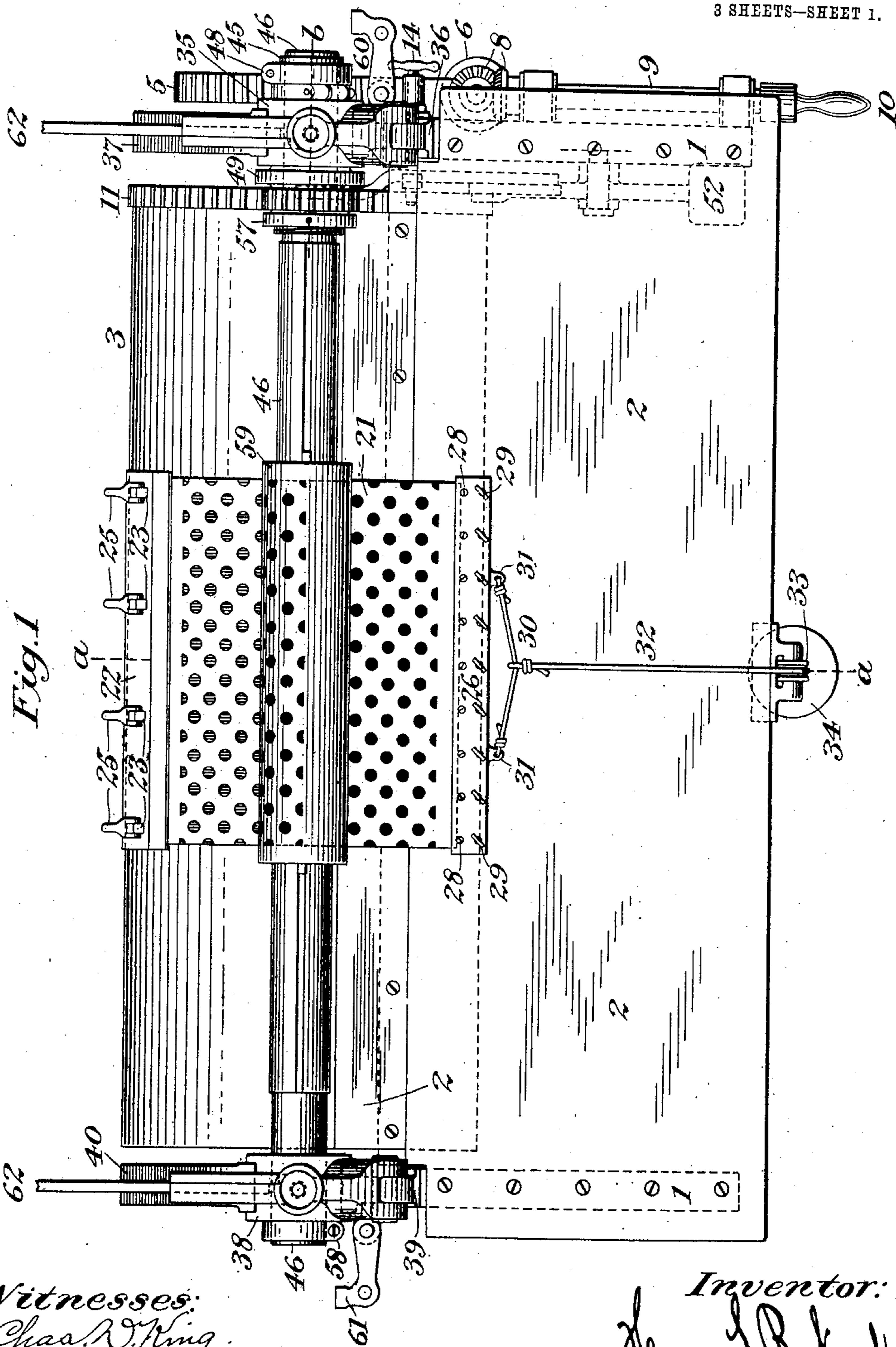


No. 810,434.

PATENTED JAN. 23, 1906.

