

A. H. BATES.
 DUPLICATING MACHINE.
 APPLICATION FILED MAY 20, 1908.

993,495.

Patented May 30, 1911.

2 SHEETS—SHEET 1.

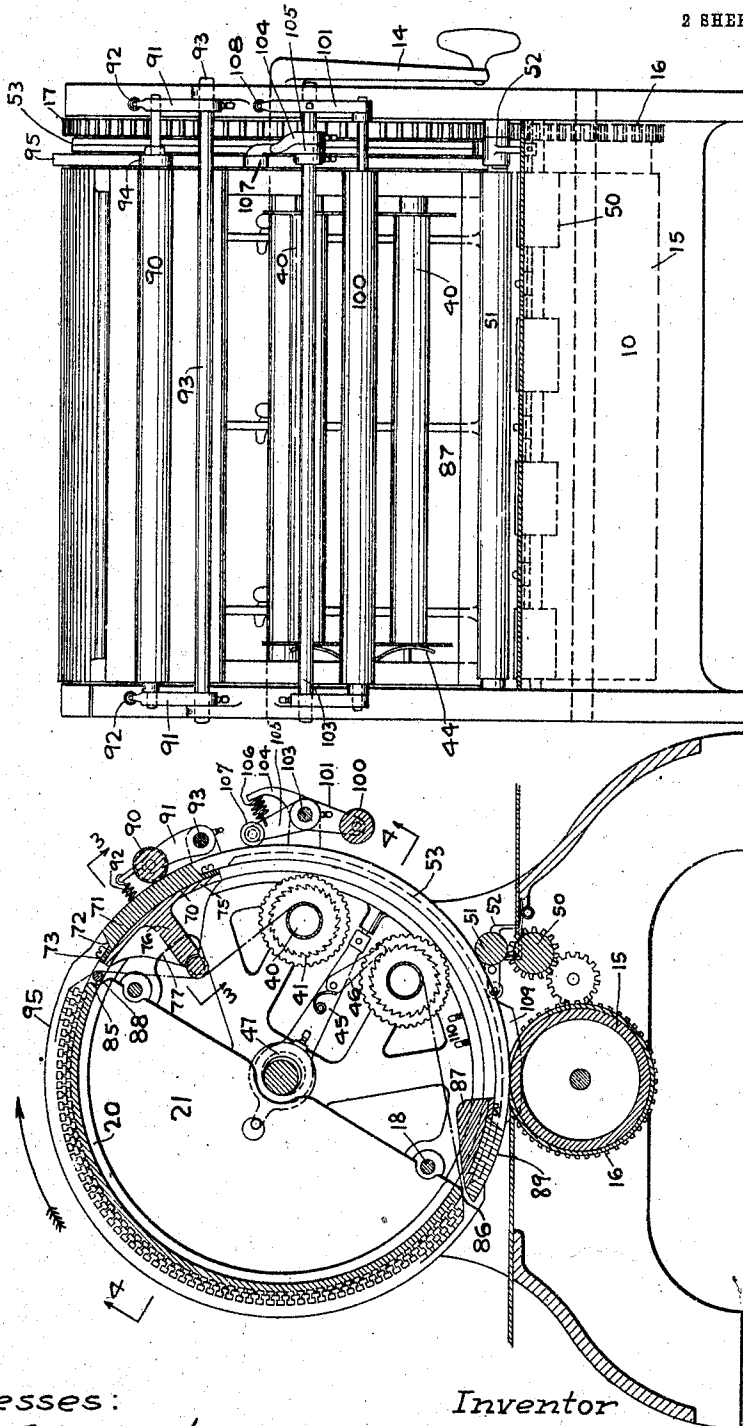


Fig. 2.

Fig. 1.

Witnesses:
 H. W. Steindorf
 A. J. Hudson

Inventor
 Albert H. Bates,
 By Bates, Foulis & Hall,
 Attys.

