam 30 is provided with a suitable cam-groove 31, in which moves a roller 32, journaled upon the link 29. The link 29 is provided at its upper end with a slot 33, through which the shaft 21 passes. 34 indicates a piston which moves in the chamber 15 between the sides thereof and between the valve 17 and

plate 25. The piston 34 is operated by a link 35 and cam 36. The cam 36 is provided with a cam-groove 37, in which moves a roller 38, journaled upon the upper end of the link 35. The link 35 is provided with a slot 39 at its upper end, through which the shaft 21 passes. The piston 34, with its link 35 and operating-cam 36, is so adjusted that when the piston is raised to its highest point, as shown in Fig. 3, the space in the chamber 15 below the piston will contain a charge of metal sufficient to form a stereotype-plate in the casting-box hereinafter described.

40 indicates a casting-box composed of a core or drag 41 and a matrix-holding cope 42. The core or drag 41 is made hollow in order to permit it to be filled with water for the purpose of cooling the plate, the water being supplied through pipes 42ª and being forced through the core or drag, so as to keep a constant supply of fresh water therein. The core or drag 41 is supported upon standards 43, and it is so placed that the inner end rests snugly against the outer surface of the sliding plate 25. The core or drag 41 has a semicylindrical surface 44, terminated upon each side by a shoulder 45, running the length of the casting-box, which shoulder when the plate is cast forms the side edges of a semicylindrical stereotype-plate.

46 indicates rods which are slidingly mounted in suitable grooves upon each side of the semicylindrical portion 44 of the drag 41 and are so placed therein as to be flush with the surface. The rods 46 are provided upon each end with a turned-up projection or hook 47, adapted to engage the rear end of the cast plate, as hereinafter described.

48 indicates a rock-shaft which is journaled in suitable framework 49, placed in advance of the casting-box. The rock-shaft 48 is provided with an arm 50, upon the end of which is journaled a roller 51. 52 indicates a cam which is keyed upon a driving-shaft 53, which is journaled in suitable bearings in the framework 49 and driven in any appropriate manner. The cam 52, rotating in the direction indicated by the arrow in Fig. 3, operates the lever to rock the shaft 48. 54 indicates arms, which are keyed or otherwise secured to the shaft 48 and are each provided at their upper ends with a slotted opening 55. The slotted openings 55 are adapted to severally engage pins 56 upon the sliding rods 46, whereby when said rock-shaft 48 is operated the rods 46 may be reciprocated in their sliding grooves on the core or drag 44 to slide the cast stereotype-plate therefrom in the manner hereinafter described.

The matrix-holding cope 42 is supported upon a frame 56ª by means of posts 57. (See Fig. 6.)

58 indicates a rod which is secured to the lower side of the frame 56ª and is provided with a flattened end having a slot 59. The rod 58 slides in a suitable bearing 60, (see Fig. 5,) mounted in suitable framework on the standards 43, so as to move up and down therein, carrying with it the cope 42.

61 indicates a cam having a cam track or groove 62. The cam 61 is mounted upon a shaft 63, which is driven in any suitable manner.

64 (see Fig. 3) indicates a roller which is journaled upon one side of the rod 58 above the slot 59 and moves in the cam-groove 62. The shaft 63 passes through and engages the slot 59. When the cam 61 is rotated, the roller 64, moving in the cam 62, will cause the rod 58 to be reciprocated up and down, carrying with it and raising and lowering the cope 42.

The cope 42, as is best shown in Fig. 9, is provided on its under side with a semicylindrical surface which when in the position shown in Fig. 9—that is to say, the position in which the plate is cast—is concentric with the semicylindrical surface 44 of the drag 41, and when the cope 42 is lowered to its lowest position there is a space, as is best shown in Fig. 9, left between the upper semicylindrical surface of the drag and the lower semicylindrical surface of the cope, which space is to adjust the thickness of the stereotype-plate to be cast, forming, it will be seen, the mold in which the plate is cast. The forward end of the cope 42 is provided with a downward-projecting semicylindrical ridge 65, which closes the forward end of the mold thus formed. The semicylindrical interior surface of the cope 42 is provided at its lower end with shallow shoulders 66, which extend along the entire under surface from end to end and support the matrix-holding cope. The surface of the drag 41 below the semicylindrical top 44 is provided with parallel vertical sides 67, and the inner surface of the cope 42 is provided also below its semicylindrical portion with parallel vertical sides 68, which are adapted to fit closely against the parallel vertical sides 67 of the drag, so as to prevent the egress of any metal, but at the same time permit the cope to be slid up upon the drag by the operation of the cam 61, as hereinafter described.

Referring to Fig. 4, 69 indicates a thin metal plate, whose side edges are bent over so as to permit the matrix 70 to be slid into it. When the matrix 70 is so slid into the plate, the plate 69 is bent into a semicylindrical shape and inserted in the cope 42 against its lower semicylindrical surface, the edges of the plate resting upon and being supported by the shoulders 66. The plate is thus held in position closely against the interior lower semicylindrical surface of the cope 42, forming the mold upon which the type-surface of the plate is cast.

71 72 indicate sprocket-wheels which are

keyed upon or otherwise secured to shafts 73 74, mounted in the standards 49 and driven in any appropriate manner. In Fig. 1 they are shown as driven by a gear 75 upon the shaft 53, and a coacting gear 76 on the shaft 73.