H. L. RECKARD.  
PHOTOMECHANICAL PRINTING.  
APPLICATION FILED JULY 21, 1905.

3 SHEETS—SHEET 1.



Witnesses:  
Chas. W. King.  
Wilbur M. Stone

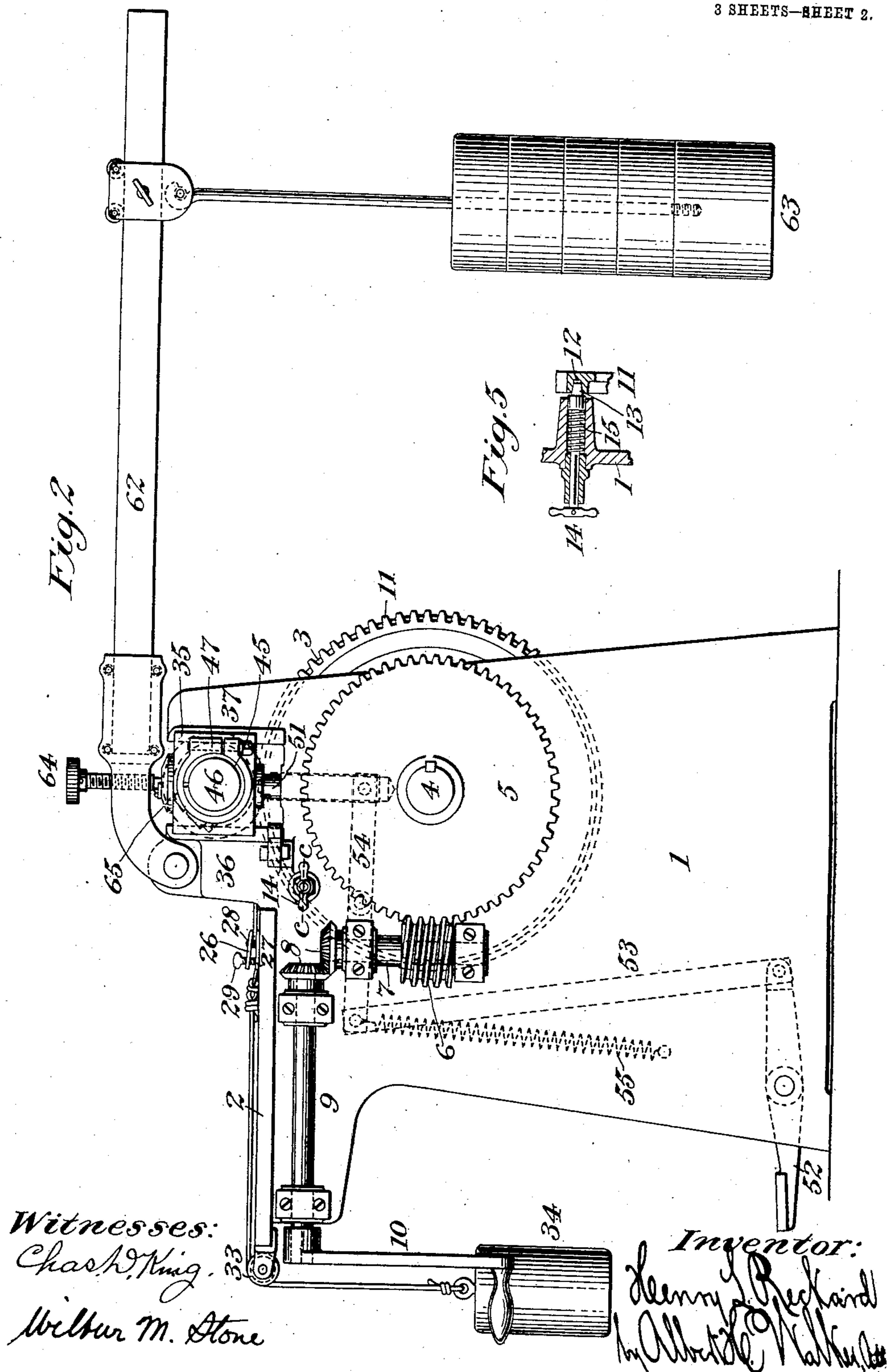
Inventor:  
H. L. Reckard.  
by Albert H. Walker, Atty.

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3 SHEETS—SHEET 2.

