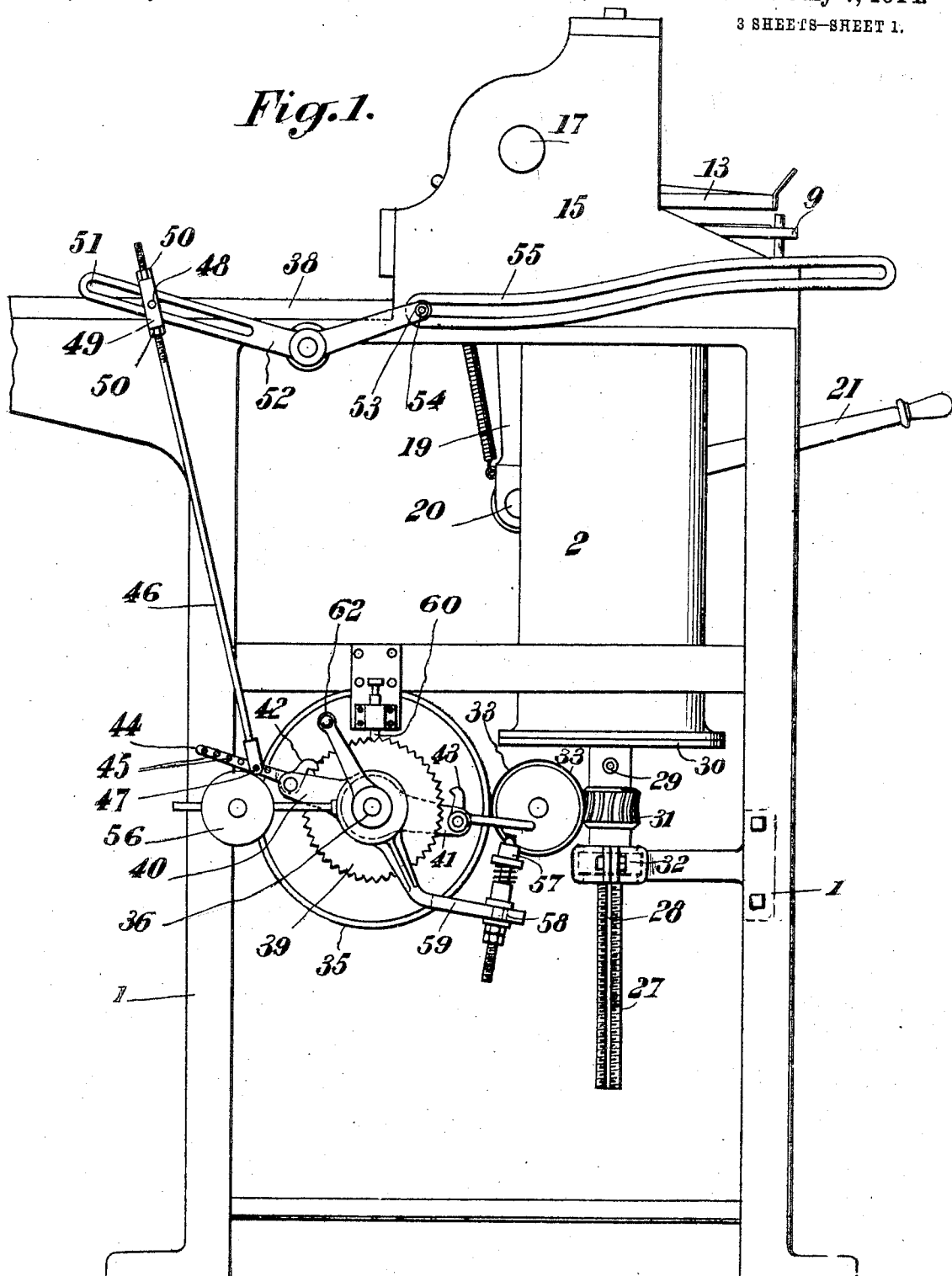


1,102,884.

3 SHEETS—SHEET 1.

Fig.1.



