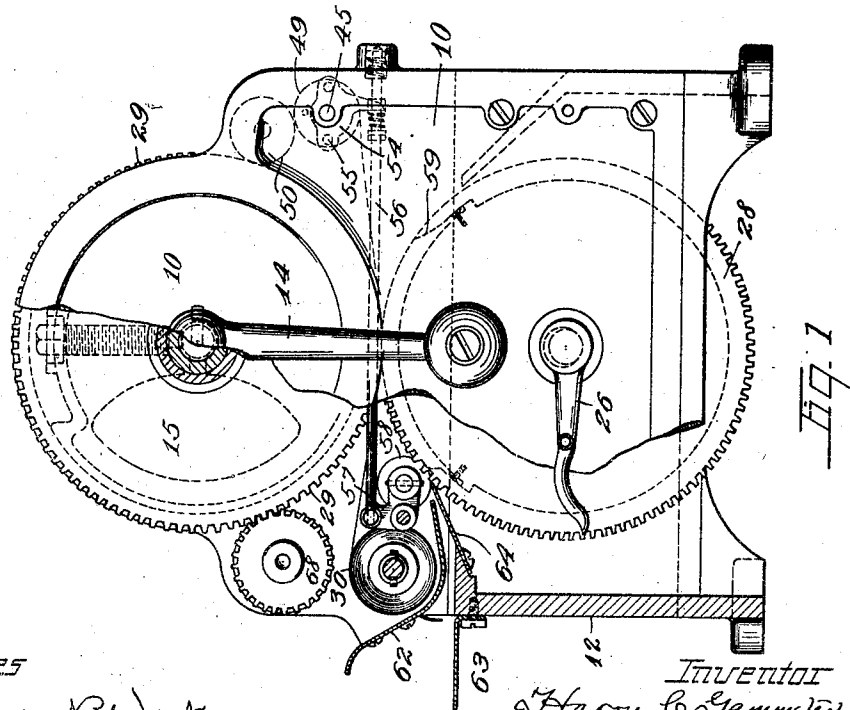
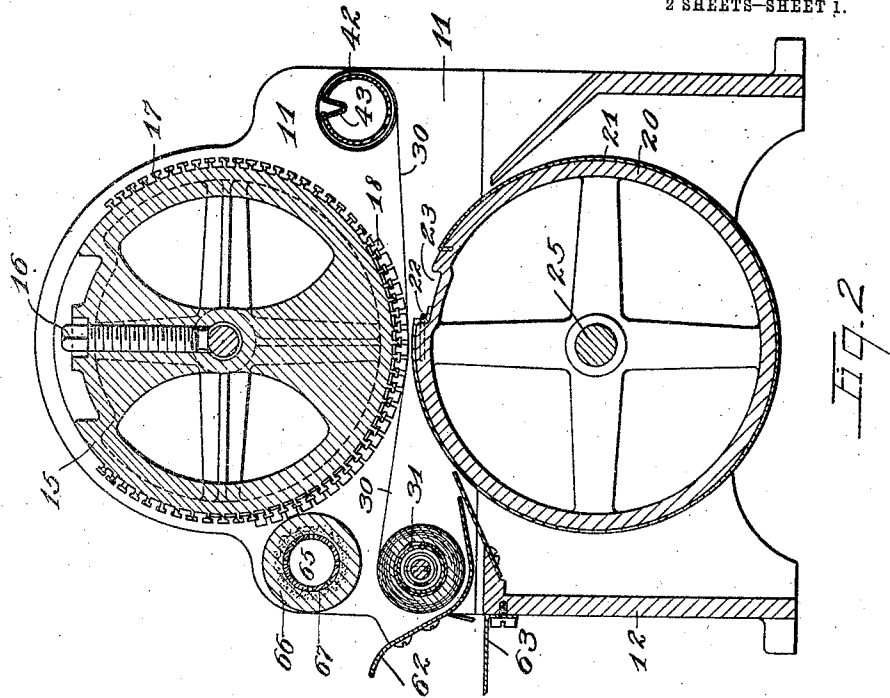


H. C. GAMMETER.
 DUPLICATING MACHINE.
 APPLICATION FILED FEB. 8, 1911.

1,050,638.

Patented Jan. 14, 1913.

2 SHEETS—SHEET 1.



Witnesses
 Bennett West,
 Oliver M. Kappeler.

