

H. C. GAMMETER.
 RIBBON FEEDING MECHANISM.
 APPLICATION FILED JAN. 9, 1905.

997,285.

Patented July 11, 1911.

3 SHEETS-SHEET 1.

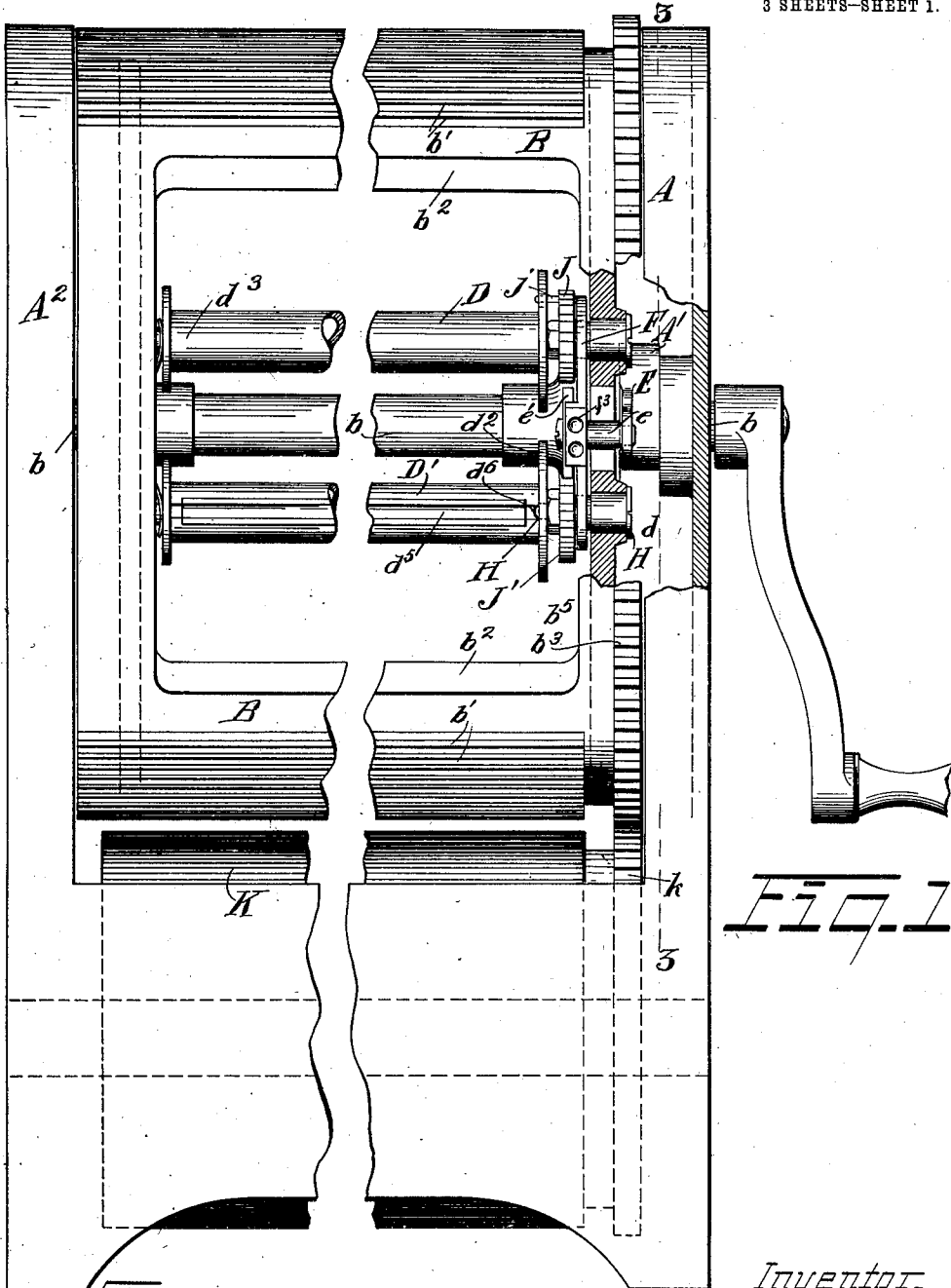


Fig. 1

Witnesses:

Nathan F. Fretter,
 Breman & West,

Inventor.