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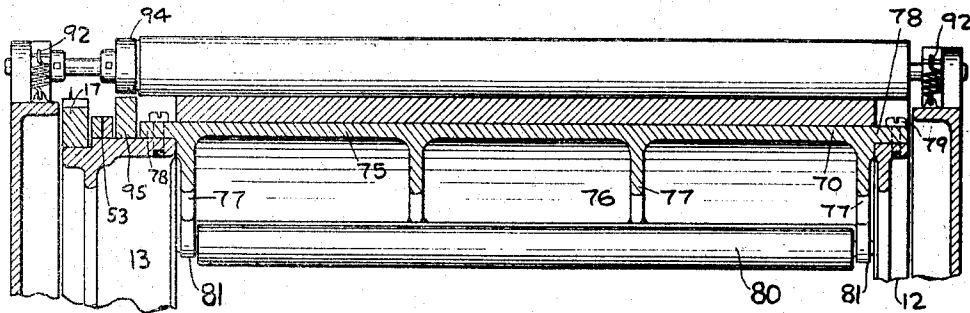


Fig. 3.

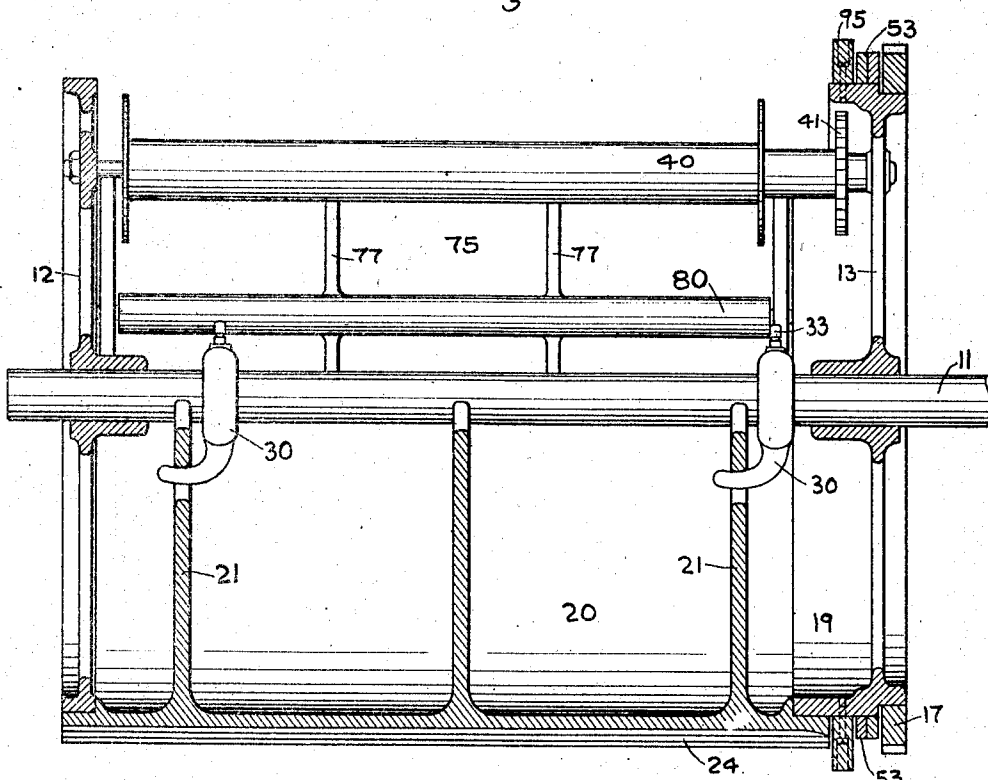


Fig. 4.

Witnesses:

H. W. Steindorf
 A. J. Hudson

Inventor

Albert H. Bates;

By Bates, Foster & Hull,
 Attys.

UNITED STATES PATENT OFFICE.

ALBERT H. BATES, OF CLEVELAND, OHIO, ASSIGNOR TO THE AMERICAN MULTIGRAPH COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

DUPLICATING-MACHINE.

993,495.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed May 20, 1908. Serial No. 433,902.