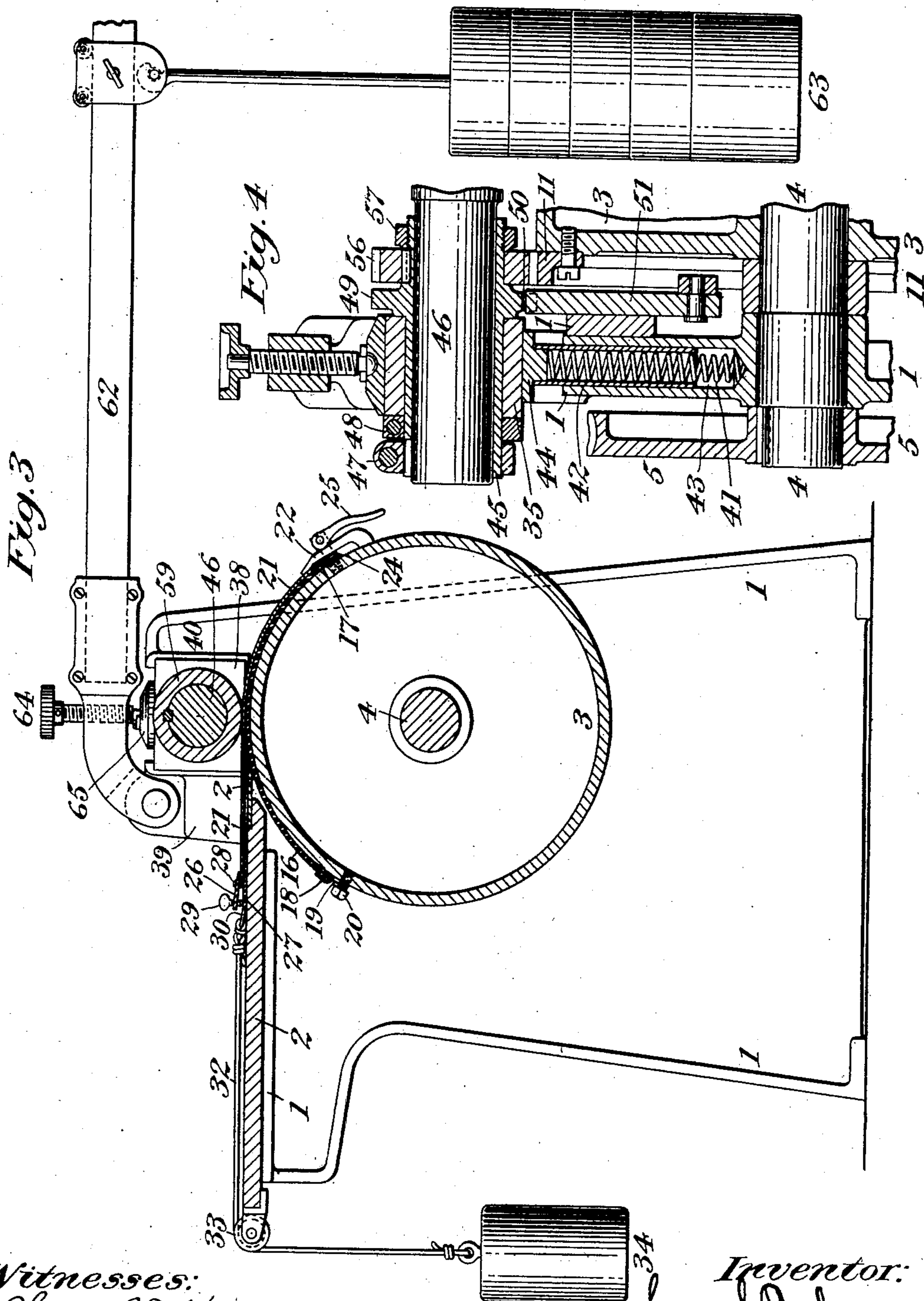


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3 SHEETS—SHEET 3.



Witnesses:  
Chas. R. King.  
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Henry L. Reckard  
by Albert J. Walker

# UNITED STATES PATENT OFFICE.

HENRY L. RECKARD, OF NEW YORK, N. Y., ASSIGNOR TO ALBERT HENRY WALKER, TRUSTEE, OF NEW YORK, N. Y.

## PHOTOMECHANICAL PRINTING.

No. 810,434.

Specification of Letters Patent.

Patented Jan. 23, 1906.

Application filed July 21, 1905. Serial No. 270,615.

*To all whom it may concern:*

Be it known that I, HENRY L. RECKARD, a citizen of the United States, and a resident of Manhattan, New York, have invented certain new and useful Improvements in Photomechanical Printing, of which the following description and claims constitute the specification and which are illustrated by the accompanying three sheets of drawings.

The object of this invention is to transfer ink or acid resist from flexible plates to metal rollers. The particular flexible plate which is shown in the accompanying drawings and which is mentioned in the following description is such a developed intaglio gelatin plate on a flexible celluloid base as is described in the Ippers patent, No. 785,735, of March 28, 1905, and in the Reckard patents, No. 788,377, of April 25, 1905, and No. 794,551, of July 11, 1905.

Figure 1 of the drawings is a plan view of my machine minus the weights, which are shown in other figures as depending from the levers, which are partly broken away in Fig. 1. Fig. 2 is a side elevation of the right-hand end of the machine of Fig. 1. Fig. 3 is a central lateral vertical section of the machine on the line *a a* of Fig. 1. Fig. 4 is an enlarged detailed vertical section on the line *b* of Fig. 1. Fig. 5 is a detailed horizontal section on the line *c c* of Fig. 2.

The strong and rigid frame of the machine is indicated by the numeral 1. The flat and rigid horizontal table 2 is permanently screwed down on the top of the frame. The cylinder 3 turns on its horizontal shaft 4, between the ends of the frame, in such a position that the table 2 is tangential to the periphery of the cylinder, as best shown in Fig. 3, where the table is shown as comprising a thick cast-iron body and a thinner sheet-steel extension, both of which are indicated by the numeral 2 in that figure. The worm-gear 5 is keyed to the outer end of the shaft 4, and the cylinder is slowly turned through that shaft and that gear by means of the worm 6, the shaft 7, the bevel-gears 8, the shaft 9, and the crank 10. The annular gear 11, having a pitch diameter slightly larger than the diameter of the cylinder 3, is bolted to the border of the right-hand end of that cylinder in the position shown in Fig. 1 and as indicated in Fig. 4. That gear is provided in its border with the recess 12, with which the locking-