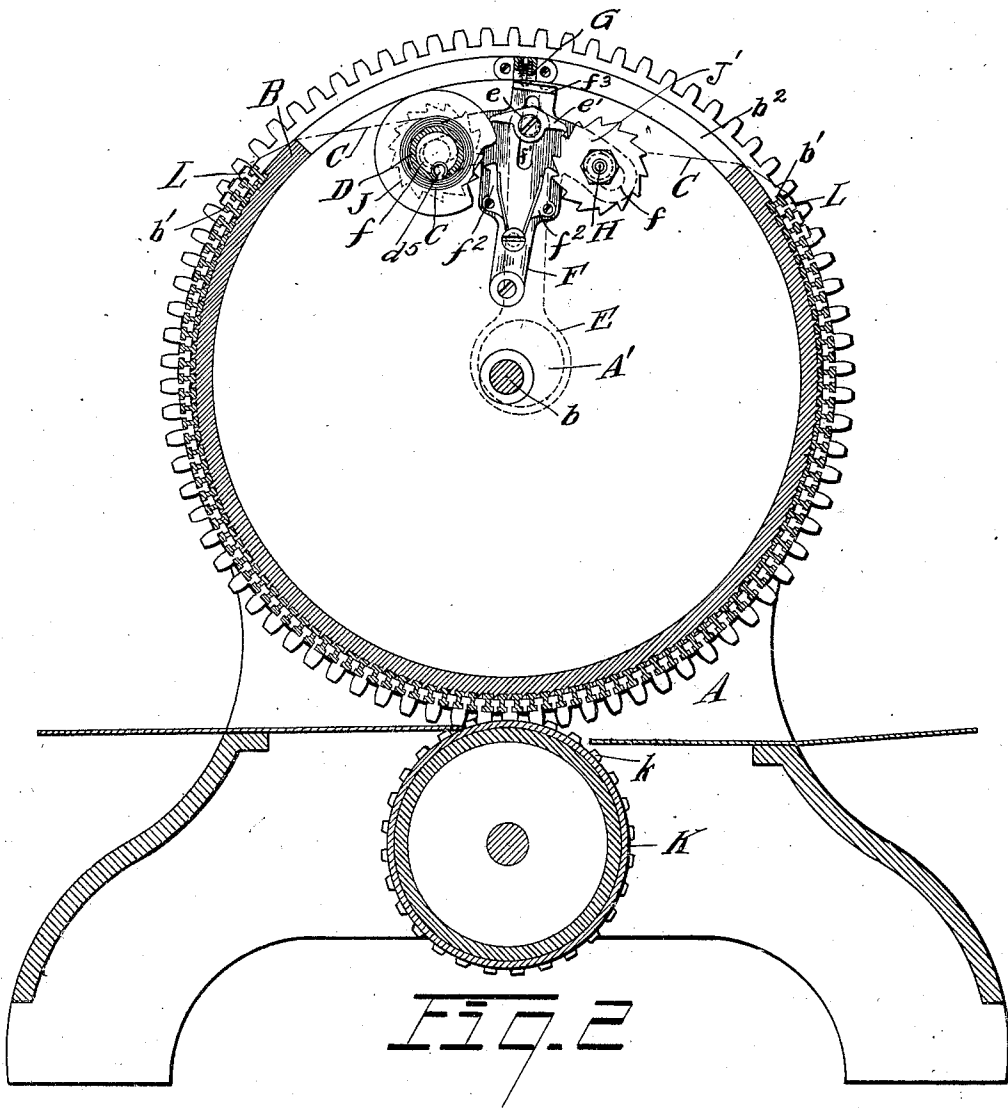
Hany C. Gammeter.
 By Baker, Foulis & Hill
 Attys.

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 Foreman & West.

