J. A. ZIEGLER.

RIBBON MECHANISM FOR TYPE WRITING MACHINES.

APPLICATION FILED MAR. 17, 1910.

1,082,104.

Patented Dec. 23, 1913.

3 SHEETS—SHEET 1.

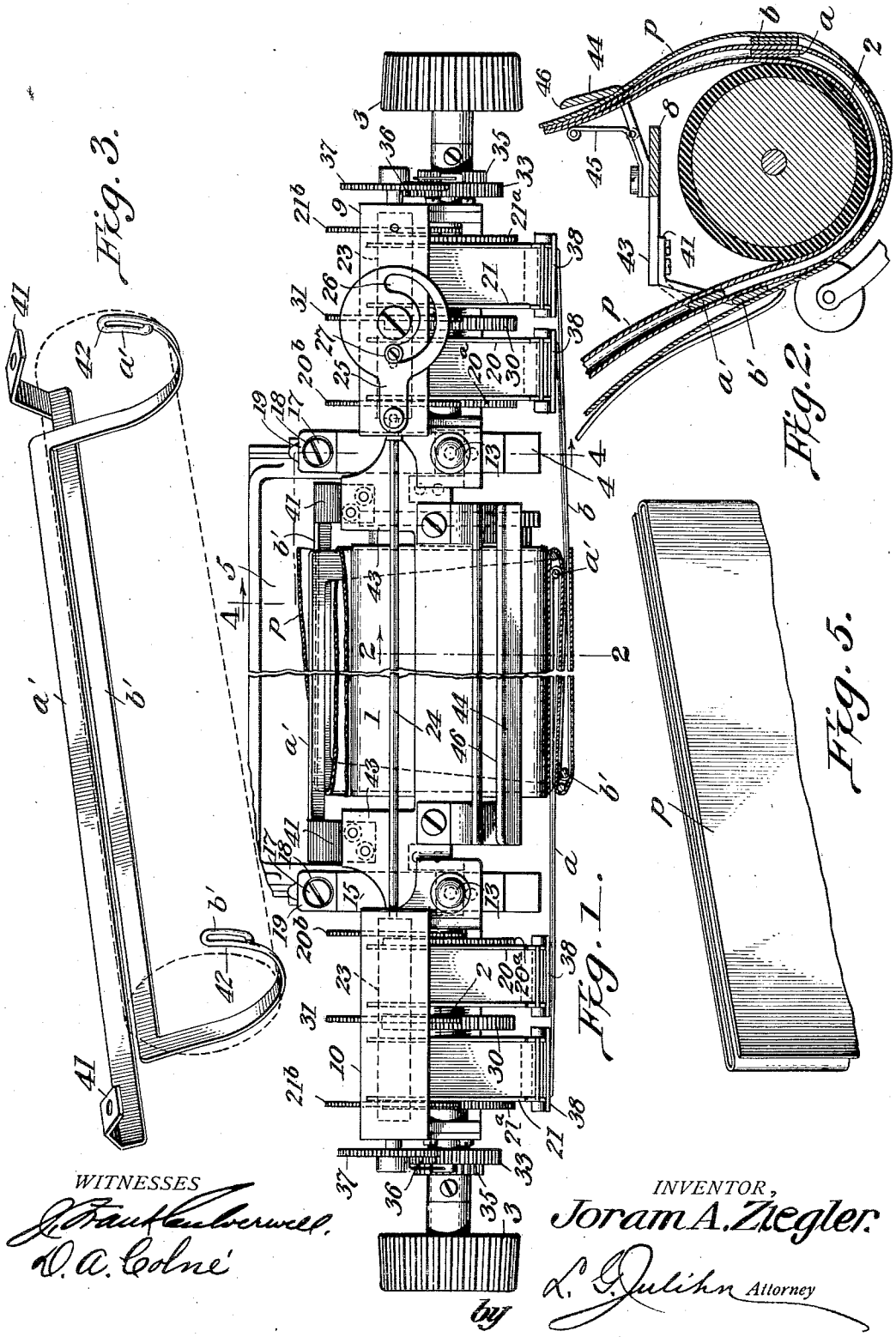

Fig. 3.

Fig. 2.

Fig. 5.

Fig. 1.