Witnesses:
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C.E. Johansen

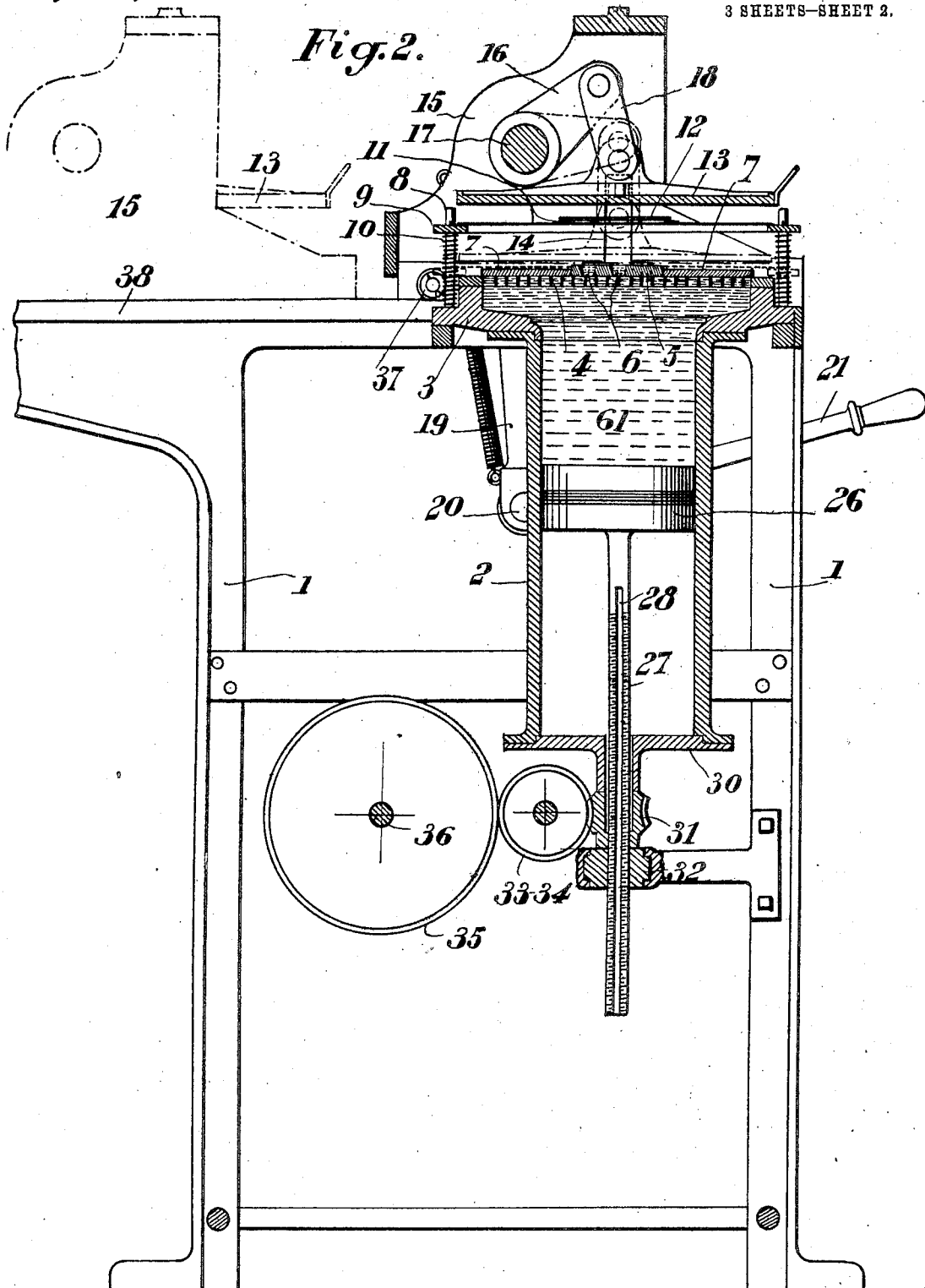
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L. S. DELEUIL.
MACHINE FOR PRINTING IN RELIEF.
APPLICATION FILED APR. 9, 1913.