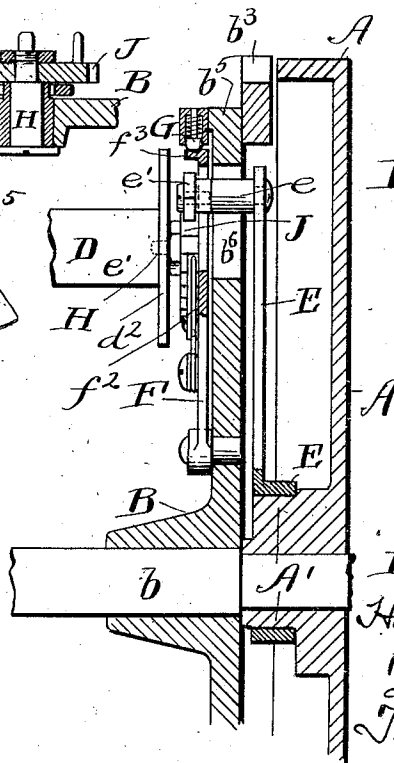
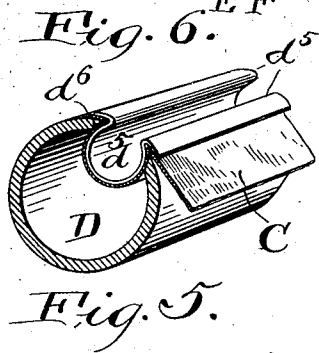
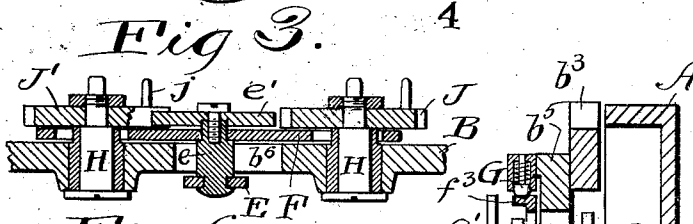
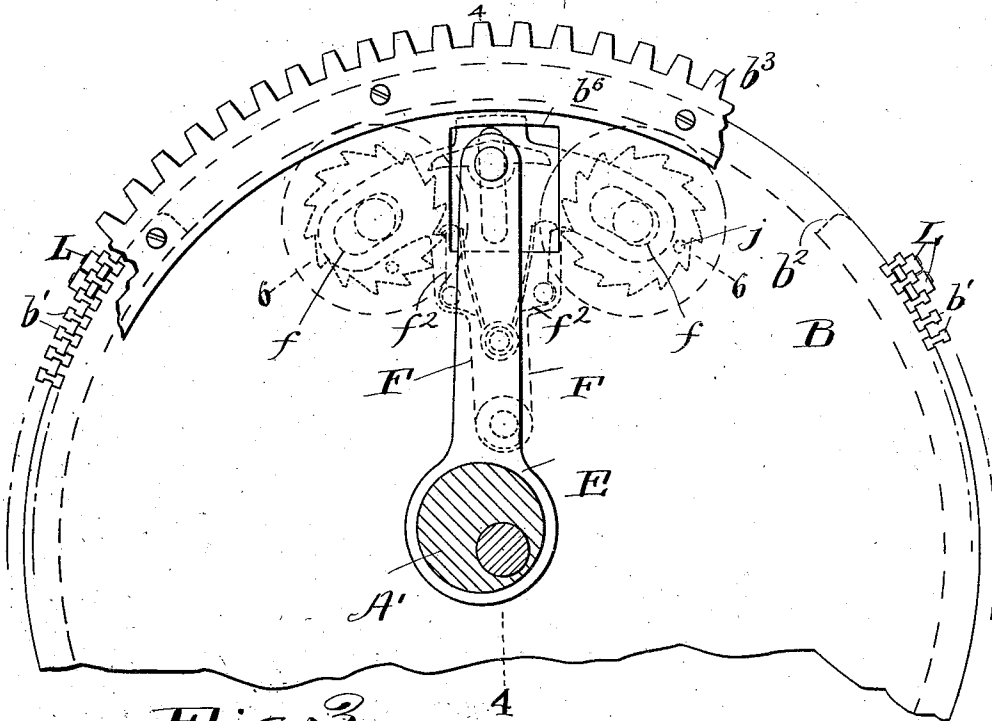
Inventor.
 Harry C. Gammeter.
 By Baker, Fouts & Hull,
 Attys.

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3 SHEETS—SHEET 3.



Witnesses.

E. B. Gilchrist
G. H. Reardon.

Inventor
Harry C. Gammeter
By his Attorneys,
Thurston & Bates

UNITED STATES PATENT OFFICE.

HARRY C. GAMMETER, OF CLEVELAND, OHIO, ASSIGNOR TO THE AMERICAN MULTI-GRAPH COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

RIBBON-FEEDING MECHANISM.

997,285.

Specification of Letters Patent.

Patented July 11, 1911.

Application filed January 9, 1905. Serial No. 240,167.