WITNESSES

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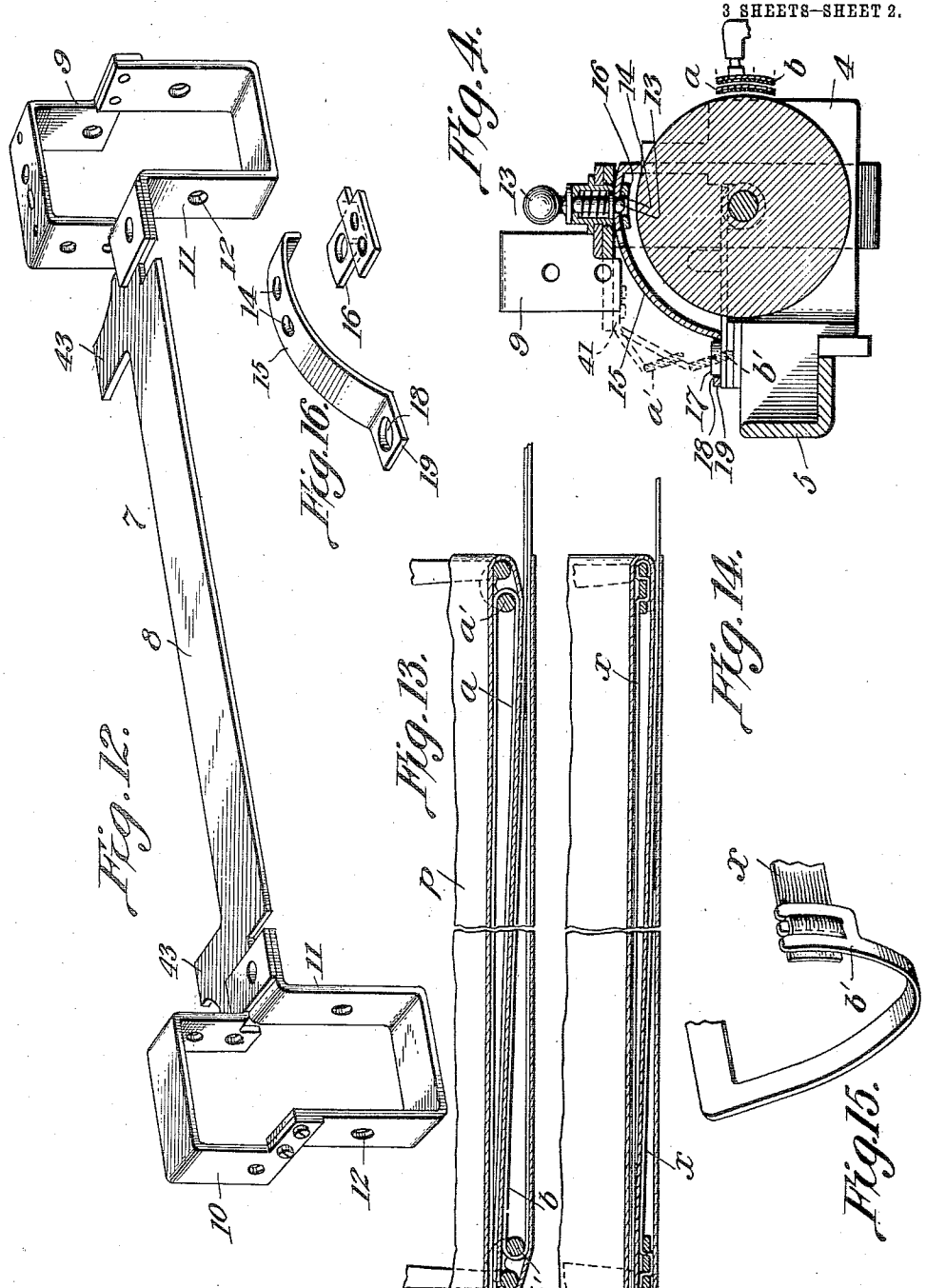

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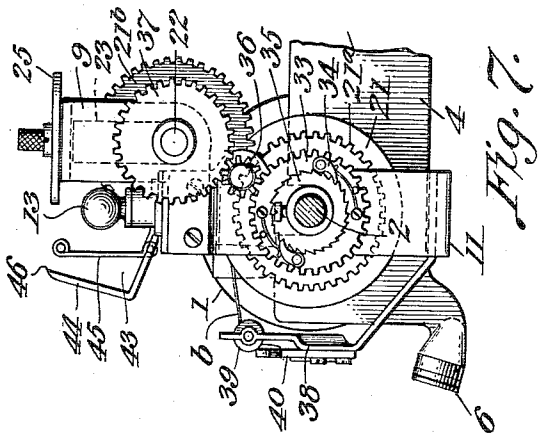

Fig. 7.

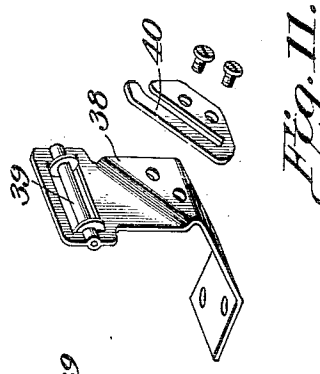

Fig. 11.

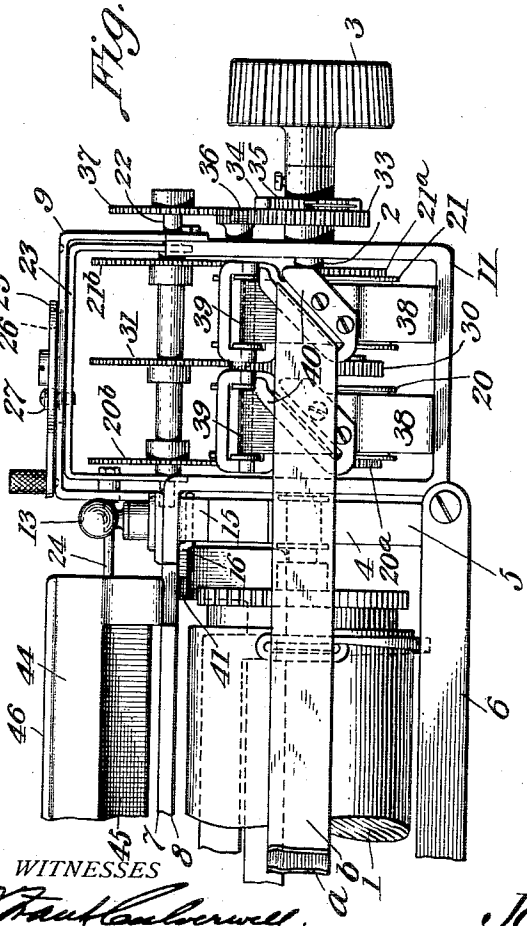

Fig. 6.