77 indicates a sprocket-chain which passes around the sprocket-wheels 71 72 and is provided with grippers 78, which may be made to operate in any well-known manner. I have indicated in Fig. 1 that they are operated by means of tracks 79 in a well-known manner, so as to engage the plate when fed to the sprocket-chain, as hereinafter described, and disengage it at the proper moment, as hereinafter described. 80 indicates sprocket-chains which are carried by sprocket-wheels 81 82, mounted, respectively, upon the shaft 74 and upon a shaft 83, journaled in standards 84. 85 (see Fig. 1) indicates a water-tank, in which the plates when cast may be deposited.

The operation of my device is as follows: The matrix and plate 70 and 69 being inserted in the cope 42, as above described, and the cope being lowered into position upon the drag 41, the operation of casting a plate is ready to begin. The valve 17 being in the position shown in Fig. 1—that is to say, its raised position—and the plate 25 in the position shown in Fig. 1—that is to say, in its lower position—the metal of course flows from the melting-pot 12 into the chamber 15. The cam 20 then operates to close the valve 17, and the plate 25 is raised until its opening 26 comes opposite the end of the casting-box. The cam 36, which operates the piston 34, then lowers the piston 34 to the bottom of the chamber 15, forcing the charge of metal through the opening 26 in the plate 25 into the casting-box, between the lower surface of the matrix 70 and the upper semicylindrical surface of the drag 41. The cam 30 then operates to drive the sliding plate 25 down, severing the metal between the casting-box and the chamber 15 and closing the end of the mold nearest the chamber 15, the end of the mold, as has been said above, coming snugly against the sliding plate 25 when the same is lowered. The piston 34 is then raised, the valve 17 raised after a suitable interval, and the operation repeated. The cams of course are so formed as to make the parts operate at suitable intervals to permit the removal of the plate from the molds in the manner herein described. When the plate is cast, it is cooled, as has been said above, by the water flowing through the casting-box. As soon as the plate is cast the cam 61 is arranged to lift the rod 58, thus raising the cope 42, with the matrix, from the drag 41 a sufficient distance to permit the plate to be slid out longitudinally of itself and of the mold. As soon as the cope is lifted the cam 52 operates to rock the shaft 48 and throw the arms 54 forward. This moves the rods 46 forward, and by the engagement of the hooks 47 upon their rear ends the cast plate is moved forward a suitable distance to permit its forward end to be engaged by one of the grippers 78, which is so timed and adjusted as to engage the forward end of the plate when it is thus delivered from the casting-box. The gripper 78 carries the plate forward on the sprocket-chain 77 and delivers it to the sprocket-chains 80, the grippers being so timed as to release the plate when it reaches the chains 80. From the chains 80 the plate may be lifted and placed in the cooling-tank 85. As soon as the plate is removed the cam 61 operates to lower the cope upon the drag, and the operation is repeated as often as may be desired.

That which I claim as my invention and desire to secure by Letters Patent is—

1. The combination with a casting-box, of a melting-pot adapted to contain stereotype-metal, a chamber adapted to contain a single charge of stereotype-metal connected with said melting-pot, of a valve adapted to alternately open and close the passage between said chamber and said melting-pot, means for operating said valve, a piston moving in said chamber and adapted to force the metal contained in said chamber into said casting-box, means for reciprocating said piston, a knife adapted to sever said metal between said casting-box and said chamber and to alternately open and close the passage between said casting-box and said chamber, and means for operating said knife, substantially as described.

2. The combination with a casting-box adapted to cast stereotype-plates, and means for automatically removing the cast plates from said casting-box, of a melting-pot adapted to contain melted stereotype-metal, a chamber adapted to contain a single charge of metal opening into said melting-pot and said casting-box, a sliding valve adapted to alternately open and close the passage between said chamber and said melting-pot, means for operating said valve, a sliding plate adapted to slide against the open end of said casting-box, between the same and said chamber, and having an opening at its lower end through which the metal may pass from said chamber to said casting-box, and a knife-edge adapted when said plate is lowered to cut off the cast plate between said casting-box and said chamber, means for operating said sliding plate, a piston contained in said chamber and adapted to force the metal therefrom into said casting-box, and means for operating said piston, substantially as described.

3. In a stereotype-plate-casting apparatus, the combination with a casting-box consisting of a core or drag and a movable matrix-holding cope, and means adapted to automatically charge said casting-box and trim the metal at the receiving end of said box at suitable intervals, of means adapted to automatically

separate said matrix-holding cope from said core or drag after said casting-box is charged, rods slidingly mounted in suitable grooves cut into said core or drag and adapted to engage the cast plate, and mechanism adapted to reciprocate said rods to push the plate from the core or drag, substantially as described.

4. In a stereotype-plate-casting apparatus, the combination with a casting-box consisting of a core or drag and a movable matrix-holding cope, and means adapted to automatically charge said casting-box and trim the metal at the receiving end of said box at suitable intervals, of means adapted to automatically separate said matrix-holding cope from said core or drag after said casting-box is charged, rods slidingly mounted in suitable grooves cut into said core or drag and adapted to engage the cast plate, mechanism adapted to reciprocate said rods to push the plate from the core or drag, and mechanism adapted to engage each plate as it is removed from said core or drag and carry it away from said casting-box, substantially as described.

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