bolt 13 may engage when the cylinder is turned into the position wherein that recess is exactly opposite to that bolt. The handle 14, by which the bolt can be withdrawn from the recess, and the spring 15, which thrusts the bolt into the recess, are shown in detail in Fig. 5. The rubber blanket 16 is permanently clamped down upon the periphery of the cylinder 3, which clamping is effected by the holding-clamp 17, extending along one edge of the blanket and attached by screws passing through it and through the blanket into the cylinder, and by the stretching-clamp 18, extending along the opposite edge of the blanket and firmly fastened thereto and provided with a series of wires 19, extending therefrom to a series of pins 20, which pins are seated in the cylinder and when turned operate to stretch the blanket tightly upon the periphery of the cylinder in the same way that piano-wires are stretched in pianos. The developed inked flexible intaglio gelatin plate 21 is clamped down upon the rubber blanket at one of its edges by the stationary clamping apparatus. (Shown in Figs. 1 and 3.) That apparatus consists of the steel strip 22 and of a series of screws 23, the unthreaded shanks of which pass through unthreaded holes in that strip, and the threaded ends of which are tapped into the cylinder, and the shanks of which are surrounded by spiral springs 24, between the surface of the cylinder and the under side of the strip 22, and the heads of which are provided with the pivoted cam-levers 25. The forward border of the gelatin plate is clamped down upon the cylinder by thrusting its forward edge under the rearward edge of the steel strip 22 and then by turning the screws 23 down farther into the cylinder and then by moving the cam-levers 25 down into the position shown in Fig. 3. That operation clamps the rearward border of the steel strip 22 firmly down on the forward border of the gelatin plate 21, because the forward and downwardly-curved border of the steel strip 22 operates as a fulcrum to enable the cam-levers 25 to press down the rearward border of the steel strip with great power. The opposite edge of the gelatin plate extends from the periphery of the cylinder 3 tangentially over the table 2, and it is clamped there by the movable clamping apparatus. (Shown in Figs. 1, 2, and 3.) That apparatus consists of the two steel

strips 26 and 27 and of a series of screws 28, the unthreaded shanks of which pass through unthreaded holes in the strip 26, and the threaded ends of which are tapped into threaded holes in the strip 27, and the heads of which are above the upper side of the strip 26, and that apparatus consists, further, of the series of set-screws 29, the threaded shanks of which are tapped through the strip 26 and the points of which impinge upon the upper side of the strip 27. The rearward edge of the gelatin plate is clamped between the strips 26 and 27 by thrusting it between their forward edges as far back as the screws 28 and by then turning the set-screws 29 so as to clamp the rearward border of the gelatin plate firmly between the forward edges of the strips 26 and 27. The movable clamping apparatus being thus clamped to the adjacent edge of the flexible gelatin plate, a cord 30 is tied to the ears 31, which project from the strip 27, and another cord 32 is tied to the cord 30 and is carried over a pulley 33. A weight 34 is attached to the free end of the cord 32 and serves to pull upon the gelatin plate 21, so as to keep it under tension.

Thus far I have described those parts of the machine which carry the developed inked flexible gelatin plate. I will now describe those parts which carry the metal roller, to the periphery of which it is the function of the machine to transfer ink from the gelatin plate.

The numeral 35 indicates a journal-box which is located between two vertical and opposite parts 36 and 37 of the right-hand end of the frame of the machine. A similar journal-box 38 is located between two vertical parts 39 and 40 of the left-hand end of the frame of the machine. These two journal-boxes carry the mandrel which carries the metal roller which is to receive ink from the gelatin plate. The journal-box 35 has some appurtenances which the journal-box 38 does not have in addition to one appurtenance which is similar in both cases.

The journal-box 35 is supported by the spiral spring 41, which is located in the tube 42, and both of those parts are located in a vertical hole 43 in the frame on the machine directly under the center of the journal-box 35. The tube 42 is surmounted by the block 44, on the upper side of which the journal-box 35 rests. The bushing 45 surrounds the mandrel 46 and is removably fastened thereto by the clamping-ring 47, which embraces the outer end of that bushing. The clamping-ring 48 also embraces the bushing 45 and constitutes a bearing to prevent endwise motion of the bushing in one direction, while endwise motion of that bushing in the other direction is prevented by the disk 49, which is integral with the bushing 45. That disk has the recess 50 for the reception of the locking-bolt 51. That locking-bolt recipro-

cates vertically in a bearing in the frame of the machine and is caused to move downward by the treadle 52, operating through the rod 53 and the lever 54, and it is caused to move upward and into the recess 50 by the spring 55 whenever the treadle is free and the recess is opposite to the locking-bolt. The gear 56 is keyed to the bushing 45 at the side of the disk 49, and it is held against endwise movement by the screw-ring 57, which ring is screwed upon the inner end of the bushing to the position shown in Fig. 4. The gear 56 meshes with the gear 11, and it receives motion therefrom and transmits it to the bushing 45 and thence to the mandrel 46. The journal-box 38 at the other end of the machine does not have any such appurtenances as the parts 47, 49, 56, and 57 and only has a clamping-ring 58, which corresponds with the clamping-ring 48 and which prevents inward endwise motion of the mandrel 46, around the left-hand end of which it is clamped.