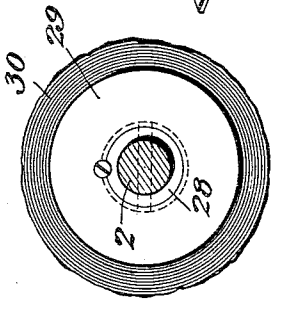

Fig. 10.

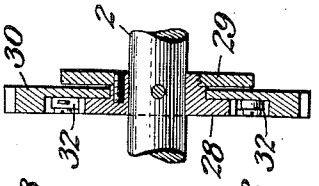

Fig. 9.

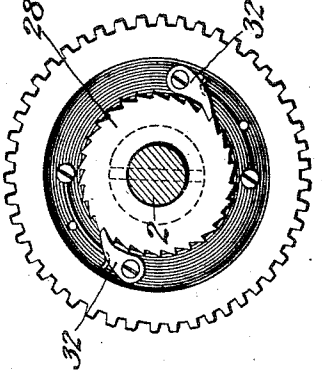

Fig. 8.

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UNITED STATES PATENT OFFICE.

JORAM A. ZIEGLER, OF CHATTANOOGA, TENNESSEE, ASSIGNOR TO ELLIOTT-FISHER COMPANY, OF HARRISBURG, PENNSYLVANIA, A CORPORATION OF DELAWARE.

RIBBON MECHANISM FOR TYPE-WRITING MACHINES.

1,082,104. Specification of Letters Patent. Patented Dec. 23, 1913.

Application filed March 17, 1910. Serial No. 549,920.

To all whom it may concern:

Be it known that I, JORAM A. ZIEGLER, a citizen of the United States of America, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented certain new and useful Improvements in Ribbon Mechanism for Type-Writing Machines, of which the following is a specification.

My present invention relates to typewriting machines, and more particularly to ribbon mechanism adapted for manifolding.

One object of the invention is to produce a ribbon mechanism in which the ribbons are so arranged and supported that they may be accommodated in opposite folds of a long manifold sheet or strip without interfering with the feed of the strip around the platen in the usual manner.

Another object of the invention is to so organize the ribbon mechanism that multichrome ribbons may be employed and readily shifted to bring the desired color stripe opposite the printing point without interfering with the ribbon feeding mechanism.

A further object is to so organize the ribbon mechanism that the same may be carried by the platen spindle and completely removed from the machine by the mere act of removing the platen in the usual manner.

Other objects of the invention will appear as the succeeding description is developed.

In the accompanying drawings—Figure 1 is a plan view of so much of a typewriter as is necessary to illustrate the application of my invention thereto. Fig. 2 is a transverse sectional view on the line 2—2 of Fig. 1. Fig. 3 is a perspective view of the ribbon guides adapted to be extended into the opposite folds of the manifold sheet or strip, the platen being indicated in dotted lines. Fig. 4 is a sectional view on the line 4—4 of Fig. 1. Fig. 5 is a perspective view of one end of the manifold sheet or strip. Fig. 6 is a front elevation of one end of the platen and the ribbon mechanism adjacent thereto. Fig. 7 is an end elevation of the subject-matter of Fig. 6. Fig. 8 is a side elevation of the main driving gear of the ribbon feeding mechanism showing the associated pawl and ratchet device. Fig. 9 is a sectional view of the subject-matter of Fig. 8. Fig. 10 is an elevation of the gear retaining disk showing the manner of its attachment. Fig. 11 is a detail view of one of the ribbon guides, the parts thereof being shown separated but in juxtaposition. Fig. 12 is a perspective view of the main supporting frame of the ribbon mechanism. Fig. 13 is a sectional view designed more particularly to show the relation of the ribbons and the folded paper strip. Fig. 14 is a detail view showing single ribbon sections led into the folds of the strip. Fig. 15 is a detail view of one of the ribbon guides shown in Fig. 14. Fig. 16 is a detail view of the arcuate guide.

Like numerals indicate corresponding parts throughout the views.

1 indicates the platen, 2 the platen spindle and 3 the knurled wheels of a typewriting machine of the standard or round platen type. The spindle 2 is supported as usual in suitable bearings in the end frame members 4 of the platen carriage, indicated as a whole by 5. The particular construction of these elements of the typewriter are not material, but so much of the structure here shown is substantially that of what is known as the L. C. Smith typewriter.

6 indicates a scale bar extending as usual longitudinally of the platen slightly below and in advance of the same.

Associated with the platen 1 and carried by the spindle thereof is what I term the main frame 7 of the ribbon mechanism. The frame 7 comprises a bar 8 disposed over and adjacent to the platen and connecting two substantially rectangular spool frames 9 and 10 extending both above and below the bar 8 and having their upper portions offset somewhat toward the rear of the machine, see Fig. 12. The side bars 11 of the spool frames are apertured as at 12 for the reception of the platen spindle 2 upon which the entire supporting frame 7 is swung and adapted to rock slightly for the purpose of shifting the ribbons laterally to present the proper color stripe at the printing point in a manner to be hereafter described. This tilting movement of the frame 7 is limited by spring-pressed catches 13 carried by the frame 7 and engaging apertures 14 in arch bars 15 gibbed to the under side of the frame bar 8 by gibs 16 and having their ends resting upon the end members of the platen carriage frame, as shown in Fig. 4.