To all whom it may concern:

Be it known that I, HARRY C. GAMMETER, 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 Ribbon-Feeding Mechanism, 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 mechanism for feeding the inking ribbon of rotary printing machines so as to present a fresh portion of the ribbon to the printing surface.

The invention is particularly adapted to printing mechanisms of the type shown in my Patent No. 722,404 and my application No. 196,840, wherein there is a rotatable drum having on its surface longitudinal type holders by which individual type are adapted to be carried. The ribbon passes around the drum and has its ends secured to a pair of spools set into a recess in the drum.

The mechanism constituting this invention, which is hereinafter more fully described and definitely set out in the claims, operates to automatically rotate one spool or the other to wind in the ribbon and to automatically shift itself when either spool becomes empty to change the direction of winding.

The drawings clearly illustrate my invention.

Figure 1 is an elevation, partly broken away, of a printing drum having my improved ribbon feed. The frame standard at the right is partly broken away to show the interior mechanism. Fig. 2 is a vertical cross section through the barrels of the spools in Fig. 1, looking toward the right (the right hand spool being omitted); Fig. 3 is a vertical cross section on the line 3—3 of Fig. 1 looking toward the left; Fig. 4 is a cross section through the end of the drum on the line 4—4 of Fig. 3; Fig. 5 is a perspective view of a portion of one of the spools, showing the method of securing the end of the ribbon; and Fig. 6 is a cross section through the studs supporting the spools, substantially on the line 6—6 of Fig. 3.

As shown in the drawings, A represents a frame standard. Journalled in this and another standard A² is a shaft *b* on which is mounted a drum B. On this drum are mounted longitudinal rails *b'* which provide

channels between them adapted to carry the type L. Within a recess *b*² in the drum are mounted a pair of spools D and D', which carry the ribbon C which is passed around the drum from one spool to the other, as shown in Fig. 2. This recess is really a space within the complete theoretic circumference of the drum, which communicates with the outside by reason of a portion of that circumference being omitted. The omitted portion may vary in extent as desired. In the illustration it is substantially one fourth of the entire circumference. The drum is rotated by suitable means and thereby prints on paper drawn between it and a suitable impression platen K. On the drum is shown a gear *b*³ which may rotate such impression platen in unison with the drum, by meshing with a gear *k* on the platen, for example.

The spools D and D' are carried at one end by studs H mounted in the end member *b*⁵ of the printing drum B. Springs *d*³ bearing against the other ends of the spools normally maintain them in such position, but either spool may be removed by pressing it to the left sufficiently to release its connection with its stud H. Journalled on the studs H are ratchet wheels J and J' either of which is adapted to be engaged and rotated to wind up the corresponding spool D or D'; the other spool being free to unwind. The body of each spool is a metal tube, and the ribbon is secured to it by means of a sheet metal channel shaped member *d*⁵, which is sprung into a longitudinal slot *d*⁶ in the spool, biting the ribbon C between it and the spool.

The mechanism for rotating the ratchet wheels consists of an eccentric strap E mounted on a stationary eccentric A' carried by the frame member A around the shaft *b* of the drum. The eccentric strap carries near its extreme end a stud *e* to which is secured a pawl *e'*, which is adapted, as the drum rotates, to engage and draw toward the center of the drum the teeth of either ratchet wheel. The eccentric is so positioned that during the most of the rotation of the drum no rotation is given to the ratchet wheel, but during the time that the open space *b*² is rotating past the impression platen, the pawl *e'* engages a tooth of the ratchet wheel and forces the same inward the distance of one tooth.

Pivoted to the plate b^5 of the drum is an arm F having slots f which take loosely around the studs H. This arm F has in it a slot f' through which the stud e projects.

- 5 The arm F is thus adapted to guide the upper end of the eccentric arm, and determine the path of movement of the pawl e' . A spring-pressed plunger G carried by the drum is adapted to hold the arm F against
10 accidental displacement from either of two extreme positions where it holds the feed pawl e' in position to engage either ratchet wheel. Carried on the arm F are a pair of
15 spring-pressed detent pawls f^2 , either of which is adapted to engage the corresponding ratchet wheel and prevent the backward rotation thereof.