1,102,884.

Patented July 7, 1914.

3 SHEETS—SHEET 2.



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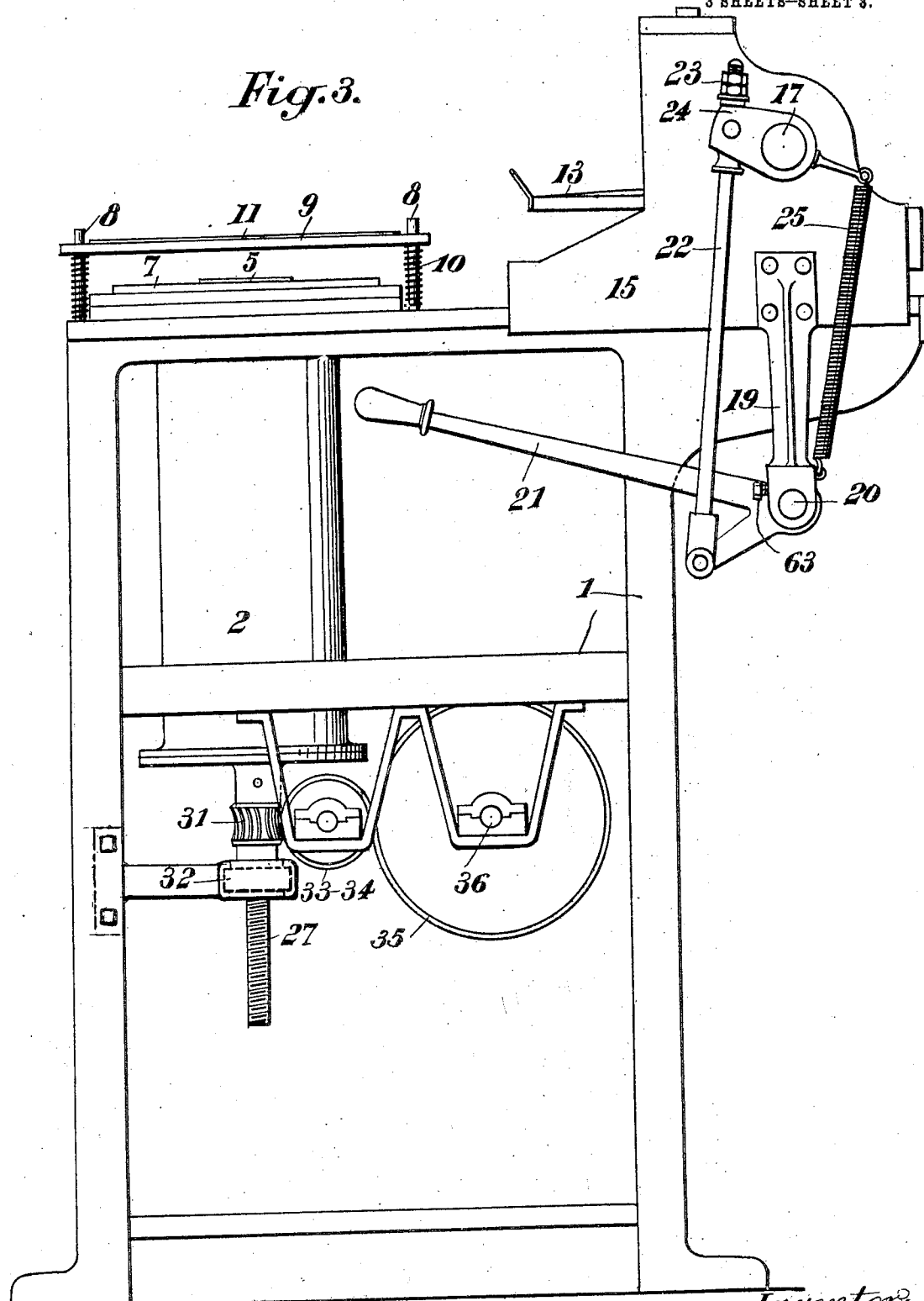
L. S. DELEUIL.
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3 SHEETS-SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

LAZARE SEVERIN DELEUIL, OF PARIS, FRANCE.