The arch bars 15 are preferably not permanently secured to the carriage frame,

since they are part of the organization which is designed to be entirely removed from the typewriter by the act of removing the platen. They are held properly in position, however, by the heads of screws 17 which are a part of the usual construction of the typewriter and extend into openings 18 in the rear foot flanges 19 of the arch bars. It will be understood from what has been said that the arch bars 15 rest on the ends of the typewriter carriage and being curved concentric with the axis of the platen spindle, serve as guides for the frame 7 when the latter is rocked, and as members to which the frame is securely held in its adjusted position by the catches 13.

Within each of the spool frames 9 and 10 are mounted two ribbon spools 20 and 21 which for the sake of clearness may be referred to as the inner and outer spools. Each of these spools has secured thereto a gear wheel 20^a and 21^a alternately engaged by gears 20^b and 21^b mounted on and rotatable with a counter shaft 22 afforded bearings in the upper portion of the spool frame. The gears 20^b and 21^b are separated by a somewhat greater interval than the gears 20^a and 21^a so that the gears on the counter shaft can never both be geared to the spool gears at the same time. On the contrary, the counter shaft 22 is longitudinally shiftable for the purpose of moving one of the gears 20^b or 21^b into mesh with one of the spool gears 20^a and 21^a and simultaneously moving the other gear of the counter shaft out of mesh with the other spool gear. Thus by shifting the shaft 22 in the proper direction a driving connection may be established between said counter shaft and either the inner or the outer ribbon spool. To effect this shifting of the counter shaft and its gears for the purpose of changing the ribbon feed, a shifting yoke 23 is mounted in the upper part of the spool frame and suitably secured to the shaft 22 and in order that the ribbon feed at both ends of the machine may be simultaneously changed through the medium of a single operating element or controlling means, the yokes 23 at the respective ends of the platen are connected by a connecting bar 24.

The ribbon reversing mechanism includes, in addition to certain of the described elements, a reversing lever 25 mounted on the top of one of the spool frames, as shown in Fig. 1, and having an eccentric or cam slot 26 engaging a stud 27 projecting upwardly from one of the yokes 23. Obviously the swinging of the reversing lever 25 will cause the stud 27 to approach or recede from the axis of movement of the lever and thus shift the two yokes 23 in one direction or the other for the purpose of reversing the feed. In the present embodiment of my invention it is designed that the feed of the ribbons, which is of course effected by the rotation of the ribbon spools, shall occur whenever the platen of the typewriter is rotated. For this reason, at a point between each pair of spools, a ratchet wheel 28 is fixed to the platen spindle 2 and is provided with a hub to which is secured a retaining disk 29.

Surrounding the hub of the ratchet 28 and rotatable thereon but confined against lateral movement by the disk 29 and the ratchet wheel, is what may be termed the main driving gear 30 of the ribbon mechanism. The gear wheel 30 is in constant mesh with an intermediate gear wheel 31 mounted on the counter shaft 22, the constant meshing of the two gears 30 and 31 being preferably provided for by making the gear 30 of sufficient width to accommodate the lateral movement of the gear 31 with the counter shaft. The gear 30 is provided on one side face thereof with spring-pressed pawls 32 which effect a connection between the ratchet 28 and said gear when the platen spindle is rotated in a forward direction, that is to say, in the direction which ordinarily effects the normal feed of the paper. For reasons which will be hereafter explained, however, it is desired that a given ribbon spool, determined by the position of the counter shaft, shall rotate to feed the ribbon not only when the platen is rotated forwardly, but also when the platen is rotated in a backward direction. To attain this end it is of course necessary to provide means whereby the rotation of the platen in either direction will effect rotary movement of a given ribbon spool in a single or uniform direction. Therefore a second, but reversely acting connection, is effected between the counter shaft 22 and the platen spindle.

Beyond the outer side of the spool frame the platen spindle is provided with a second driving gear 33 having spring-pressed pawls 34 disposed to engage a ratchet 35 fixed to the platen spindle. This group of elements, to-wit the gear 33, the pawls 34 and the ratchet 35 are similar, in their relation to each other and to the platen spindle, to the gear 30, dogs 32 and ratchet 28, except that the two ratchets are reversely acting. That is to say, when the platen spindle rotates forwardly the ratchet 35 clicks idly under the pawls 34 and effects no rotary movement of the second driving gear 33, while the gear 30 is driven by its pawl and ratchet mechanism to impart movement to the counter shaft 22 and the particular ribbon spool geared thereto. During the reverse or backward movement of the platen spindle, however, the gear 30 is idle and the gear 33 is positively driven, driving in turn an intermediate pinion 36 suitably mounted on a stud shaft projecting from the spool

frame and in turn meshing with a gear wheel 37 on the outer end of the shaft 22.

Attention is now directed to the fact that the gear 30 meshes directly with the gear 31 on the counter shaft 22, whereas the second driving gear 33 drives the gear 37 on the counter shaft through the interposed pinion 36. It therefore follows that the counter shaft 22 and consequently the ribbon spool geared thereto will be driven in a given direction whenever the platen spindle is rotated and regardless of the direction of rotation of the latter. Unlike any other ribbon mechanism with which I am familiar, each of the two ribbons employed is led from one spool to the opposite end of the platen and thence back again to another spool adjacent to the one from which the ribbon starts. In other words, both ends of the ribbon are wound upon spools at the same end of the platen and an intermediate portion or loop of the ribbon is carried to a guide located at the opposite end of the platen. The ribbon *a* is led in the manner stated from the spools at the left hand end of the platen to a ribbon guide *a'* at the right hand end of the platen, while the other ribbon *b* is led from the spools at the right hand end of the platen to and around a guide *b'* at the left hand end of the platen. Each ribbon is thus doubled upon itself and overlaps a looped or doubled portion of the other ribbon, as clearly shown in Figs. 1 and 13. In order to cause the ribbon to lie smooth and thus feed with greater accuracy and freedom, a ribbon guide indicated as a whole by 38 is mounted in front of each spool and includes a horizontal roller 39, over which the ribbon is led from the spool, and an angular guide bar 40 around which the ribbon is led in its passage from the horizontal roller 39 to the vertical guide *a'* or *b'*, as the case may be.