Inventor
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 By Albert H. Baker,
 Atty.

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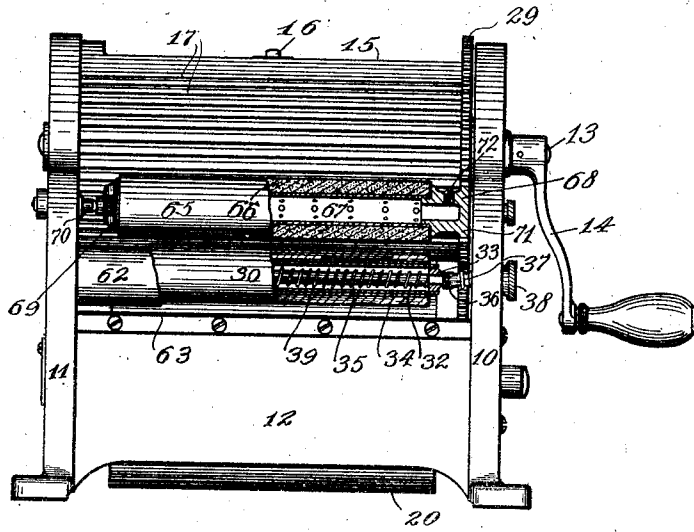


Fig. 3

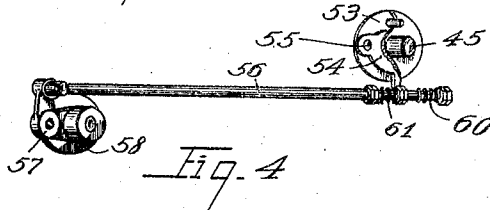


Fig. 4

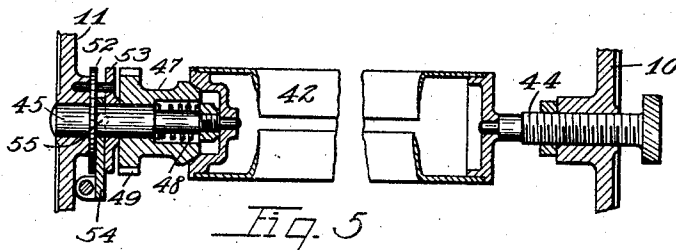


Fig. 5

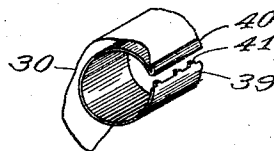


Fig. 6

Witnesses

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UNITED STATES PATENT OFFICE.

HARRY C. GAMMETER, OF BRATENAH, OHIO, ASSIGNOR TO THE AMERICAN MULTIGRAPH COMPANY, OF CLEVELAND, OHIO, A CORPORATION.

DUPLICATING-MACHINE.

1,050,638.

Specification of Letters Patent.

Patented Jan. 14, 1913.

Original application filed March 28, 1906, Serial No. 308,379. Divided and this application filed February 8, 1911. Serial No. 607,346.

To all whom it may concern:

Be it known that I, HARRY C. GAMMETER, a citizen of the United States, residing at Bratenahl, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Duplicating-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My prior application Number 308,379, filed March 28, 1906, shows a rotary printing machine having a removable drum formed with rails for carrying individual type; another drum, co-acting therewith, as a platen; an ink supplying fabric passing between the two drums and mounted on a pair of rollers independent of either drum, the fabric moving forward during the impression and being retracted between impressions; and a hollow absorbent roller contacting with the printing drum, whereby the fabric is replenished for each rotation.

The present application relates to the replenishing feature—that is, the successive application of ink to the fabric. The feature of the removable type-holding member is covered in application Number 574,660, filed July 30, 1910, as a division of said application Number 308,379. The other features are covered in the parent application. The drawings clearly illustrate the present invention.

Figure 1 is an end view, partly sectional, of a printing machine embodying the invention; Fig. 2 is a cross section thereof in a plane parallel with Fig. 1; Fig. 3 is a front elevation, partly sectioned through the ink supply roller and the ribbon spool beneath it; Fig. 4 is a perspective view of the clutch mechanism for controlling the ribbon feed; Fig. 5 is a sectional side elevation of the ribbon receiving roller and its clutch; Fig. 6 is a perspective view of the support and clasp upon which the ribbon is wound.