MACHINE FOR PRINTING IN RELIEF.

1,102,884.

Specification of Letters Patent.

Patented July 7, 1914.

Application filed April 9, 1913. Serial No. 760,035.

To all whom it may concern:

Be it known that I, LAZARE SEVERIN DELEUIL, a citizen of the French Republic, and resident of Paris, France, have invented certain new and useful Improvements in Machines for Printing in Relief, of which the following is a specification.

This invention relates to machines for printing, and more particularly to that class of machines adapted to print in relief.

The object of this invention is to provide a machine for printing in relief, which is adapted to employ a thick ink which is forced through stencil plates by means of a piston alternately operated by the carriage of the press.

A further object of this invention is to provide a mechanism of the character set forth which shall comprise means adapted to vary the movements of the ink supplying piston in accordance with the quantity of ink absorbed by each impression.

With these and other objects in view, this invention consists in the peculiar combination of the parts of a machine for printing in relief, as hereinafter set forth and more particularly pointed out in the appended claims.

Referring to the drawings, wherein similar reference numerals indicate similar parts wherever shown: Figure 1 is a side elevation of the machine at the left side thereof. Fig. 2 is a transverse section of the machine. Fig. 3 is a side elevation of the machine at the right side thereof.

Mounted upon the forward part of a bed or framework 1, is a cylinder 2, adapted to receive a quantity of ink, enamel or the like. Mounted upon the upper portion of the cylinder at the open end thereof, is a cup shaped member 3, which is covered by a grating 4. Upon the grating 4, are placed stencil plates or characters 5, in which the characters to be printed are cut out as at 6. Covering that portion of the grating 4 which is not covered by the stencil plate 5, is a second plate 7.

At each of the corners of the cup member 3 is placed a vertical rod 8, which carries a frame 9. Encircling the rods 8 are coil springs 10, upon which the frame 9 rests, the frame 9 being cushioned thereby. Slidably mounted upon the uprights 8—8 are bars 11, which run diagonally across the frame 9, and thus form a support for the sheet to be printed, represented by 12.

The apparatus above described is adapted to cooperate with a press comprising a movable carriage 15, having a platen 13, adapted to slide in the vertical grooves 14 of the carriage. The platen 13 is reciprocated by means of a toggle member 18 driven by a crank arm 16 carried by an oscillatory shaft 17. This oscillatory movement of the shaft 17 is caused by the mechanism described below. Carried by the carriage 15 is a depending bracket 19. The lower end of this bracket carries a pivot member 20 of a hand lever 21. Carried by the hand lever 21 is a connecting rod 22 which is connected to a crank arm 24 on the shaft 17. The length of this rod is regulated by means of adjusting nuts 23. The shaft 17 is normally held in such a position that the platen 13 is raised. This is done by means of a coil spring 25 which returns the shaft to normal position. The movable carriage 15 is provided with antifriction rollers 37, adapted to roll along the rails 38 on the upper edges of the main bed or framework 1.

Slidably mounted within the cylinder 2 is a piston 26 carrying a rod 27 screw-threaded on the greatest portion of its length and provided with a longitudinal slot 28. Engaging this slot 28 is a pin 29 located within the bearing of the lower portion 30 of the cylinder 2. Threaded upon the rod 27 is a sleeve 32 carrying a worm wheel 31 adapted to be engaged by an endless screw 33 on a shaft carrying a gear wheel 34 which is in turn driven by a larger gear wheel 35 carried by the shaft 36 which also carries the controlling mechanism for the operation of the piston 26.