The numeral 59 indicates the metal roller which is to receive ink from the gelatin plate and which is removably fastened to the mandrel 46. That roller and that mandrel, together with the two journal-boxes 35 and 38 and their appurtenances, rest on the spiral spring 41 and upon a similar spiral spring under the journal-box 38, which duplicate spring, together with its inclosing tube and hole and the block surmounting that tube, are omitted from the drawings as unnecessary to be shown. Those two springs being only strong enough to support those parts without much added weight and it being desirable to sometimes support them positively, a swinging supporting-block 60 is pivoted to the right-hand side of the frame of the machine and a counterpart block 61 is pivoted to the left-hand side of the frame of the machine in the positions shown in Fig. 1. When those blocks are swung inward on their pivots, they pass under the journal-boxes 35 and 38, respectively, or even under the blocks 44, which support those journal-boxes, and they thus positively hold up the journal-boxes and their appurtenances as long as they remain there. The periphery of the metal roller 59 is not arranged in accurate or definite predetermined cooperating relation to the printing-plate 21 either longitudinally or transversely, and the machine has no guide by which either of those results can be accomplished. The printing-plate begins to print along an imaginary line extending lengthwise of the periphery of the roller; but the particular location of that line is not predetermined and is left to chance, for it is immaterial, and the ink is applied by the printing-plate to the roller somewhere midway between the ends of the roller; but the machine neither has nor requires any guide for the accurate longitudinal centralization of that ap-

plication. Such accurate centralization is not necessary, even with reference to register between the ultimate printing-surfaces of two or more rollers, which may receive counterpart ink impressions from two or more printing-plates, respectively, for accuracy of registration is attained in such cases by longitudinal adjustment of those rollers in the printing-machine in which they are used.

When the metal roller 59 is to be rolled over the intaglio gelatin plate to receive ink therefrom, it must be pressed down upon that plate with many times more pressure than can result from the weight of the roller and all the other parts which are supported by the springs under the journal-boxes. That great pressure is necessary in order to transfer sufficient ink from the depressions in the intaglio gelatin plate to the periphery of the metal roller. To produce that great downward pressure, a duplicate mechanism is provided at each end of the machine. That mechanism at the right-hand end of the machine is shown in Fig. 2, and that at the left-hand end is shown in Fig. 3, of the drawings. It is enough to describe that at the right-hand end of the machine, for both sets are alike and are designated by the same set of numerals.

The long lever 62 is pivoted at one end to the part 36 of the frame of the machine, which pivot is the fulcrum of the lever. Power is applied to the other end of the lever 62 by means of the weights 63, and the working point of that lever is between its ends, but many times nearer to its fulcrum than to its power. The work done by the lever consists in pressing powerfully down on the journal-box 35. That pressure is exerted through the screw-bolt 64, which is tapped vertically through the lever and through the round base-plate 65, which is attached by a ball-and-socket joint to the lower end of the screw-bolt, so as to be lifted up therewith when the lever is raised and so as to equalize the pressure of the lever over all those areas of the upper side of the journal-box which are pressed upon by the plate 65. The amount of pressure exerted by this apparatus upon the journal-box is adjustable by means of changing the amount of the weight 63 and also by shifting its position upon the lever 62. The apparatus which exerts downward pressure on the journal-box 38 must be adjusted like that which exerts downward pressure on the journal-box 35, because both boxes must receive the same pressure as each other every time the apparatus is used, though that pressure will be varied at different times, according to the total pressure required in particular cases.

The mode of use and operation of this machine is as follows: Beginning with preparing the machine to receive the metal roller, the weights 63 are removed from the levers 62,