- It will be seen that by shifting the arm F from one of its positions to the other the
20 ribbon feed is reversed. This shifting is caused automatically whenever either spool becomes empty, because such empty spool holds the end of the ribbon and the winding in of the other spool stretches the ribbon, which, thus pulling backward on the
25 spool, causes the ratchet wheel to force the corresponding detent pawl f^2 away from the ratchet, and this movement swings the plate F so that the spring pressed plunger G engages in the other depression in the upper
30 end of the arm, and this completes the movement of the arm into its opposite position. This changes the direction of winding, the new direction continuing until the other
35 spool is empty, when the direction is again automatically reserved.

- It will be seen that my ribbon-feeding mechanism is extremely simple of construction, positive in operation and requires no
40 extra parts whatever to cause it to automatically shift. It occupies space in the drum which would otherwise be useless.

I claim:

1. In a ribbon feeding mechanism, the
45 combination of a rotatable drum, a pair of spools mounted therein and adapted to carry the ribbon, a ratchet for driving one of said spools, an eccentric, and a member operated thereby for driving the ratchet.
- 50 2. The combination of a printing drum, a pair of spools carried thereby, an eccentric placed about the axis of rotation of the drum, and an eccentric strap carried by the drum and a driving connection between said
55 strap and one of the spools.
3. The combination of a drum, a pair of ribbon spools mounted therein, a wheel connected with each spool, an eccentric, an eccentric strap surrounding the same and re-
60 volving with the drum, a member actuated by said strap and adapted to engage either wheel, and means for shifting said member.
4. The combination of a printing drum, a pair of ribbon spools mounted therein, a
65 ratchet wheel for each ribbon spool, mech-

anism having a pawl adapted to engage one ratchet wheel or the other as the drum rotates, and means for shifting the pawl from one wheel to the other.

5. The combination of a rotary drum, a 70 pair of ribbon spools carried thereby, ratchet mechanism connected with the ribbon spools, an eccentric, an eccentric strap surrounding the same and carried by said drum and adapted to operate the ratchet mechanism, 75 and shifting means for determining the spool driven.

6. The combination of a drum, a pair of ribbon spools mounted therein, wheels connected with the ribbon spools, an eccentric, 80 an eccentric strap surrounding the same and revolving with the drum and adapted to operate either wheel, and shiftable means for determining which wheel the strap operates.

7. The combination of a rotatable drum, 85 a pair of spools mounted therein, ratchet wheels for driving said spools, a member for operating said wheels, a movable arm pivoted to the drum and having a slidable connection with said member, and means for 90 reciprocating said member.

8. The combination of a pivoted arm, an eccentric, an eccentric strap surrounding the same and slidably connected with said arm, a pair of spools, and driving mechanism 95 therefor adapted to be operated by said eccentric strap.

9. The combination of a rotatable drum, an arm pivoted thereto, a stationary eccentric, an eccentric strap surrounding the 100 same, and slidably connected with said arm, a pair of spools each having a driving ratchet adapted to be operated by said eccentric strap.

10. The combination of a pivoted arm, an 105 eccentric, an eccentric strap surrounding the same, a member movable by said strap and guided by said arm, a pair of spools, and driving mechanism therefor adapted to be operated by said member. 110

11. In a printing mechanism, the combination of a rotary drum, a pair of ribbon spools carried thereby, ratchet wheels connected with the ribbon spools, a stationary 115 eccentric, an eccentric strap surrounding the same and carried by said drum and adapted to operate either ratchet, means for shifting said strap from one ratchet to the other, said means being controlled by an empty 120 spool.

12. The combination of a rotatable drum, an arm pivoted thereto, a stationary eccentric, an eccentric strap surrounding the same slidably connected with said arm, a pair of spools each having a ratchet adapted to be 125 operated by said eccentric strap, and mechanism actuated by one of the spools becoming empty to shift said arm.

13. The combination of a movable type member, a pair of spools carried thereby, a 130

pivoted arm carried by said member, a stationary eccentric, an eccentric strap surrounding the same, and mechanism operated by said strap and guided by said arm for operating either spool.

14. The combination of a pair of ribbon spools, a ratchet wheel for each spool, mechanism adapted to engage one ratchet wheel or the other, a movable member for controlling the position of said mechanism, detent mechanism carried by said movable member and adapted to engage the active ratchet wheel and prevent its backward rotation, the pull of the ribbon when a spool becomes empty operating through said detent mechanism to shift said member.