To all whom it may concern:

Be it known that I, ALBERT H. BATES, a citizen of the United States, residing at Cleveland, 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.

The object of this invention is to provide a simple and efficient rotary printing press adapted for the rapid production of circular letters in imitation of typewriting, wherein the body of the letter is printed through an inking ribbon, and the letter-head or the signature, or both, are printed by direct inking.

Another object is to provide such a machine in a form wherein all the printing surfaces are easily removable and changeable.

Another object is to enable the printing at one rotation of two successive sheets, with the letter-head and body on one sheet and the body and signature on the other sheet, both sheets being printed by the same face of the ribbon.

Still another object is to provide independent and different inking for the letter-head and signature.

The invention is particularly adapted for a rotary printing machine of the type shown in application No. 432,777 filed May 14, 1908, by Harry C. Gammeter, wherein the type are carried on a removable segmental member mounted in a skeleton drum, and such type form is inked by a ribbon extending across it and having its ends on spools, which are mounted in the skeleton drum opposite the type form. In my invention, I may take such printing machine and equip it with means for carrying a suitable electrotype, or other printing surface, of either the letter-head or the signature, or both, and I mount such member, or each of such members, on the drum between one edge of the segment for the body of the letter and the adjacent ribbon spool. The ribbon thus passes beneath my holder for the letter-head or signature and passes outwardly between it and the removable form which carries the body of the letter; and if two of my holders are employed the ribbon passes from the other edge of the body form to the other spool beneath the second holder. Suitable

means are provided for directly inking my additional printing surfaces. The result is that with this machine a single rotation of the drum may print not only the body of the letter through the inking ribbon but the letter-head by direct inking and in a different color of ink, if desired. Or, in place of the letter-head, I may print the signature, or I may print both the letter-head and the signature. This special printing of the letter-head or signature, or both, is combined with a removable member for carrying the type form, so that the body of the letter may be changed, as desired.

I am familiar with application No. 409,434 filed January 6, 1908 by Henry C. Osborn, wherein there is shown a segmental type-carrying member about which passes an inking ribbon combined with a printing segment which is directly inked, and I do not intend to claim herein any combination or structure which is claimed or could be claimed in Mr. Osborn's application. In that application, however, the relative arrangement of the printing surfaces and the spools which carry the ends of the ribbon therefor is different from that shown and claimed herein, and the relation of the directly inked segment to the ribbon is different; the construction of my segments and the arrangements for deflecting the ribbon are different; my method of printing the signature is different; and the adaptation of direct printing to a removable semi-cylindrical type-carrying drum printing through a ribbon is mine. Moreover, in Mr. Osborn's application when two sheets are printed by a single rotation of the drum they are printed through opposite sides of the ribbon. While this is advantageous in causing more service to be obtained from the ribbon, in my mechanism both sheets are printed through the same face of the ribbon, thereby insuring a more absolute uniformity of product where the ribbon has already been worn on one side, or for any other reason has one side different from the other.

In the drawings, Figure 1 is a vertical cross section through a rotary printing machine embodying my invention; Fig. 2 is a front elevation thereof; Fig. 3 is a radial section through the removable member designed to carry the letter-head form; and Fig. 4 is a longitudinal section through the

drum. These sections are taken on the lines indicated respectively by 3—3 and 4—4 of Fig. 1.

Referring first to the general construction of the embodiment shown, 10 represents the frame of the printing machine having a base and suitable end plates. In these end plates is journaled a shaft 11, on which are mounted spiders or rings 12 and 13. These rings are braced by shouldered tie rods 18 which have nuts on their ends. The shaft, rings and tie rods constitute a skeleton drum. This drum is adapted to be rotated by a suitable crank 14 or in other suitable manner. Beneath the drum is a rotary impression platen 15 which has a gear 16 meshing with the gear 17 on the drum ring 13. 20 represents the body of the removable printing member which is shown as a semi-cylindrical piece of metal reinforced by the transverse webs 21. Into the surface of this member are set longitudinal rails 24 providing between them under-cut grooves adapted to be occupied by grooved type. This type-holding segment rests near its ends on the periphery of the ring 12 and a suitable arc shaped projection 19 on the ring 13. The stiffening webs rest at their edges substantially against the tie rods 18, the webs being grooved for that purpose. The segment is held on the drum by a pair of dogs 30 which surround the shaft 11 and have turned over ends extending through openings in the webs, these dogs being held in place by set screws 33. Loosening of the set screws 33 allows the shifting of the dogs to release the segment so that it may be entirely removed and another similar segment substituted for it. The segment is long enough arcually to carry the longest page form used, or longer, as hereinafter explained.