and those levers are raised to an upright position. Then the mandrel 46 and all its appurtenances, including the journal-boxes 35 and 38, are lifted bodily away from the frame of the machine and are temporarily placed on some other supporting structure. Then the clamp-ring 47 is loosened, so as to unclamp the bushing 45 from the mandrel 46, and thereupon that bushing and all the parts which surround it are taken away from the mandrel. The metal roller 59 is then placed and fastened in the position shown in Fig. 1 by being passed over that end of the mandrel from which the bushing 45 and its appurtenances were temporarily removed and by being keyed or otherwise secured to the mandrel. Then those parts are returned to their former positions, relatively to the mandrel, while the mandrel and its appurtenances remain on the temporary support. The cylinder 3 is then turned to the position where the locking-bolt 13 enters the recess 12 in the border of the gear 11. In that exact position of the cylinder a registry-mark exists or is made on the rubber blanket 16 lengthwise of the periphery of the cylinder and exactly opposite the mathematical axis of the space occupied by the mandrel 46 before that mandrel was removed from the frame of the machine. That registry-mark can be made by drawing a line across the rubber blanket from a point exactly half-way between the upright parts 36 and 37 of the frame of the machine to a point exactly half-way between its upright parts 39 and 40, because the journal-boxes 35 and 38 are both perfectly symmetrical in having the axes of their journal-bearings exactly midway between their sides. This registry-mark indicates the exact location which is to be occupied by the forward edge of the printing-surface of the developed and inked flexible gelatin plate when that plate is thereafter placed and fixed upon the rubber blanket. A second registry-mark is also made across the rubber blanket exactly parallel to the first and nearer to its forward edge, the distance between the two being identical with the distance between the forward edge of the printing-surface of the inked gelatin plate and a registry-mark made on the unprinting forward border of that plate. A third registry-mark is also made on the rubber blanket across the second mark and at an exact right angle thereto and midway of the blanket, and this mark corresponds with a second registry-mark on the forward border of the gelatin plate. A registry-mark is also made on the table 2 on a line with the third registry-mark on the rubber blanket, and this table-mark corresponds with a mark on the rearward unprinting border of the gelatin plate. The rubber blanket and the table and the gelatin plate being thus provided with registry-marks, the forward border of the gelatin plate is placed and clamped on

the rubber blanket, with the forward edge of its inked printing-surface exactly over the first registry-mark on the blanket and with the two registry-marks on its forward border exactly over the second and third registry-marks on the rubber blanket, respectively, and with the registry-mark on its rearward border exactly over the registry-mark on the table. The gelatin plate is not clamped to the table; but it extends backward tangentially over the table from its forward border and is held there under tension exerted by the weight 34 through the cords 20 and 31 and the movable clamping apparatus which is now attached to its rearward border. The mandrel 46 and its appurtenances are now lifted bodily from their temporary resting-place and are replaced in their position in the machine, with the journal-boxes 35 and 38 resting on the blocks and spiral springs, which have been described as supporting them. In that position the metal roller 59 is held up and out of contact with the inked gelatin plate, for there should be no such contact except during the subsequent time in which the metal roller is being rolled over the inked plate and except during the instants in which the metal roller is being lowered into such contact and raised away therefrom. The levers 62 are now turned down to their horizontal positions, with the base-plates 65 resting upon the journal-boxes 35 and 38, respectively; but those levers do not add enough weight to press the metal roller down upon the inked gelatin plate. That result occurs when the weights 63 are hooked at their predetermined positions upon the levers 62, as shown in Figs. 2 and 3. At that time the locking-bolt 13 is withdrawn from the recess 12 in the border of the gear 11, and the locking-bolt 51 is withdrawn from the recess 50 in the disk 49, so as to permit the turning of the cylinder 3 and the metal roller 59. Thereupon the crank 10 is turned in an anticlockwise direction until the metal roller has made exactly one revolution, at the end of which the spring 55 carries the locking-bolt 51 into the recess 50 in the disk 49, and thus stops the machine. While the metal roller has been making its one revolution (in an anticlockwise direction as viewed in Fig. 3) the cylinder 3 has been turning in the opposite direction, and that turning has carried the printing-surface of the inked gelatin plate entirely and precisely across an imaginary straight line connecting the mathematical axis of the metal roller with the mathematical axis of the cylinder. In order to attain this precise result, the printing-surface of the gelatin plate must be precisely as long as a tape, which will precisely encircle the metal roller. The printing-surface of the gelatin plate can be given this precise length by making the translucent photograph which produces that

printing-surface with precisely the same length, and that result can be accomplished by properly adjusting the camera in which that photograph is made. At the end of the one revolution of the metal roller over the printing-surface of the gelatin plate the ink in the depressed areas of the gelatin plate has been transferred to the periphery of the metal roller, or at least enough ink from each of those areas has been thus transferred to constitute a complete reproduction on the metal roller of the design or picture composed by the depressed and inked areas of the gelatin plate. In Fig. 1 of the drawings the inked gelatin plate has depressed areas consisting of polka-dots. That figure represents the condition of affairs when the metal roller has made half of its one revolution. At that time half of its periphery has taken up a full supply of ink from half of the gelatin plate, but has left a little ink in each of the depressions from which ink was taken. That residuum of ink is represented by lines across each of those depressions. The undiminished inks in those depressions in the gelatin plate which have not yet passed under the metal roller are represented by the full black polka-dots on the gelatin plate in Fig. 1. As soon as the one revolution of the metal roller over the inked gelatin plate is completed and the machine has automatically stopped at the end of that revolution the weights 63 are instantly unhooked from the levers 62 and those levers are raised to upright positions. Thereupon the spiral springs under the journal-boxes 35 and 38, respectively, automatically raise the now inked metal roller away from the gelatin plate and the work of the machine is completed. The mandrel 46 and all its appurtenances, including the inked metal roller, are then lifted away from the machine, and the clamping-ring 47 is loosened and the bushing 45 and all the parts which surround it are taken away from the mandrel, and then the inked metal roller is removed from the mandrel and is taken away for subsequent operations thereon in further prosecution of one or another of the processes described in the said Letters Patent Nos. 788,377, 785,735, or 794,551.