Referring to the parts shown by numerals, 10 and 11 are a pair of end plates mounted on a suitable base 12.

13 designates a shaft mounted in bearings in the end plates and having on its end a crank 14, by which it may be rotated. Mounted on this shaft between the end plates is a drum, designated 15, which is shown as clamped to the shaft by a centrally

placed radial set screw 16. Carried by the periphery of this drum are a series of parallel rails 17 which have over-hanging edges, whereby these rails may loosely confine between them parallel rows of grooved individual types, designated 18, assembled into page form. The loosening of the set screw 16 enables a simple pull on the crank, lengthwise of the shaft, to draw the crank out and free the drum. Accordingly, the page form may be removed intact and preserved for future use, or type may be assembled into, or distributed from, one drum while another is in the machine printing in coaction with the platen, now to be described.

Beneath the drum 15 is a drum 20, which acts as a platen therefor. This drum may have a soft exterior covering 21, removably held by a bail 22, clamping the end of the covering into a recess 23 in the drum. The extreme diameter of the drum with its covering may be the same as the diameter of the printing drum and its type, causing the type to successively impress the same portion of the platen, allowing convenient over-laying and under-laying. The platen may be mounted on a shaft 25 which has eccentric bearings in the end plates, and is shown as having on its end a lever 26 by which it may be adjusted. On the platen is a gear 28 which meshes with a gear 29 on the drum 15, whereby the two rotate in unison when driven by the crank 14.

In printing in imitation of type-written work, it is desirable to make the impression through an inked fabric. Such fabric is shown in the present machine as extending between the two drums and mounted on rollers 31 and 42 in front of and behind the line of contact and parallel therewith. The fabric itself is designated 30. As herein-after explained this fabric is fed forwardly with the paper during the printing portion of the rotation, and after such portion is retracted to its original position by a spring within the roller 31. It is to be understood that the paper to be printed is passed into the machine by hand, or otherwise, beneath the guard 62 which extends below the roller 31 and above the table 63 and the guard 64 behind it. Now, with the cooperating parts described, the same short section of the rib-

bon may be used over and over again until exhausted. When it is exhausted, the clip 43, or other means, which holds the end to the receiving roller is loosened, and the exhausted portion of the ribbon is cut off, the ribbon being again connected to the receiving roller. This method of operation has the advantage over using a successively fed ribbon for its full length continuously in that the impressions made by the successive impressions are more uniform. Moreover, there is eliminated that wear on the ribbon which is caused by dragging it across the type. To replenish the ribbon as it is used, I provide an inking roller 65 which is adapted to bear directly on the type and ink them, so that the type furnish to the ribbon an amount of ink which corresponds to that which is taken off the ribbon by the impression. This inking roller may also allow direct printing, the ribbon being removed. The inking roller may itself constitute an ink reservoir. As shown in Fig. 3, the inking roller consists of a felt exterior 66 mounted on the perforated tube 67 which is held by heads 68 and 69. The head 69 is adapted to receive the spring pressed bearing pin 70, while the head 68 carries a gear 71, which, meshing with the main gear 29, furnishes means of rotation. The head 68 is hollow to communicate with the interior of the roll, and a filling opening is provided in the head, which, when the roller is in use, is plugged by the screw 72. The support for the roller allows its easy removal and for filling with ink, either for direct printing or of the proper composition and color to replenish the ribbon.

In printing matter with lines of type acting through a ribbon, it results that where the lines are short, as at the end of paragraphs and elsewhere, a portion of the ribbon is unacted upon, thus, ordinarily, leaving the ribbon comparatively fuller of ink at such points; and this inequality of inking in the ribbon increases with successive impressions of the same matter on the same portion of the ribbon, resulting in giving a comparatively bad impression, when with change of matter, a full line comes on such portion. For many classes of work this inequality of impression is immaterial and may be disregarded. However, to enable the very best result to be produced, I have incorporated with the rotary ribbon printing machine my system of inking the type and letting it ink the ribbon. This obviates the difficulty by supplying to the ribbon ink at the exact place where it is removed, and this allows the same short portion of fabric to be used over and over again, producing the same impression however the lines of type run. The ribbon is always in good condition until the fabric itself is worn out. The ribbon may originally be inked inde-

pendently of the type or it may receive its ink solely from the type. In either case, the amount of ink impressed on the paper is even throughout the page, and thus a close imitation of type-written matter may be made, this imitation effect being augmented by the loose manner in which the rails hold the type.