The described arrangement of the ribbons is desirable for the reason that obviously ribbons extending in the usual manner across the platen from spool to spool could not possibly be utilized in connection with a folded strip of paper because each layer or ply of the strip is connected along one longitudinal edge with the adjacent ply or layer of said strip. Therefore, the ribbon must of necessity extend into the open side of the fold and extend to the closed side of the fold where it must terminate, as indicated in Fig. 14, or else return through the same or open side of the strip. Similarly the guides *a'* and *b'* which are located within the folds of the paper strip must be supported by means which will accommodate itself to this peculiar form of the work element. For this reason the guides *a'* and *b'* are in the form of angular bars each having a retaining tab 41 at one extremity and a ribbon guiding loop 42 at its opposite extremity. The tabs 41 are secured to rearward extensions 43 of the frame bar 8 and the ribbon guides *a'* and *b'* extend in opposite directions from their points of attachment in order to enable them to be received within the opposite folds of the manifold sheet or strip *p*. Thus each ribbon guide is secured at one end only at the open side of the fold and is provided at its opposite extremity with ribbon engaging means which lies within the same fold adjacent to the closed edge thereof. Thus the ribbon guides oppose no prohibitive obstruction to the free passage or feed of the manifold strip upon the several layers of which a type impression may be simultaneously imprinted, the impression on the layers underlying or behind the outside layer being produced by transference through the instrumentality of the ribbons or other transfer elements retained within the folds. Obviously, however, the invention in certain aspects thereof is not limited to the use of folded work elements, since it is obvious that separate sheets may be fed around the platen in alternation with the ribbons and in fact, in alternation with the ribbon sections, since additional sheets may be passed through the loop formed by each individual ribbon. Nor is it absolutely essential that the ribbon engaging portions of the ribbon guides *a'* and *b'* be in the form of loops, but where the work element is in the form of a folded strip it is desirable because the outer bar of the loop constitues a paper guide directly engaging the fold of the paper and guards the fold from direct contact with the end of the ribbon loop, thus reducing the tendency of the ribbon, when fed, to smut or soil the paper. At this point it may be well to direct attention to the utility of the particular method here shown of feeding the ribbons. It will of course be understood that the folded paper strip lies closely upon the interposed transfer elements and exerts a normal tendency when fed either forward or backward, to shift the ribbon laterally and thus effect its displacement unless the ribbon is held taut. If a positive gear connection is effected between the platen spindle and one of the spools. obviously the ribbon will be drawn forward and held taut during the rotation of the platen in one direction, but if the platen is rotated in the reverse direction, the spool will be reversely rotated, thus slacking the ribbon and permitting its lateral displacement in the manner specified. If, on the contrary, the ribbon is allowed to remain stationary during one movement of the platen, there is still some tendency, though not so great, to displace the ribbon. In order, therefore, to insure the accurate location of the ribbon under all conditions of paper feed, whether forward or back, provision is made, as here-

tofore described, for compelling the ribbon to be fed in one direction, determined by the spool in gear, whenever the platen is rotated either forward or back so that lateral displacement of the ribbon from the printing point in either the forward or rearward direction of the paper feed is avoided. Furthermore, it will now be evident that since the ribbon supporting and guiding mechanism is all carried by a single rocking structure swinging about the axis of a platen, the ribbon may be raised or lowered relative to the printing point by the adjustment of the frame 7 relative to the arch bars 15 to do which it is simply necessary to disengage the catch 13 and shift the frame until said catch engages in the next opening in the arch bar. The manipulation of both of the catches shown at opposite ends of the platen is unnecessary because the catch at the left hand end of the platen is sufficiently short to enable it to be forced out of the openings by the pressure exerted on the frame, the engagement between this left hand catch and its arch bar being merely sufficient to insure accurate alinement of the parts in the event of any slight torsional yield. As the paper web leaves the platen it is preferably fed upwardly through a paper guide 43 comprising front and rear members 44 and 45, the former of which has a knife edge 46 against which the printed end of the paper may be drawn and severed.

It should be understood that while for illustrative purposes the invention is shown applied to a standard or round platen typewriter, the invention in several aspects is capable of embodiment not only in other standard or round platen typewriters, but also in any machine capable of printing upon manifold sheets or strips, since it is broadly new, so far as I am aware, to provide an arrangement of inking ribbons so combined with their retaining devices that they may be accommodated within the opposite folds of a manifold sheet or strip without interfering with the feed of the latter or of the ribbons when the strip is of considerable length. Furthermore, it is believed to be broadly new to provide for the tensioning of the ribbon whenever the paper is fed relative to it in order that such feed of the paper will not effect displacement of the ribbon. It is furthermore novel in machines of the round platen type to extend a ribbon or other transfer element between carriers or guides so located and arranged that the ribbons may be accommodated in the opposite folds of a long work element the length of which is not limited in any manner by the ribbon or its supporting elements.