The type on the segment are inked by a ribbon carried by the drum itself. For this purpose there are provided suitable ribbon spools 40 mounted between the end members 12 and 13 of the skeleton drum. These spools engage at their ends with ratchets 41 by which they may be fed by suitable mechanism, carried by the end member 13. For this purpose, I have shown a pawl 46 on a strap 45 which surrounds and is driven by a stationary eccentric 47. This pawl is double shouldered and adapted to engage either ratchet, and the gain made is held by suitable detents, not shown. This is substantially after the manner of the mechanism shown in Mr. Gammeter's application No. 240,167. The spools are shown as held in place by a suitable spring 44 pressing them toward the ring 13. The spools and their holding and driving mechanism are thus entirely independent of the type holding segment.

The paper may be fed to the printing

couple by feed rollers 50 and 51, the former of which is geared with the platen to be continually rotated, and the latter of which is carried by arms 52, one of these arms having a roller which coöperates with the cam 53 on the ring 13, whereby as the drum is rotated, the roller 51 is raised or lowered to control the paper feed. This paper feeding mechanism is substantially the same as that shown in Patent No. 846,992.

The construction above described is shown in the application of Mr. Gammeter No. 432,777, referred to. In my invention, I mount on the rings 12 and 13 a suitable segmental member 70 which lies outside of the ribbon and carries a suitable printing surface 71 which may be an electrotype or other member for printing the letter-head. As shown, the printing surface 71 is an arc-shaped electrotype having beveled edges 72, by which it is clamped by suitable strips 73 fastened by screws to the segment 70, though other means of securing the printing surface to the segment may be employed. The segment itself comprises an arc shaped portion 75, the longitudinal webs 76 and the transverse webs 77. These webs are employed to brace the segment and make it very stiff, preventing its sagging at its central portion. Near its ends, the arc-shaped portion of the segment extends over the rings 12 and 13 as shown at 78, and is secured in place by suitable screws 79 passing through such flanges into the rings. The proper position of the segment longitudinally is insured by annular bosses on the outer sides of the endmost webs 77 which abut the rings 12 and 13.

The above construction makes a very easily removable member and at the same time one which will be accurately fitted in place. Different electrotypes or other printing surfaces may be secured to the member as desired, or different segmental members may be substituted.

As the depth of the webs on the segment 70 deflect the ribbon inwardly, as shown in Fig. 1, I mount opposite the inner edge of the longitudinal web a roller 80. This roller may be journaled by pins extending into ears 81 which extend from the endmost of the transverse webs 77. The roller may lie close to the web 76, which edge may be concaved to accommodate the roller.

For printing the signature, I provide a second removable segment 87. This segment may be considerably smaller than the segment 70. In fact, instead of being a webbed structure, it may be a solid bar, as shown, having its ends extending across the rings 12 and 13 and secured in a manner similar to the segment 70. The printing surface 89 may be similarly secured to the segment. This segment with its printing surface preferably overhangs the edge 86

of the removable type carrying member so as to bring the signature close to the last line of the printing.

Where the ribbon draws across the end of the type-carrying segment, a roller may be employed, as shown at 85, to reduce the friction, or the edge of the segment may be simply rounded, as shown at 86. Where the roller is employed, it may be carried by the segment, or by the rings 12 and 13, as desired. Fig. 1 shows the roller 85 as having gudgeons extending into the rings 12 and 13, the roller occupying a concave recess 88 in the edge of the segment.