This mechanism comprises a ratchet wheel 39 fast on the shaft 36. Adjacent the ratchet wheel 39 are mounted two loose arms 40 and 41 on the shaft 36. Each one of these arms 40 and 41 carries a catch 42 and 43. The catch 42 carries an elongated portion 44 provided with a plurality of holes 45 drilled therein. Pivotaly secured in one of the holes 45 by means of a pin 47 is a connecting rod 46, the upper end of which is pivoted at 48 and carries a removable and adjustable socket 49 regulated by means of nuts 50. The pivot 48 engages a slotted bar 51 carried by a pivoted lever 52 on the bed framework. The adjustable socket 49 permits the rod 46 to be fastened at any point along the slotted bar 51. The other arm of the lever 52 carries a bolt 53

which carries an anti-friction roller 54 which is adapted to slide in a slotted bar 55 fixed to the side of the movable carriage 15.

A balance weight 56 is fixed to the hub of the arm 40 on the same side of shaft 36 as the arm 40. Formed integral with the arm 40 and extending at an opposite direction thereto is an arm 59 carrying a rib 58 which carries a spring cushioned finger 57 which is positioned directly underneath the tail of the catch 43. The catch 43 is normally out of engagement with the teeth of wheel 39. A spring held pawl 60 engages to regulate to a certain extent the speed of the said wheel. A handle 62 is mounted on the shaft 36.

The operation of this device is as follows: A sheet or plate to be printed, represented at 12, is placed on the frame formed by the bands 11 directly above the stencil plate. Any suitable ink, enamel or pigment is placed in the receptacle 61 formed by the cylinder 2 above the piston head 26. It is necessary to bring the ink level with the top of the stencil 5. To do this the catches 42 and 43 are disengaged from the wheel 39 and the shaft 36 rotated by means of the handle 62 fixed thereon. This rotation of the shaft 36 rotates the gear wheel 35 which in turn drives the gear train 33, 34, 31, which rotates the nut 32, which acts upon the threaded bar 27 to raise the piston 26 to the desired level.

The piston is operated by the bed 15 in the following manner: The carriage 15 being at the back of the machine upon a movement of the carriage to the front it causes the slotted bar 55 to push the bolt 53 downward which causes the lever 52 to have a corresponding upward movement. This upward movement through the medium of the connecting rod 46 upon the tail 44 of the catch 42 which is then thrown into engagement with the teeth of the wheel 39 and thus turns the wheel 39 as long as the upward pull upon the rod 46 by the lever 52 continues or during the entire forward movement of the carriage 15. This rotation of the wheel 39 causes the shaft 36 to operate the gears 35, 34, 33 and 31 to turn the nut 32 to operate upon the threaded rod 27 to operate the piston 26. The return movement of the carriage 15 will cause the inverse movement of the preceding action by means of a depression of the rod 46 which causes the catch 42 to disengage. The catch 43 is now engaged with the wheel 39 by means of the balance weight 56, which operates the arm 59 to raise the spring finger 57 which kicks in the catch 43. The catch 43 being positioned away from the teeth of the wheel 39, part of the driving stroke of the weight 56 is taken up in kicking in the catch 43 with the result that the piston 26 is not withdrawn with as long a stroke as it

is raised. By reason of this a few alternate strokes of the carriage 15 will raise the piston head sufficiently to bring the level of the ink or suitable material even with the top surface of the stencils. The difference in length between the ascending and descending strokes of the piston 26 is regulated proportionately to the quantity of ink consumed at each impression. This is done by regulating the spring finger 57 by raising or lowering it in the rib 58 of the arm 59 until the desired length of the downward stroke is secured. The upward stroke is regulated by means of the adjustable collar 49 of the rod 46 which is operated by means of the nuts 50—50. The lower end of the rod 46 may be placed in any one of the holes 45 in the tail 44 of the catch 42, thus regulating the distance the rod 46 travels.

The printing operation is as follows: After the machine has been suitably regulated the carriage 15 is brought to the front of the machine, which raises the piston 26, as previously described. This raises the ink level to the height of the stencils. The lever 21 is now operated to lower the platen 13, which presses on the frame 9 against the action of the springs 10. The thick ink passes through the stencil characters and forms raised characters upon the plate to be printed which, when dry, constitutes an impression in relief. To remove the plate 12, the carriage 15 is pushed rearwardly. This movement of the carriage 15 causes the piston 26 to descend. As the descent of the piston is made by a stroke somewhat shorter than the upward stroke when the piston reascends the lengthening of the up-stroke will compensate for the quantity of the ink used in the previous impression. This action follows until the ink holder is completely empty.