For convenience in claiming, attention is directed to the fact that the several ribbon spools, as well as the several ribbon guides, may be referred to broadly as carriers and in many of the claims this broad designation will be employed since it is obvious that in broader aspects of the invention the specific character of the ribbon engaging and retaining devices is not material, the essence of the invention residing rather in the relation of these devices than in the form thereof.

In Fig. 14 I have shown a modification in which the ends of ribbons x are led into the folds of the sheet from the inner spools and carried into the opposite folds of the work sheet where their extremities are retained by the guides a' and b'. When the ribbons are mounted in this manner they are not designed to be automatically fed, and the feeding mechanism may be thrown out of gear by simply throwing the springs of the several pawls 32 and 34 under instead of over the pawls.

It is thought that from the foregoing, the construction, operation and advantages of my invention will be clearly apparent, but I wish to reserve the right to effect such changes, modifications and variations of the illustrated structure as may come fairly within the scope of the protection prayed.

What I claim is:—

1. The combination with supporting means for a folded paper strip, of an ink ribbon located within a fold of the strip and disposed transversely thereof, and means extended within a fold of the paper strip to retain the ribbon.

2. The combination with supporting means for a folded paper strip, of a carrier, a transfer element extended into a fold of the paper strip from the carrier and disposed transversely to said strip, and means extended into said fold of the paper strip to support the transfer element at a point remote from the carrier.

3. The combination with supporting means for a longitudinally folded work element, of two carriers both supported outside of a fold of said work element and one of said carriers being extended into said fold of the work element, and a transfer element extended between the carriers and located within the fold of the work element.

4. The combination with supporting means for a longitudinally folded work element, of two carriers both supported outside of a fold of said work element and one of said carriers being extended into said fold of the work element, and a transfer element extended between the carriers and located within a fold of the work element and extended transversely of said element.

5. The combination with a support for a longitudinally disposed work element, of a ribbon carrier located outside of the fold of said work element, a second ribbon carrier supported outside of said fold of the work element, but extended into said fold, a transfer element extended between the carriers

and located within the fold of the work element, and means for feeding the transfer element.

6. The combination with a support for a longitudinally folded work element, of two carriers supported beyond the open side of a fold of said work element, and a ribbon extended from one carrier to the other and located within a fold of the work element.

7. The combination with a support for a longitudinally folded work element, of two carriers supported beyond the open side of a fold of said work element, a ribbon extended between said carriers and located within a fold of the work element, and means for feeding the ribbon longitudinally.

8. The combination with a support for a longitudinally folded work element, of two carriers supported beyond the open side of a fold of said work element, and a ribbon extended between said carriers and located within a fold of the work element, said ribbon being shiftable transversely.

9. The combination with a support for a longitudinally folded work element, of two carriers supported beyond the open side of a fold of said work element, and a ribbon extended between said carriers and located within a fold of the work element, said ribbon being shiftable transversely and movable longitudinally.

10. The combination with a support for a longitudinally folded work element, of two carriers supported beyond the open side of a fold of said work element, a ribbon extended between said carriers and located within a fold of the work element, and ribbon feeding means.

11. The combination with a support for a longitudinally folded work element, of two carriers supported beyond the open side of a fold of said work element, and a ribbon extended between said carriers and located within a fold of the work element, one of said carriers being movable to feed the ribbon.

12. The combination with a support for a longitudinally folded work element, of two carriers supported beyond the open side of a fold of said work element, and a ribbon extended between said carriers and located within a fold of the work element, said carriers being movable in unison to shift the ribbon transversely.

13. The combination with a support for a longitudinally folded work element, of two carriers supported beyond the open side of a fold of said work element, and a ribbon extended between said carriers and located within a fold of the work element, said carriers being movable to shift the ribbon transversely and one of said carriers being movable to feed the ribbon longitudinally.

14. The combination with means for supporting a longitudinally folded paper strip, of a carrier supported exclusively beyond the open side of a fold of said strip and extended into the fold, a ribbon spool, and a ribbon extended into the fold of the paper strip from said spool and engaged by the carrier.

15. The combination with means for feeding a manifold strip longitudinally, of a ribbon disposed transversely of said manifold strip and extended into a fold thereof, and means retaining the ribbon within said fold of the strip and constructed and arranged to permit free movement of the manifold strip as the same is fed.

16. The combination with means for feeding a manifold sheet or strip, of a transfer element located within a fold of said strip and two carriers engaging the transfer element at different points in its length, said carriers being supported at points intermediate of the ends of said strip and outside of the fold thereof within which the transfer element is retained.

17. The combination with means for feeding a manifold sheet or strip, of a transfer element located within a fold of said strip and extended transversely thereof, and two carriers engaging the transfer element at different points in its length, said carriers being supported at points intermediate of the ends of said strip and outside of the fold thereof within which the transfer element is retained.

18. The combination with a rotary platen, of means, including the platen, for feeding a manifold sheet or strip, a transfer element located within a fold of the manifold sheet or strip, and retaining means for said transfer element, said retaining means being supported exclusively outside of the fold of said strip within which the transfer element is located and intermediate of the ends of said strip whereby the feed of the manifold strip is not interfered with by the retaining means for the transfer element.

19. The combination with a rotary platen, of means, including the platen, for feeding a manifold sheet or strip, a transfer element located within a fold of the manifold sheet or strip, retaining means for said transfer element, said retaining means being supported exclusively outside of the fold of said strip within which the transfer element is located and intermediate of the ends of said strip whereby the feed of the manifold strip is not interfered with by the retaining means for the transfer element, and means for feeding the transfer element.