To ink the electrotpe 71, I provide the felt inking roller 90, which carries its own ink in a well known manner, this roller being mounted in arms 91 which are rigid on a rock shaft 93 journaled in the frame standards, the roller being drawn toward the drum by springs 92. On the shaft of the inking roller, or otherwise operating to rock the shaft 93, is a roll 94 which lies over and coöperates with a cam 95 on the drum. When the ribbon printing portion of the drum is passing the inking roller 90, a portion of the cam of larger radius is acting on the roll 94, holding the roller 90 out of action. Before the electrotpe comes opposite the roller 90, however, the depressed portion of the cam allows the springs 92 to draw the roller inwardly to ink the electrotpe. The inking of the signature surface might be accomplished by the same roller 90. In order that it may be inked by ink of a different color, however, I provide the roller 100 mounted between rock arms 101 on a rock shaft 103. This rock shaft has a rock arm 104 which extends in the opposite direction and is connected with a loose arm 105 through an interposed compressible spring 106. This arm 105 carries a roller 107 adapted to stand in proximity to the cam 95. With this construction, whenever the roller 107 is forced outwardly, the inking roller is forced inwardly. This operation may be caused by an outward projection 109 from the cam 95, such outward projection extending farther than the main enlarged portion of the cam. The result of this is that when either the reduced portion of the cam, or the portion of intermediate radius is passing the roller 107, the same is not forced outwardly enough to cause the inking roller to engage any of the forms. When, however, the surface 109 comes into engagement with the roll 107, the inking roller engages the signature form under a spring pressure. When this extra projection 109 passes the roller 94 of the other inking roller, it simply moves the same outwardly idly. A light tension spring 108 (Fig. 2) holds the roller 100 normally in idle position.

From the above described construction, it will be seen that each of my segmental direct

printing members may be mounted on the drum whenever desired or removed therefrom without varying the operation of the portion of the machine which prints through the ribbon. The segment which carries the letter-head may be used alone, or that which carries the signature alone, or either or both used with the ribbon printing portion. The drum may be constructed of such size that the segmental member 20 will just carry the body of an ordinary letter, allowing both my letter-head and signature printer to be used at the same time so that one rotation will print the letter-head, the body of the letter and the signature.

To make the machine more adaptable, however, the type carrying segment 20 may have a large enough surface to carry type for the longest sheet of paper in common use, that is, legal size, which is commonly thirteen inches in length. The body portion of a circular letter is seldom over six or seven inches on the first sheet and somewhat longer on the second sheet, so that by making the diameter of the drum approximately ten inches, and thus providing a semi-cylindrical type carrying surface of about fifteen inches, the surface may carry the body portion of two successive sheets. Accordingly, such a machine can print one sheet with the letter-head and the second sheet with the signature,—the form of the first and second sheets being so mounted on the drum that the first sheet begins substantially at the edge of the segment nearest the letter-head electrotpe, and the second sheet ends substantially at the final type-holding channel of the segment, there being a gap between the two type forms which varies according to the amount of matter set up. Such an arrangement has the decided advantage that the first and second sheets of a letter are printed through the same ribbon so that they are identical in appearance.

Where two sheets are printed by one rotation of the drum, it is desirable to have the paper feed interrupted so as to insure the proper starting of the second sheet, though a continuous feed on a long single sheet might be employed, the sheet being divided after printing. To provide this interrupted feed, I make the cam 53 which operates the paper feed in the form of two rings, side by side, independently adjustable, and I position these rings so that after the first sheet is fed, a depression on one of the rings operates on the arm 52 to lower the roller 51 and cause a subsequent feeding shortly after the first sheet has cleared the feeding rollers. The set screws 110 (Fig. 1) illustrate means for clamping the two cam rings in adjusted position, though if desired the clamp shown in Mr. Gammeter's application No. 396,571 may be employed.