While it is true that developed flexible inked gelatin plates can be made to conform in length to the circumference of a particular metal roller even where the original design or picture from which that gelatin plate was made does not thus conform, it is also true that for other reasons it is sometimes necessary to use metal rollers of different circumferences at different times. This machine is adapted to receive and ink several different sizes of such roller; but there must be a separate gear for every size of metal roller, for the pitch diameter of that gear must be identical with the diameter of the metal roller used therewith

in order that the surface speed of the metal roller may be identical with the surface speed of the gelatin plate on the cylinder.

The table 2 may be convexly curved on its upper side instead of being flat. Indeed, it may be omitted from the machine and the gelatin plate may be stretched away tangentially into space from the periphery of the cylinder 3 by means of the movable clamping apparatus (shown in Figs. 1, 2, and 3) and by means of the cords 30 and 31 and the weight 34, which are attached to that apparatus, or, the table being omitted from the machine, the flexible inked gelatin plate may be clamped down on the rubber blanket at its rearward border in addition to being thus clamped at its forward border; but it is best to clamp the gelatin plate down upon the rubber blanket only at the forward border of the gelatin plate and to leave the body of the gelatin plate to be bent upon the periphery of the cylinder as it is drawn forward against the resistance of the weight 34 by the cylinder as it turns.

The rubber blanket may be omitted from the machine and the elastic foundation of the gelatin plate may be otherwise provided in some cases, and in some few cases such a foundation may be omitted entirely.

The details of this machine, as shown in the drawings, conform to the first and only machine of the kind which has ever yet been built as far as I know. That machine has stood the test of actual use and appears to be altogether effective and convenient; but the details of some or all of its parts can probably be changed in several ways without substantially affecting its essential character. For these reasons I do not confine my claims to narrow grounds.

I claim as my invention—

1. The combination of a cylinder, adapted to turn in one direction on its axis, and having an elastic cushion affixed to its periphery, and having a flexible plate affixed on that cushion; and a metal roller, adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate, and with its periphery rolling upon the surface of that plate; and a table adjacent to the cylinder, and adapted to support the rear part of that plate, at the beginning of the turning of the cylinder, and to gradually surrender that plate to the cylinder, as the cylinder turns; and a weight, attached to the rear border of the flexible plate, and subjecting to tension the forward movement thereof; and a pair of levers and weights, adapted to exert pressure on the journal-boxes of the metal roller, as it rolls; all substantially as described.

2. The combination of a cylinder, adapted to turn in one direction on its axis, and having an elastic cushion affixed to its periphery, and having a flexible plate affixed on that cushion; and a metal roller, adapted to turn in the other direction on its axis, at the same

surface speed as the flexible plate, and with its periphery rolling upon the surface of that plate; and a table adjacent to the cylinder, and adapted to support the rear part of that plate at the beginning of the turning of the cylinder, and to gradually surrender that plate to the cylinder, as the cylinder turns; and a weight, attached to the rear border of the flexible plate, and subjecting to tension the forward movement thereof; all substantially as described.

3. The combination of a cylinder, adapted to turn in one direction on its axis, and having an elastic cushion affixed to its periphery, and having a flexible plate affixed on that cushion; and a metal roller, adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate, and with its periphery rolling upon the surface of that plate; and a table adjacent to the cylinder, and adapted to support the rear part of that plate, at the beginning of the turning of the cylinder, and to gradually surrender that plate to the cylinder, as the cylinder turns; and a pair of levers and weights, adapted to exert pressure on the journal-boxes of the metal roller, as it rolls; all substantially as described.

4. The combination of a cylinder, adapted to turn in one direction on its axis, and having an elastic cushion affixed to its periphery, and having a flexible plate affixed on that cushion; and a metal roller adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate, and with its periphery rolling upon the surface of that plate; and a weight, attached to the rear border of the flexible plate, and subjecting to tension the forward movement thereof; and a pair of levers and weights, adapted to exert pressure on the journal-boxes of the metal roller, as it rolls; all substantially as described.

5. The combination of a cylinder, adapted to turn in one direction on its axis, and having an elastic cushion affixed to its periphery, and having a flexible plate affixed on that cushion; and a metal roller, adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate, and with its periphery rolling upon the surface of that plate; and a table adjacent to the cylinder, and adapted to support the rear part of that plate, at the beginning of the turning of the cylinder, and to gradually surrender that plate to the cylinder, as the cylinder turns; all substantially as described.