20. The combination with a rotary platen, of means, including the platen, for feeding a manifold sheet or strip, a transfer element located within a fold of the manifold sheet or strip, and retaining means for said transfer element, said retaining means being supported exclusively outside of the fold of

said strip within which the transfer element is located and intermediate of the ends of said strip whereby the feed of the manifold strip is not interfered with by the retaining means for the transfer element, said transfer element being shiftable laterally.

21. The combination with means for supporting the manifold sheet or strip, of a pair of ribbon spools upon which the opposite ends of the ribbon are wound, an intermediate portion of said ribbon being extended into a fold of the manifold sheet or strip from the open side thereof, and a carrier supported exclusively outside of the fold and intermediate of the ends of the strip and retaining that portion of the ribbon extended into the fold, the supporting of the carrier in the manner specified serving to prevent the same from interfering with the longitudinal movement of the manifold strip relative to the ribbon.

22. The combination with a rotary platen and a ribbon, of platen rotating means, and mechanism coöperatively related to the platen rotating means and to the ribbon to feed the ribbon longitudinally when the platen is rotated in either direction.

23. The combination with paper feeding means, including a platen, of an inking ribbon, and means for placing the ribbon under tension whenever the paper feeding means is operated.

24. The combination with a rotary platen, of platen rotating means, an inking ribbon, and ribbon feeding means operative to feed the ribbon in a uniform direction whenever the platen is rotated either forward or back.

25. The combination with a rotary platen, of platen rotating means, an inking ribbon, ribbon feeding means operative to feed the ribbon in a uniform direction whenever the platen is rotated either forward or back, and means for changing the direction of the ribbon feed.

26. The combination with a platen and its spindle, of a frame carried by the spindle and adapted to rock about the axis thereof, ribbon spools mounted in the frame, and a ribbon extended between said spools and adapted to be shifted transversely by the rocking of the frame.

27. The combination with a platen and its spindle, of a frame carried by the spindle and adapted to rock about the axis thereof, ribbon spools mounted in the frame, and a ribbon extended between said spools and adapted to be shifted transversely by the rocking of the frame, said ribbon spools being mounted concentric with the axis of the frame.

28. The combination with a platen, of ribbon spools mounted beyond the opposite ends thereof, ribbons extended from said spools into opposite folds of a manifold web or strip led opposite the platen, and ribbon carriers extended into said opposite folds of the manifold strip to engage and support the ribbons and supported exclusively outside of said folds and intermediate of the ends of the strip.

29. The combination with a platen, of a set of ribbon spools adjacent to each end of the platen, ribbons looped into the opposite folds of a manifold sheet or strip led opposite the platen, each of said ribbons being wound upon the spools of one set, and ribbon carriers extended into the opposite folds of a manifold sheet or strip and engaging the looped portions of the ribbons to retain the same in place, said carriers being supported exclusively outside of the folds of the manifold sheet or strip and intermediate of the ends of said strip.

30. The combination with a platen, of a frame movable about the axis of the platen, ribbon guides carried by the frame, and a ribbon extended between said guides and shiftable transversely by the movement of the frame about the axis of the platen.

31. The combination with a platen, of a frame movable about the axis of the platen, ribbon guides carried by the frame, a ribbon extended between said guides and shiftable transversely by the movement of the frame about the axis of the platen, and means for retaining the frame to hold a desired portion of the ribbon opposite the printing point.

32. In a typewriting machine, the combination with means for feeding a longitudinally folded paper strip, of a ribbon, supports engaging the ribbon at opposite sides of the printing point, one of said supports being constructed and arranged to retain a portion of the ribbon within a fold of the paper strip, and means for feeding the ribbon.

33. An attachment for typewriters, comprising a plurality of spools positioned at the ends of the typewriter platen, and inking ribbons wound from one spool at one end of the platen to another spool at the same end of the platen and passed in front of the platen with a plurality of thicknesses of said ribbons across the printing point of said platen and guiding means for the ribbon.

34. An attachment of the character described, comprising a plurality of spools positioned at the ends of a platen, two inking ribbons, one ribbon wound at its ends upon the spools at one end of the platen, the other ribbon wound at its ends upon the spools at the other end of the platen, means supporting said ribbons between their ends whereby four thicknesses of said ribbons are disposed across the platen at the printing point.

35. An attachment of the character described, comprising a plurality of spools

positioned at the ends of a platen, two inking ribbons, one ribbon wound at its ends upon the spools at one end of the platen, the other ribbon wound at its ends upon the spools at the other end of the platen, means supporting said ribbons between their ends whereby four thicknesses of said ribbons are disposed across the platen at the printing point, and means for turning certain of said spools.

36. An attachment of the character described, comprising a pair of spools positioned at one end of a platen, a fixed loop or guide in front of the platen near its end opposite to the location of the spools, and a ribbon wound at its ends on said spools and between its ends passed through said guide whereby two thicknesses of said ribbon are positioned in front of the printing point of said platen.

37. An attachment of the character described, comprising two pairs of spools positioned at opposite ends of a platen, guides located adjacent the ends of the platen, one inking ribbon wound at its ends around the spools at one end of the platen and between its ends passed through one of said guides, the other ribbon wound at its ends around the spools at the opposite end of the platen and between its ends around the other guide, whereby four thicknesses of said ribbon are located in front of the printing point of said platen.

38. The combination with a typewriter platen, of two spools mounted at each end of said platen, inking ribbons passed from one spool at one end of the platen to the other spool at the same end of the platen and providing a plurality of thicknesses of a ribbon across the printing point on said platen and guiding means for the ribbons.