It will be proper now to describe the means shown for holding and reciprocating the ribbon. In the form shown, the spring barrel 31 consists of a central shaft 32; heads 33 thereon; a tube 34 connecting these heads; and a spring 35 within the barrel, secured at one end to the shaft and at the other end to one of the heads 33. The shaft is freely journaled in the frame at one end and at the other end extends into a socket carried by a short shaft 36. This shaft is pressed toward the drum by a spring 37, and its socket is so formed that it prevents the shaft having independent rotation. On the shaft 36 is a head 38 and on the frame and the face of the head which bears against it are formed cooperating projections and recesses, holding the shaft 36 against accidental displacement, allowing adjustment of the spring by the turning of the head 38. To allow the coil of ribbon to be applied to the spring barrel without unwinding the coil, I mount it on a split sleeve 39 (Figs. 1, 3 and 6), this sleeve having one edge 40 doubled on itself to clamp the ribbon and having the other edge 41 turned inwardly to occupy a slot in the tube 34, preventing slipping. When the head 38 is pulled endwise against the spring 37, the spring barrel may be removed and the spool slipped into place over it.

In the embodiments shown, the receiving roll 42, which carries the forward end of the ribbon, is automatically rotated as the drums are revolved, and thus takes up the ribbon gripped and fed forward with the paper by the two drums, such operation winding the ribbon off of the ribbon roll and winding up the spring 35. When the sheet has been printed, the receiving roll 42 is released and the ribbon flies back to original position on the roll 31, the spring 35 unwinding. The mechanism causing this operation will now be described.

The roll 42 (Fig. 5) is mounted at its ends in studs 44 and 45, carried by the end frame members 10 and 11. The stud 44 may be screw threaded in the frame, to allow the removal of the roller. The stud 45 is rigid with the frame and has loosely journaled on it a clutch 47 which may engage with the counter-bored end of the roller. A spring 48 tends to prevent such engagement. On the clutch 47 are formed teeth 49 which mesh with an idler 50 (Fig. 1) which in turn meshes with the teeth of the main gear 29.

On the stud 45 is a rigid flange 52 and a

loose washer 53 which are secured by a pin against rotation. Between these washers is a plate 54 journaled on the stud and having recesses containing balls 55. These balls normally occupy also recesses in the washers 52 and 53. If the plate 54 be rocked on the shaft however, the balls are moved out of their recesses, forcing apart the washers 52 and 53, and this forces the clutch into engagement with the end of the roller 42 to cause the same to rotate with the clutch. The plate 54 may be shifted at the proper time to set the clutch by a rod 56 connected with the plate 54 at one end and at the other end with a bell crank 57 which carries a roller 58 adapted to bear on a segmental cam 59 mounted on the impression platen. When this roller 58 is in engagement with the cam, the rod 56 holds the clutch 47 in disengaged position. When, however, the cam releases the roller 58, the spring 60 draws the rod 56 in the direction to apply the clutch and the ribbon is accordingly pulled along concurrently both by the grip of the drums and the rotating roller 42. The size of the gear 49 and the roller 42 are so selected that the peripheral speed of the roller is substantially the same as that of the drums, so that the ribbon is constantly wound in as it is fed forward by the cooperating surfaces of the drums. At the same time the positive pull of the roller 42 overcomes any tendency of the spring barrel 31 to cause backward slippage of the ribbon when gripped between the drums. A weak spring 61 surrounding the rod 56 allows movement of the rod without jamming the clutch after the clutch is sufficiently tight.

From the construction described, it will be seen that my printing mechanism, while being very simple in construction, can be made to effect excellent imitations of type-written work, by reason of the conjoint action of its several features, namely:—(a) impression through the same portion of an inked ribbon; (b) constant replenishment of the ribbon at points where its ink is removed; (c) the employment with such replenished ribbon of type loosely held about the periphery of a rotary drum cooperating with a roller platen, whereby a digging impression is given corresponding to the blow of typewriter key-bars. It will also be seen that the type on the drum has a corresponding digging effect on the inking roller, thereby inking more heavily the advance edge of the type and heightening the imitative effect produced.