If the type carrying segment be not made

in a removable semi-cylinder, as shown, but an immovable member, it may extend for considerably more than a semi-circumference and thus produce a desired extent of surface with a smaller diameter; or such extended surface may be adapted to a removable segment by making such segment in sections, in which case, it may be desired to arrange the machine so that any one of the sections may be used, or all of them, or any portion of them, used together. This provides for adjusting the type carrying form to a length corresponding to that of the body of the letter so that both the letter-head and signature printing devices may be used on one sheet. It will be seen therefore that my invention is adapted for a wide variety of uses in producing circular letters, printing either the letter-head and the body of the letter, or the body of the letter and the signature, or the letter-head and body on one sheet, and simultaneously the body and signature on another sheet, or if constructed of special size, or adjustable, the letter-head, body, and signature on the same sheet at one time.

I have referred to the invention as being particularly adapted for printing circular letters. It is not limited to such use, however, as a simple removal of the type form would allow the letter-head printer or signature printer to operate alone, which is of advantage in using the machine either to print stock-letter sheets or other forms, or, for example, to print the signature on single sheets which have had their letter-head and body previously printed by this machine.

There is no intention to limit the protection obtained by this patent to any particular use of the machine, nor to the particular construction illustrated, further than the claims and the prior art require.

Having thus described my invention, I claim:

1. The combination of a printing member, a type carrying portion on said member removable as a whole from the machine without disassembling the form, and an inking ribbon extending across the type carrying portion, and a printing surface carried by said member outside of the inking ribbon, the ribbon passing beneath it directly to the adjacent edge of said type carrying member.

2. The combination of a printing member adapted to turn on an axis, a type carrying portion on said member formed with parallel overhanging rails adapted to loosely confine individual type, said portion being removable as a whole without disassemblage of the type, a ribbon spool, an inking ribbon extending across the type carrying portion, and a printing surface carried by said

member outside of the inking ribbon, the ribbon passing beneath it from the spool to the adjacent edge of the type-carrying portion.

3. The combination of a skeleton drum, a removable type holding segment mounted thereon, a pair of ribbon spools carried by the drum on the opposite side of the axis from said segment, a ribbon passing from one of said spools to the other and across said segment, and another segment carried by the drum between one of said spools and the edge of the type carrying member.

4. The combination of a skeleton drum, a removable type holding segment mounted thereon, a pair of ribbon spools carried by the drum on the opposite side of the axis from said segment, a ribbon passing from one of said spools to the other and across said segment, another segment carried by the drum between one of said spools and the adjacent edge of the type carrying member, and means independent of the ribbon for inking the printing surface carried by such last mentioned surface.

5. The combination of a rotary skeleton drum, a removable type holding segment mounted thereon, a pair of ribbon spools carried by the drum on the opposite side of the axis from said segment, a ribbon passing from one of said spools to the other and across said segment, another segment carried by the drum between one of said spools and the adjacent edge of the type carrying member, and a platen cooperating with both printing surfaces.

6. The combination of a rotary skeleton drum, a removable type holding segment mounted thereon, a pair of ribbon spools carried by the drum on the opposite side of the axis from said segment, a ribbon passing from one of said spools to the other and across said segment, two other segments carried by the drum between said spools and the adjacent edges of the type carrying member respectively, and means independent of the ribbon for differentially inking the two printing surfaces last mentioned.

7. The combination of a member adapted to turn on an axis, a type holding segment mounted thereon, a pair of ribbon spools carried by the member on the opposite side of the axis from said segment, a ribbon passing from one of said spools to the other and across said segment, another segment carried by the member between one of said spools and the adjacent edge of the type carrying member, said last mentioned segment being provided with a projecting web extending inwardly between the spool and the adjacent edge of the type carrying member.

8. The combination of a type holding member, a ribbon spool, a ribbon passing from said spool across said member, another

member carried between said spool and the adjacent edge of the type carrying member, said last mentioned member carrying on its inner side a roller over which the ribbon passes from the spool to the type carrying portion of the machine.