39. The combination with a roller platen, a shaft for turning said platen, two spools on said shaft at each end of the platen, of inking ribbons wound on said spools passing from end spool at one end of the platen to the other spool at the same end of the platen and across the printing point of said platen, whereby a plurality of thicknesses of the ribbon is located across the printing point of said platen and guiding means for the ribbons.

40. The combination with a roller platen and a platen shaft of two spools mounted to turn loosely on said shaft at each end of the platen, inking ribbons passing from one spool at one end of the platen to the other spool at the same end of the platen and across the printing point on said platen, means for transmitting motion to any of said spools and guiding means for the ribbons.

41. The combination with a roller platen, of a shaft for turning the said platen, and spools loose on said shaft at both ends of the platen, inking ribbons wound on said spools and adapted to be moved across the platen, pinions fixed to said spools, a gear wheel fixed to said shaft between the pinions, means for transmitting motion from said gear wheel to either of said pinions and guiding means for the ribbons.

42. The combination with a roller platen, of a shaft for turning the said platen, and spools loose on said shaft at both ends of the platen, inking ribbons wound on said spools and adapted to be moved across the platen, guiding means for the ribbons, pinions fixed to said spools, a gear wheel fixed to said shaft between the pinions, a counter shaft above the spools, a pinion on said shaft meshing with said gear wheel, and gear wheels on said counter shaft adapted to be moved into mesh with the pinions on the spools, but one of said last mentioned gears being meshed at a time.

43. The combination with a roller platen, of a shaft for turning the said platen, and spools loose on said shaft at both ends of the platen, inking ribbons wound on said spools and adapted to be moved across the platen, guiding means for the ribbons, pinions fixed to said spools, a gear wheel fixed to said shaft between the pinions, a counter shaft above the spools, a pinion on said shaft meshing with said gear wheel, and gear wheels on said counter shaft adapted to be moved into mesh with the pinions on the spools, but one of said last mentioned gears being meshed at a time, said counter shaft mounted to reciprocate within certain limits to position either of the gear wheels on said shaft into operative engagement with a spool pinion, and finger holds on the ends of said counter shaft.

44. The combination with a roller platen, of bars secured adjacent to the platen forming paper guides, ribbon guides secured to said bars, ribbon supporting spools, ribbon on said spools and said ribbons so positioned through said guides that a plurality of thicknesses of ribbon will be positioned across the printing point of the platen.

45. An attachment for typewriters, comprising a plurality of spools positioned at the ends of the typewriter platen, inking ribbons adapted to be wound from one spool at one end of the platen to the other spool at the same end of the platen and passed in front of the platen with a plurality of thicknesses of said ribbons across the printing point of said platen, guiding means for the ribbons, and means for moving said ribbons when the platen moves.

46. An attachment of the character described, comprising a plurality of spools positioned at the ends of a platen, two inking ribbons, one ribbon wound at its ends upon the spools at one end of the platen, the other ribbon wound at its ends upon the spools at

the other end of the platen, means supporting said ribbons between their ends whereby four thicknesses of said ribbons are disposed across the platen at the printing point, and means for moving said ribbons when the platen moves.

47. An attachment of the character described, comprising a plurality of spools positioned at the ends of a platen, two inking ribbons, one ribbon wound at its ends upon the spools at one end of the platen, the other ribbon wound at its ends upon the spools at the other end of the platen, means supporting said ribbons between their ends whereby four thicknesses of said ribbons are disposed across the platen at the printing point, and means for turning certain of said spools when the platen moves.

48. An attachment of the character described, comprising a pair of spools positioned at one end of a platen, a fixed loop or guide in front of the platen near its end opposite to the location of the spools, and a ribbon wound at its ends on said spools and between its ends passed through said guide whereby two thicknesses of said ribbon are positioned in front of the printing point of said platen, and means for moving either of said spools to draw the ribbon from the other spool when the platen moves.

49. An attachment of the character described, comprising two pairs of spools positioned at opposite ends of a platen, guides located adjacent the ends of the platen, one inking ribbon wound at its ends around the spools at one end of the platen and between its ends passed through one of said guides, the other ribbon wound at its ends around the spools at the opposite end of the platen and between its ends around the other guide, whereby four thicknesses of said ribbon are located in front of the printing point of said platen, and means for moving said ribbons when the platen moves.

50. The combination with a typewriter platen, of two spools mounted at each end of said platen, inking ribbons passed from a spool at one end of the platen to the other spool at the same end of the platen and providing a plurality of thicknesses of a ribbon across the printing point on said platen, guiding means for the ribbon and means for moving said ribbons when the platen moves.

51. The combination with a roller platen, a shaft for turning said platen, and two spools on said shaft at each end of the platen, of inking ribbons wound on said spools passing from one spool at one end of the platen to the other spool at the same end of the platen and across the printing point of said platen, whereby a plurality of thicknesses of the ribbon is located across the printing point of said platen, guiding means for the ribbons and means for moving said ribbons when the platen moves.

52. The combination with a roller platen and a platen shaft, of two spools mounted to turn loosely on said shaft at each end of the platen, inking ribbons passing from one spool at one end of the platen to the other spool at the same end of the platen and across the printing point on said platen, and means for transmitting motion to any of said spools, and means for moving said ribbons when the platen moves.

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

JORAM A. ZIEGLER.

Witnesses:
D. A. COLNÉ,
J. FRANK CULVERWELL.

BEST AVAILABLE COPY