I claim:

1. The combination of a rotary member provided with means for carrying rows of individual type, a rotary cooperating platen, a fabric through which the impression is made, and a roller co-acting with this rotary

member for supplying ink to the fabric on each rotation.

2. The combination of a rotary printing drum, a rotary impression platen, a fabric, means for holding the same so that successive impressions are made through the fabric at the same points, and means for inking the fabric at such points.

3. The combination of a rotary type carrying member provided with means for carrying a plurality of parallel lines of type, a roller impression platen cooperating therewith, and an inking ribbon and an inking roller simultaneously cooperating with the form on the same side of the paper to be printed.

4. The combination of a printing member formed to carry a page form of parallel lines of type, a rotary platen, and two inking means, one being an ink ribbon and the other an inking roller, and the two cooperating simultaneously with the printing member on the same side of the paper to be printed.

5. The combination of a rotary printing couple, and two inking means therefor, one being a fabric, and the other an absorbent roller and both bearing against the form member of the couple.

6. The combination of a roller platen, a type carrying drum, a fabric through which the printing is effected, the same portion of the fabric covering the same characters on successive impressions, and means for re-inking the fabric for each impression at the points where the ink was used on the preceding impression.

7. The combination of a rotary form member, a cooperating platen, a fabric through which the printing is effected by the rolling movement of said member and platen, and a roller cooperating with the member for supplying ink to said fabric, said roller being mounted parallel with the form member and driven concurrently with the rotation of the latter and supplying ink during such rotation.

8. A printing couple, one member of which is rotary and carries a form, combined with an inking ribbon and an inking roller simultaneously cooperating with said member of the couple on the same side of the paper to be imprinted.

9. In a duplicating machine, the combination of a rotary printing member, an impression platen, an inking roller bearing on the surface of the printing member and adapted to ink the type thereon, and an inking ribbon passing between the printing member and the paper to be printed, whereby the ink on the ribbon is replenished.

10. The combination, with two members of a rotary printing couple, of an inking roller adapted to act on the printing surface carried by one of said members, and means for feeding a ribbon, said ribbon be-

ing removable whereby the couple may print directly or through the ribbon on the same side of the paper, the ribbon being inked by the printing surface.

11. The combination, with two members of a rotary printing couple, of an inking roller adapted to act on type carried by one of said members, and means for feeding an inking ribbon between the members of the couple and on the side of the paper to be printed adjacent to the printing member, said ribbon being removable whereby the couple may print directly or through the ribbon, the ribbon having its ink thus replenished.

12. The combination, with the two members of a rotary printing couple, of a printing ribbon, mechanism for causing it to reciprocate between said members, and means for reinking such ribbon for each rotation.

13. The combination of a rotary printing couple comprising an impression platen and means for carrying a page form of individual type, means whereby the form may be removed as a whole without being disassembled, a fabric through which the form prints, and means for inking the fabric on each rotation of the machine.

14. In a duplicating machine, the combination, with a printing member and an impression platen, one of which is rotary and the other of which has coöperative concurrent movement, whereby the printing is effected by rolling impression, of an inking roller bearing against the printing surface on the printing member, and an inking ribbon passing between the two members of the printing couple and inked on its back side by the ink from the type.

15. The combination, with the frame of the machine, of a roller platen, a page form of individual type arranged to travel in a circle and periodically coöperate with the platen, means for carrying the form, means for removing the form from the machine without disassembling it, a fabric through which the impression is made, means for carrying the fabric, and means for inking the fabric during the operation of the machine.

16. The combination, with a roller platen, of a printing form mounted to move in co-operation with the platen, means for carrying the form, means for supplying ink directly to the form at one point, and an inked ribbon through which the form prints at another point.

17. The combination of a rotary impression platen, a rotary member above the platen, a device removably mounted on said member and having parallel rails for holding individual type whereby a page form may be removed as a whole, a fabric, means for holding the same so that successive impressions are made through the same points

thereof, and means for inking the fabric for each impression.

18. The combination of a printing couple carrying a page form of individual type adapted to print by rolling contact, an inking ribbon adapted to engage the form face of the type on the front side of the paper to be printed, and an inking roller acting directly on a portion of the form while another portion of the form is effecting the impression through said ribbon.

19. The combination, with a rotary platen, of a rotary member mounted parallel therewith, a device removably mounted on the rotary member and adapted to carry a page form of individual type and allow its removal without disassemblage, a fabric through which the impression is made, and means for inking said fabric for each impression.