9. The combination of a skeleton drum, a removable type holding segment mounted thereon, a pair of ribbon spools carried by the drum on the opposite side of the axis from said segment, a ribbon passing from one of said spools to the other and across said segment, another segment carried by the drum between one of said spools and the adjacent edge of the type carrying member, said last mentioned segment carrying on its inner side a roller over which the ribbon passes from the spool to the type carrying portion of the machine.

10. In a printing mechanism, the combination of a shaft, a pair of rings secured thereto, a segmental type carrying member resting on said rings and secured to said shaft, a pair of ribbon spools mounted between the rings on the opposite side of the shaft from said segmental member, and another segmental member mounted on the rings between one of the ribbon spools and an edge of the first mentioned segmental member.

11. In a printing mechanism, the combination of a shaft, a pair of rings secured thereto, a segmental type carrying member resting on said rings and secured to said shaft, a pair of ribbon spools mounted between the rings on the opposite side of the shaft from said segmental member, two other segmental members mounted on the rings, each between one of the ribbon spools and the adjacent edge of the first mentioned segmental member, and means for independently inking said two segmental members.

12. In a printing mechanism, the combination of a shaft, a pair of rings secured thereto, a segmental type carrying member resting on said rings and secured to said shaft, a pair of ribbon spools mounted between the rings on the opposite side of the shaft from said segmental member, and another segmental member mounted on the rings between one of the ribbon spools and an edge of the first mentioned segmental member, said last mentioned segmental member having an inwardly projecting web, and a roller at the inner edge of said web, across which the ribbon is deflected.

13. In a printing mechanism, the combination of a shaft, a segmental type carrying member held around said shaft, a pair of ribbon spools, another segmental member mounted between one of the ribbon spools and an edge of the first mentioned segmental member, said last mentioned seg-

mental member having an inwardly projecting web, a roller at the inner edge of said web across which the ribbon is deflected, another roller at the edge of the type carrying segment across which the ribbon is deflected in the opposite direction, and means for inking a printing surface carried by the exterior segment.

14. In a printing machine, the combination of an inking ribbon, two type carrying members, one exterior of the ribbon and the other interior thereof, the interior member and its type being removable as a whole from the machine independently of the exterior member, a ribbon spool carrying the wound-up end of the ribbon, said ribbon passing from the spool to the adjacent edge of interior segment beneath the exterior segment.

15. In a printing machine, the combination of an inking ribbon, two type carrying segments one exterior of the ribbon and the other interior thereof, a ribbon spool carrying the wound-up end of the ribbon, said ribbon passing directly from the spool to the adjacent edge of the interior segment beneath the exterior segment, a rotary drum carrying the parts mentioned, an inking roller adapted to ink a printing surface on the exterior segment, and a cam on the drum for operating said roller.

16. The combination of a skeleton drum, a removable segment carrying rails and adapted to be secured to said skeleton drum and extending for substantially a semi-circumference, a pair of ribbon spools mounted adjacent to each other in the skeleton drum on the opposite side of the axis from said segment, and a member adapted to carry an electrotpe or other printing surface which is mounted on the drum between the spool and the edge of the said segmental member.

17. The combination of a shaft, a pair of rings mounted thereon, a pair of ribbon spools mounted between said rings, a segmental member mounted on the rings on the opposite side of the shaft from said spools, a ribbon passing from one spool across the segmental member and then to the other spool, two members carried by said rings between the spools and the edge of the segmental member to which the ribbon runs from such spool respectively, means for independently inking the printing surfaces on such additional members, a two-part cam on one of the rings for controlling such inking, a platen cooperating with individual type on the said segment and with said additional printing surfaces, a paper feeding device, a double cam on one of the rings adapted to control and subdivide the paper feed, and means for automatically feeding the ribbon as the drum rotates.