6. The combination of a cylinder, adapted to turn in one direction on its axis, and having an elastic cushion affixed to its periphery, and having a flexible plate affixed on that cushion, and a metal roller, adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate, and with its periphery rolling upon the surface of that

plate; and a weight, attached to the rear border of the flexible plate, and subjecting to tension the forward movement thereof; all substantially as described.

5 7. The combination of a cylinder, adapted to turn in one direction on its axis, and having a flexible plate affixed on its periphery; and a metal roller, adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate; and with its periphery rolling upon the surface of that plate; and a table adjacent to the cylinder, and adapted to support the rear part of that plate, at the beginning of the turning of the cylinder, and to gradually surrender that plate to the cylinder, as the cylinder turns; and a weight attached to the rear border of the flexible plate, and subjecting to tension the forward movement thereof; and a pair of weights and levers, adapted to exert pressure on the journal-boxes of the metal roller, as it rolls; all substantially as described.

8. The combination of a cylinder, adapted to turn in one direction on its axis, and having a flexible plate affixed on its periphery; and a metal roller, adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate; and with its periphery rolling upon the surface of that plate; and a table adjacent to the cylinder, and adapted to support the rear part of that plate, at the beginning of the turning of the cylinder, and to gradually surrender that plate to the cylinder, as the cylinder turns; and a weight attached to the rear border of the flexible plate, and subjecting to tension the forward movement thereof; all substantially as described.

9. The combination of a cylinder, adapted to turn in one direction on its axis, and having a flexible plate affixed on its periphery; and a metal roller, adapted to turn in the other direction on its axis; at the same surface speed as the flexible plate, and with its periphery rolling upon the surface of that plate; and a table adjacent to the cylinder, and adapted to support the rear part of that plate, at the beginning of the turning of the cylinder, and to gradually surrender that plate to the cylinder, as the cylinder turns; and a pair of weights and levers, adapted to exert pressure on the journal-boxes of the metal roller, as it rolls; all substantially as described.

10. The combination of a cylinder, adapted to turn in one direction on its axis, and having a flexible plate affixed on its periphery; and a metal roller, adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate; and with its periphery rolling upon the surface of that plate; and a weight attached to the rear border of the flexible plate, and subjecting to tension the forward movement thereof; and a pair of weights and levers, adapted to exert

pressure on the journal-boxes of the metal roller, as it rolls; all substantially as described.

11. The combination of a cylinder, adapted to turn in one direction on its axis, and having a flexible plate affixed on its periphery; and a metal roller, adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate; and with its periphery rolling upon the surface of that plate; and a table adjacent to the cylinder, and adapted to support the rear part of that plate, at the beginning of the turning of the cylinder, and to gradually surrender that plate to the cylinder, as the cylinder turns; all substantially as described.

12. The combination of a cylinder, adapted to turn in one direction on its axis, and having a flexible plate affixed on its periphery; and a metal roller, adapted to turn in the other direction on its axis, at the same surface speed as the flexible plate; and with its periphery rolling upon the surface of that plate; and a weight attached to the rear border of the flexible plate, and subjecting to tension the forward movement thereof; all substantially as described.

13. The combination of a carrier, having a curved carrying-surface adapted to move through an arc of a circle, and having a flexible printing-plate affixed on that surface; and a metal roller, adapted to revolve at the same surface speed as the movement of the printing-plate on the carrier; and with its periphery rolling upon the surface of that plate; and a weight attached to the rear border of the flexible plate, and subjecting to tension the forward movement thereof; all substantially as described.

14. The combination of a carrier, having a curved carrying-surface adapted to move through an arc of a circle, and having a flexible printing-plate affixed on that surface; and a metal roller, adapted to revolve at the same surface speed as the movement of the printing-plate on the carrier, and with its periphery rolling upon the surface of that plate; and a tension device attached to one border of the flexible plate, and subjecting it to tension, during the movement thereof; all substantially as described.

15. The combination of a carrier, having a curved carrying-surface adapted to move through an arc of a circle, and having a flexible inked printing-plate affixed on that surface; and a metal roller adapted to revolve at the same surface speed as the movement of the printing-plate on the carrier, and with its periphery rolling upon the inked surface of that plate, and having its circumference identical in measurement with the length of the inked surface of the printing-plate, so that one revolution of the roller upon the plate, will take ink from the entire surface of the plate, and so that the ink thus taken will pre-

cisely encircle the roller; all substantially as described.

16. The combination of a carrier, having a curved carrying - surface adapted to move  
5 through the arc of a circle, and having a flexible inked intaglio gelatin printing-plate affixed on its surface; and a metal roller, adapted to revolve at the same surface speed as the movement of the printing-plate on the  
10 carrier, and with its periphery rolling upon

the inked surface of that plate; and means for pressing the roller with great force upon the inked intaglio gelatin printing-plate, in order to transfer sufficient ink from the depressions in the plate to the periphery of the  
15 roller; all substantially as described.

HENRY L. RECKARD.

Witnesses:

ALBERT H. WALKER,  
FREDERICK C. HUNTER.