15. The combination of a pair of ribbon spools, a ratchet wheel for each spool, a pivoted arm, driving mechanism for the ratchets governed by said arm, a pair of detent pawls thereon adapted to engage either ratchet, whereby the pull of the ribbon, when it becomes empty, giving a backward rotation to the ratchet, forces the engaged detent away from the ratchet and thereby shifts the driving mechanism to the other spool.

16. The combination of a spool for carrying the ribbon, said spool having a longitudinal recess therein, and a channel shaped spring member having edge flanges and a bulging intermediate portion which is adapted to be forced into such recess and by bearing against the walls thereof to hold the ribbon to the spool.

17. The combination of a movable type-carrying member, a pair of spools mounted therein, an eccentric, an eccentric strap surrounding the same, mechanism carried by said member which is adapted to be operated by said strap, guiding means for such mechanism mounted on said member, and a spring tending to hold said guiding means in either extreme position to drive either spool.

18. The combination of a rotary drum, a stationary eccentric surrounding the axis of rotation of the drum, an eccentric strap surrounding the eccentric, shiftable guiding means carried on the drum, a pair of spools mounted on the drum and each having a driving ratchet, and mechanism for engaging either ratchet driven by said eccentric and guided by said guiding means.

19. In a printing mechanism, the combination of a movable printing member, a pair of ribbon spools carried thereby, a ratchet wheel for each spool, an eccentric, an eccentric strap surrounding the same, and shiftable means adapted to connect the eccentric strap with either ratchet, said means being automatically controlled according to the amount of ribbon on one of the spools.

20. The combination of a rotary printing member, a pair of ribbon spools mounted

thereon, an eccentric carried by the frame, an eccentric strap surrounding such eccentric and adapted to rotate either spool, and automatic means for reversing the direction of feed of said ribbon.

21. The combination of a rotary drum member adapted to carry a page form of type, a cooperating platen, a pair of ribbon spools mounted on the drum and adapted to carry a transfer fabric a page wide extending across the type and cooperating therewith, means for rotating either spool to feed the ribbon at a time when the type is not impressing the platen, and automatic means for reversing such feeding means due to the pull of the fabric.

22. The combination of a movable printing member, formed to carry individual type, a pair of spools mounted thereon and adapted to carry a transfer fabric extending across the type, means for automatically feeding such fabric as the printing member moves, and means for automatically reversing the direction of feed due to the pull of the fabric.

23. The combination of an impression platen, a movable printing member formed to carry type on its surface, a pair of spools mounted in said member, an eccentric, and an eccentric strap movable with said printing member and operating to rotate one of said spools, while such spool is opposite the impression platen.

24. In a printing mechanism, the combination of a movable printing member, a pair of ribbon spools carried thereby, a wheel for each spool, an eccentric, an eccentric strap surrounding the same, and shiftable means adapted to connect the eccentric strap with either wheel.

25. The combination of a movable type-carrying member, a pair of spools mounted therein, an eccentric, an eccentric strap surrounding the same, and mechanism carried by said member which is adapted to be operated by said strap to drive either spool.

26. The combination of a drum, a pair of ribbon spools mounted therein, a wheel connected with each spool, mechanism carried by the drum for engaging and operating either wheel, a stationary member, and a member adapted to travel around the stationary member and connected with said mechanism to operate it.

27. The combination of a rotatable drum, a pivoted arm carried thereby, a member slidably guided by said arm, a pair of spools, driving mechanism therefor operated by said member, a stationary member, and mechanism carried around the same as the drum rotates and operatively connected with the member first mentioned.

28. The combination of a rotatable printing drum, a pair of spool-operating wheels carried thereby, an eccentric placed about

the axis of rotation of the drum, an eccentric strap carried by the drum, and connecting mechanism between said strap and one of the spools.

29. The combination of a rotatable printing drum, a pair of spool-operating wheels carried thereby, a stationary operating member placed about the axis of rotation of the drum, a driving member carried around by the drum and engaging said operating member, and connecting mechanism between said driving member and one of the spool-operating wheels.

30. The combination of a rotary printing member formed to carry a page form, a pair of ribbon spools adapted to carry a ribbon therefor a page wide, and automatic means operated by the pull of the ribbon on the spool for reversing the direction of the feed thereof while the member is rotating.

31. The combination of a movable printing member formed to carry a page form of individual type, a comparatively long inking ribbon a page wide adapted to cooperate therewith, a pair of ribbon spools mounted on the printing member, means for rotating either spool to feed the ribbon from the other, and means controlled by the pull on the ribbon for changing the spool driven.