20. The combination of a page form and a roller platen having rolling co-action with the whole form, an inking ribbon extending between the two in position to engage the face of the form, spools for holding the ends of the ribbon, means for feeding paper between the ribbon and platen, and an inking roller adapted to contact with the form at a point not covered by the ribbon.

21. The combination, with a roller platen, of a printing form having rolling coaction therewith and consisting of parallel lines of individual type, all of which are adapted to coact with the platen, an inking ribbon extending between the platen and form on the front side of the paper to be printed, but leaving a portion of the form uncovered, and means for inking the form directly at an uncovered portion.

22. The combination of a roller platen, a coöperating type-carrying member, a page form of individual type projecting a substantially equal extent throughout, whereby the whole page coacts with the platen, an inked fabric adapted to extend between the member and platen and to points on each side of the line of contact, spools for carrying the ends of such fabric with the fabric engaging the form when paper is between the form and platen, and an inking device, a portion of the form being exposed to the action of such device while the ribbon is covering another portion.

23. The combination of a roller platen, a coöperating type-carrying member provided with means for carrying a page form of individual type held in a plurality of parallel lines, an inked fabric adapted to extend between the two and to points on each side of the line of contact, spools for carrying the ends of such fabric with the fabric engaging the form when paper is between the form and platen, the axes of said spools not moving out of constant horizontal planes, the fabric receding from the form,

and an inking roller adapted to contact with a portion of the form where the fabric is out of contact.

24. The combination of a roller platen, a 5 coöperating type carrying member having means for holding a page form consisting of a plurality of parallel lines of individual type, an inked fabric adapted to extend between the two and to points on each side of 10 the line of contact, spools for carrying the ends of such fabric, the axes of said spools not moving out of constant horizontal planes during printing, there being a portion of the form not covered by the fabric, 15 means for feeding paper between the fabric and platen, and an inking roller adapted to contact with the form at points where the fabric is out of contact with it.

25. The combination of a form consisting 20 of a plurality of parallel lines of loosely held individual type, a roller platen having rolling coaction therewith, an inking ribbon extending between the two on the front side of the paper to be printed, means for holding 25 ing the ends of the ribbon, and an inking roller adapted to contact with the form at a point not covered by the ribbon.

26. The combination, with a roller platen, 30 of a printing form having a plurality of parallel lines of individual type mounted to move in coöperation with the platen, means for carrying the form, means for supplying ink directly to the form at one point, an 35 inked ribbon, and means for holding the ribbon between the platen and the face of the line of type which is printing on the front side of the paper being printed.

27. The combination of a printing member 40 formed to carry parallel lines of individual type, a rotary platen, and two inking means, one being an inking ribbon adapted to lie between the type and platen and the other an inking roller and the two 45 coöperating simultaneously with the printing member, and means for feeding sheets of paper between the ribbon and platen.

28. The combination of a rotary printing drum formed to carry individual type projecting a substantially uniform distance 50 from the axis of rotation, a rotary platen parallel with the drum and adapted to coact with the page form carried by the drum, and two inking means, one being an inking ribbon adapted to lie between the type and 55 platen and the other an inking roller, the two coacting simultaneously with the printing member whereby the ink of the ribbon is periodically and automatically replenished by the rotation of the drum.

29. The combination of a rotatable drum, 60 means for holding thereon lines of removable individual type parallel with the axis of the drum, whereby a page form of type adapted to print at one rotation may be mounted on the drum, a platen adapted to 65 have rolling contact with the type on the drum a line at a time, and two inking means, one being an inking fabric adapted to extend between the type and platen on the front side of the paper to be printed 70 and the other an inking roller, and the two coöperating simultaneously with the printing member.

30. The combination of a rotatable drum, 75 means for holding thereon parallel lines of loose individual type, said lines extending parallel with the axis of the drum, a roller platen adapted to coact with the type on the drum a line at a time, an inking fabric adapted to extend between the type and 80 platen and being pressed simultaneously by a line of type, and an inking roller bearing against the type whereby the same are automatically inked as the drum rotates and thereby replenish the fabric at the same 85 time that they print through it.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

HARRY C. GAMMETER.

Witnesses:

H. L. PHILLIPS,
D. E. AUSTIN.