The machine being described is adapted more particularly for hand operation, but it is clearly evident that the drive for the machine could be mechanical.

Considerable variation of the details of this invention may be resorted to without variation from the spirit thereof.

What I claim as new and desire to secure by U. S. Letters Patent is:

1. In a machine for printing in relief, the combination with a main frame, of a cylindrical ink reservoir mounted thereon, a piston tightly sliding in said reservoir and forming a movable bottom therefor, a cup-shaped member on said reservoir, a grate on said cup, a stencil on said grate, a plurality of vertical posts mounted on said cup, coil springs inclosing said posts, a frame supported by said springs, crosswise strips on said frame adapted to support a sheet to be printed, a movable carriage traveling on said main frame, means for actuating said

carriage, a reciprocating press plate above the sheet holding means, means for operating said press plate, and means for automatically controlling the reciprocatory movement of the sliding piston from the movable carriage.

2. A machine for printing, comprising a frame, an ink reservoir, a piston slidably mounted in said reservoir, controlling means for said piston, means for holding a sheet to be printed above said reservoir, a movable carriage, means for operating said movable carriage comprising a downwardly projecting bracket on said carriage, an angular lever pivotally mounted in said bracket and having two arms, a handle on one of said arms, an adjustable rod pivotally mounted upon said second arm, a reciprocating press plate adapted to slide in slots in said carriage, a crank shaft mounted on said carriage, a link connecting said press plate and said crank shaft, means for connecting said adjustable rod and said crank shaft to operate the press plate by means of the handle, and a spring for returning the handle to normal position.

3. A machine for printing, comprising a main frame, an ink reservoir thereon having a cup-shaped mouth, means mounted above said reservoir for holding a sheet to be printed, a movable carriage having a press plate adapted to cooperate with said sheet holding means, means for operating said carriage, a piston adapted to reciprocate in said ink reservoir, means for controlling the movement of said piston, said means comprising a threaded rod on said piston and having a longitudinal groove therein, a pin adapted to engage said groove, a nut threaded on said rod, means for preventing a vertical movement of said nut, a worm wheel integral with said nut, a shaft, a connecting gear between the worm wheel and the shaft, a toothed wheel on said shaft, arms loosely mounted on said shaft, a pawl on each of said arms adapted to engage said toothed wheel, an extension provided with a plural-

ity of slots on one of said pawls; a counter-weight adjacent said extension, and means for actuating said arms to cause the pawls to engage the toothed wheel, said actuating means including an adjustable rod adapted to be connected with said extension in any one of the slots thereof.

4. A machine for printing, comprising a main frame, an ink reservoir thereon having a cup-shaped mouth, means mounted above said reservoir for holding a sheet to be printed, a movable carriage having a press plate adapted to cooperate with said sheet holding means, means for operating said carriage, a piston adapted to reciprocate in said ink reservoir, means for controlling the movement of said piston, said means comprising a threaded rod on said piston and having a longitudinal groove therein, a pin adapted to engage said groove, a nut threaded on said rod, means for preventing a vertical movement of said nut, a worm wheel integral with said nut, a shaft, a connecting gear between the worm wheel and the shaft, a toothed wheel on said shaft, arms loosely mounted on said shaft, a pawl on each of said arms adapted to engage said toothed wheel, an extension provided with a plurality of slots on one of said pawls, a weight supporting arm on one of said arms, a counter-weight on said arm, means for actuating said arms to cause the pawls to engage the toothed wheel, said means comprising an adjustable connecting rod pivoted to said slotted extension, a crank lever having one arm connected to said rod, the other arm engaging a slotted bar on said movable carriage, a member carrying means comprising a spring finger adapted to kick in said second named pawl, and means for governing the movement of said toothed wheel.

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

LAZARE SEVERIN DELEUIL.

Witnesses:

GEORGE E. LIGHT,
LUCIEN MANNING.