32. The combination of a movable printing member, a pair of ribbon spools mounted thereon, means for rotating either spool while the member is moving, and means operated by the pull on the ribbon for automatically changing the drive from one spool to the other.

33. The combination of a movable printing member carrying a page form of individual assembled type, a pair of ribbon spools mounted thereon and adapted to carry a ribbon to cooperate therewith, means for driving either spool to feed the ribbon, and means operated automatically by the retardation of a spool due to the other spool becoming empty and independent of the number of operations of the printing member to change the direction of drive from one spool to the other.

34. The combination of a movable member adapted to carry type, a pair of ribbon spools mounted thereon, adapted to carry a transfer fabric cooperating with the type, means for rotating either spool to feed the ribbon, and automatic means controlled by either spool becoming empty for changing the drive action from one spool to the other.

35. The combination of a rotary printing drum which prints by rolling impression, a pair of ribbon spools adapted to carry a ribbon therefor, and automatic means operated by the pull on the ribbon, and independent of the number of rotations of the drum, for reversing the direction of the feed of the ribbon.

36. The combination of a rotatable print-

ing drum, a pair of ribbon spools mounted thereon, means for partially rotating either spool while the drum is rotating, and means operated by the pull on the ribbon for automatically changing the drive from one spool to the other.

37. The combination of a type carrying member and an impression platen which cooperate to print by rolling contact, a pair of ribbon spools adapted to carry a ribbon to cooperate therewith, means for driving either spool to feed the ribbon, and means operated automatically by either spool becoming empty and independent of the number of impressions to change the direction of drive from one spool to the other.

38. The combination of a rotary type-carrying drum, a pair of ribbon spools mounted in a recess therein, adapted to carry a transfer fabric cooperating with the type, means for rotating either spool to feed the ribbon, and automatic means controlled by either spool becoming empty for changing the drive action from one spool to the other.

39. The combination of a rotary drum, means thereon to carry type, a pair of spools in a recess therein and adapted to carry a transfer fabric extending across the type, ratchet mechanism adapted to operate on either spool for automatically feeding such fabric as the drum rotates, and means controlled by the length of the ribbon for automatically reversing the direction of the feed.

40. The combination of a rotatable printing drum adapted to carry a page form, an inking ribbon extending over such form, a pair of spools on which the ribbon is mounted; a pair of spool-operating wheels carried by the drum, a stationary driver, a driven member cooperating therewith for a considerable portion of a rotation, and carried by the drum, and connecting mechanism between said driven member and one of the spools.

41. The combination of a printing member adapted to turn on an axis, means for carrying a type form thereon, a pair of spool-operating wheels carried thereby, a stationary operating member placed around the axis of the printing member, a driving member carried around by the member last mentioned in engagement with said operating member, and connecting mechanism between said driving member and one of the spool-operating wheels, and means for changing the effective connection from one spool-operating wheel to the other.

42. The combination of a rotary drum, adapted to carry type, an inking ribbon for such type, means for moving said ribbon with the drum during the printing, and means for gradually feeding said ribbon across the type while the drum is rotating

but not printing, said last mentioned means including a reciprocating member which moves idly in one direction and gradually and effectively in the other and means for connecting said reciprocating member with either of a pair of spools on which the ends of the ribbon are wound.

43. The combination of a movable printing member, a pair of ribbon spools carried thereon, an eccentric, an eccentric strap surrounding the same and movable with the printing member, and mechanism operated by said strap and shiftable to engage either spool as desired.

15 44. The combination of a rotary printing drum, a pair of ribbon spools carried thereon, ratchet wheels therefor, a non-circular stationary driver, a member engaging the same and traveling with the printing member and moving in and out during such travel, and mechanism operated by said member and shiftable to engage either ratchet wheel, as desired.

25 45. The combination of a movable printing member, a pair of spools carried thereby, a stationary driving device, a member carried by the printing member and moved in and out by said driving device, and means connected with such driven member for gradually operating either spool as desired.

30 46. The combination of a rotary printing drum, a pair of ribbon spools carried thereon, a stationary non-circular driving device, a member carried by the printing member and always cooperating with said driving device, and means connecting such driven member with either spool as desired.