18. The combination with a drum carrying an arcual printing segment, a ribbon spool mounted in the drum, a roller carried by said segment for deflecting the ribbon, and another printing surface carried by the drum outside of which the ribbon passes.
19. The combination with a member carrying a printing surface, a ribbon spool, and a roller carried by said member on its inner side for deflecting the ribbon, and another printing surface over which the ribbon passes.
20. The combination, with a ribbon spool and a ribbon, of two printing surfaces, ribbon passing beneath one of such surfaces and over the other, a roller for deflecting the ribbon located beneath the surface which it does not ink, and a roller for deflecting the ribbon onto the surface which it does ink.
21. The combination, with a ribbon spool and a ribbon, of two printing segments, ribbon passing beneath one of such segments and over the other, a roller for deflecting the ribbon beneath the segment which it does not ink, and a roller for deflecting the ribbon onto the segment which it does ink.
22. The combination, with a rotary member of ribbon spool and a ribbon, of two printing surfaces, ribbon passing beneath one of such surfaces and over the other, a roller for deflecting the ribbon located beneath the surface which it does not ink, and a roller for deflecting the ribbon onto the segment which it does ink, one of said rollers being carried by the segment, and the other by the rotary member.
23. In a printing machine, the combination of a rotary segment adapted to carry a printing surface, a pair of ribbon spools adapted to carry a ribbon passing across such surface, a member carrying an additional printing surface, means independent of the ribbon for inking said member, and a roller for deflecting said ribbon beneath said member.
24. In a printing machine, the combination with a printing surface of a ribbon adapted to pass over the same, a member carrying a second printing surface, means independent of the ribbon for inking said second surface, a roller for deflecting said ribbon beneath said member, said roller being mounted between ears which project from webs on the inner side of said member.
25. The combination of a printing surface formed to carry the body of two standard letter sheets, adjacent to each other, a ribbon extending continuously across both bodies and presenting the same face thereto, means for printing the letter-head, and means for printing the signature, all by one operation of the machine.
26. The combination of a printing surface adapted to carry the body of two letter sheets, means for printing the letter-head, means for printing the signature, all by one operation of the machine, and means for interrupting the paper feed between the two sheets.
27. The combination of a rotary member, a type carrying portion of said member adapted to carry the body of two sheets, an inking ribbon adapted to extend across such member, means mounted on the member outside of the ribbon adjacent to one edge of the type form for carrying a letter-head printing surface, means mounted on the printing member adjacent to the other edge of the type form and outside of the printing ribbon for carrying a signature printer, and a pair of ribbon spools mounted in the rotary member on the opposite side of the axis from the type form, the ribbon passing from said spools to said form beneath said letter-head printer and signature printer.
28. The combination of a rotary member, a type carrying portion of said member adapted to carry the body of two sheets, an inking ribbon adapted to extend across such member, means mounted on the member outside of the ribbon adjacent to one edge of the type form for carrying a letter-head printing surface, means mounted on the printing member adjacent to the other edge of the type form and outside of the printing ribbon for carrying a signature printer, means for feeding sheets of paper, and means for interrupting the feed between the two forms on the printing member.
29. The combination of a rotary member, a type carrying portion of said member formed to carry the body of two standard sheets, an inking ribbon adapted to extend across such member, means mounted on the member outside of the ribbon adjacent to one edge of the type form for carrying a letter-head printing surface, means mounted on the printing member adjacent to the other edge of the type form and outside of the printing ribbon for carrying a signature printer, and means automatically operated for independently inking the letter-head and the signature forms.
30. The combination, with the frame of the machine, of a member formed to carry parallel lines of individual type, a second member adapted to carry a printing surface, the first member being removable from the machine without disassemblage of its form and independently of the second member, an inking fabric lying over the face of the first member and passing beneath the second member, and means for inking the printing surface on the second member.
31. The combination, with a rotary frame, of a member mounted thereon and provided with means for carrying a page form of individual type, said member being removable

with its form without disassembling it, an independent member carrying a printing surface and mounted on said frame, an ink-carrying fabric extending across said page form, means for directly inking the said printing surface, and a ribbon spool mounted in said frame for carrying the wound-up end of the fabric, the fabric in passing from

the page form to the spool going beneath said independent member.

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

ALBERT H. BATES.

Witnesses:

W. L. McGARRELL,
A. J. HUDSON.