35 47. The combination of a rotary printing drum, a pair of ribbon spools, an eccentric, an eccentric strap, and mechanism driven by said strap and adapted to drive either spool, as desired.

45 48. The combination of a rotary printing drum, a pair of ribbon spools, shiftable mechanism for driving either spool, and means whereby the retardation of a spool due to the other spool becoming empty shifts said mechanism from the full spool to the empty spool.

50 49. The combination of a rotary printing couple, one member of which carries a page form which the other member impresses a line at a time, means for carrying the wound up ends of an inking ribbon adapted to lie between the members of the couple, means for feeding said ribbon, and mechanism operated by a resistance to such feed to change the direction of feed.

60 50. The combination of a type carrying member, a cooperating platen, a pair of ribbon spools adapted to carry a ribbon lying between the member and platen, a stationary actuating member, a movable ribbon driving member adapted to be moved in

engagement with said actuating member to effect the ribbon feed, and mechanism whereby the same driving member may drive either spool.

51. The combination of a type carrying member and an impression platen which co-operate to print by rolling contact through an inking ribbon, of a pair of spools adapted to carry the wound up ends of such ribbon, mechanism adapted to automatically drive either spool and shiftable from one spool to the other, and means, operated by the retardation of one of the spools when the ribbon becomes taut due to the other spool becoming empty, for automatically shifting said mechanism.

52. The combination of a type carrying member adapted to turn on an axis, a pair of ribbon spools, a pair of ratchets for driving said spools, mechanism adapted to co-operate with either ratchet, means for automatically driving said mechanism as the member turns on its axis, and means for automatically shifting said mechanism when either spool becomes empty.

53. The combination of a rotary drum, a pair of ribbon spools mounted therein, a ratchet for driving each spool, pawls for operating said ratchets, a stationary driver, mechanism operated by said driver as the drum rotates for moving said pawls, and means for automatically changing the presentation of the pawls to the ratchets.

54. The combination of a type carrying member, a cooperating movable roller platen adapted while moving to impress the printing surface on the type carrying member, a pair of ribbon spools, spool driving mechanism, and means for shifting said driving mechanism due to a retardation of one of the spools.

55. The combination of a type carrying member having a page printing form, an impression platen formed to roll on such surface while printing, a ribbon adapted to lie between the two, spools adapted to carry the wound up ends of the ribbon, mechanism for driving either spool, and means for changing the direction of the drive automatically due to a restraint of the free rotation of the driven spool.

56. The combination with a printing surface and a roller platen formed to impress each other while the platen is turning on its axis, of a pair of ribbon spools mounted on the member which carries the printing surface, means for driving either of them, means for automatically shifting the drive from one to the other due to a restraint of the free rotation of the driven spool.

57. The combination of a rotary type carrying drum, a pair of ribbon spools mounted therein, mechanism for driving either spool, and mechanism for shifting the

drive from one spool to the other due to a restraint of the free rotation of the driven spool.

58. The combination of a movable type
5 carrying member, a pair of ribbon spools
carried thereby, a ratchet wheel for each
spool, a driving mechanism having pawls
and arranged to drive either ratchet wheel,
and means for shifting such driving mech-
10 anism from one ratchet wheel to the other,
such shifting being caused by a restraint in
the free rotation of one of the ratchet
wheels.

59. The combination of a printing drum,
15 a pair of spools carried thereby, a driving
member embracing the axis of rotation of
the drum, mechanism carried by the drum
and moved with reference to such driver
and operated thereby to feed one of the
20 spools, and means for connecting said mech-
anism with either spool.

60. In a ribbon feeding mechanism, the
combination of a rotatable drum having a
recess and having an end member, spools

mounted in said recess, a movable bar partly 25
on the outer side of the end member passing
through an opening in the end member and
carrying a pawl on the inner side of the
end member, a wheel connected with one of
the spools and adapted to be engaged by 30
said pawl, and means for moving said bar.

61. The combination of a rotatable drum,
a pair of ribbon spools carried in a recess
therein, a pair of ratchet wheels within such
recess for driving the spools respectively, a 35
reciprocating bar partly within the drum
and partly beyond the end thereof slidably
guided near one end and yoking around the
drum shaft near the other, and means car-
ried by the bar for operating one or the 40
other ratchet.

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

HARRY C. GAMMETER.

Witnesses:

ALBERT H. BATES,
SYLVESTER KOHN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,"
Washington, D. C."