

Dec. 13, 1960

J. P. KNIGHT

2,964,157

TYPEWRITER RIBBON REGULATORS

Filed Jan. 31, 1958

2 Sheets-Sheet 1

Fig. 1

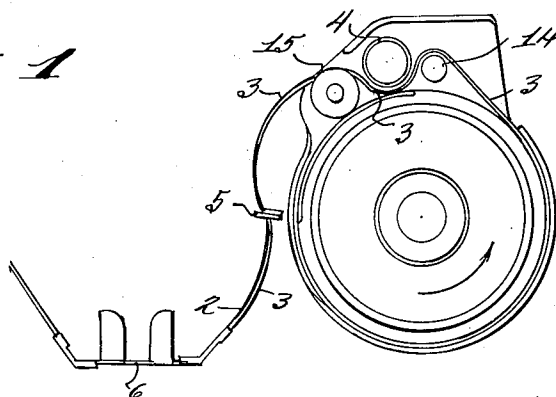


Fig. 2

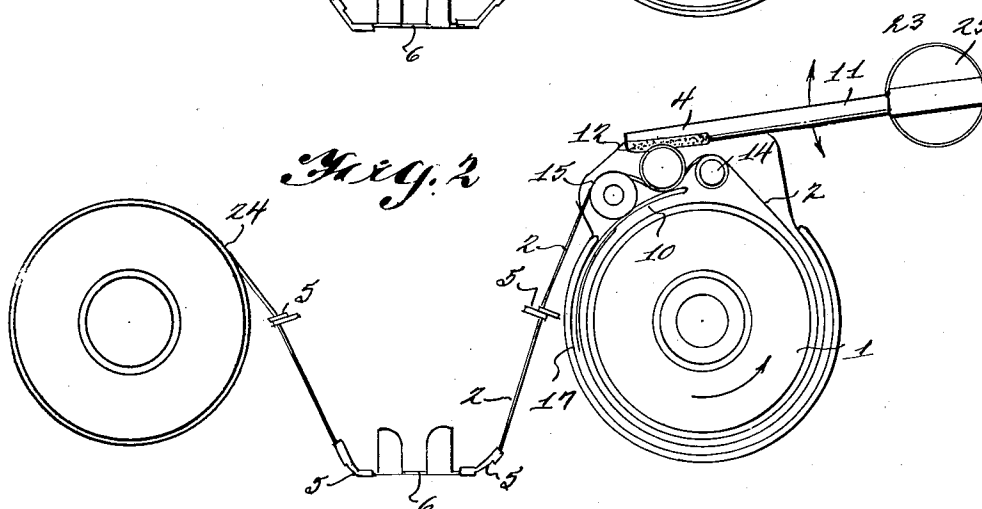


Fig. 3

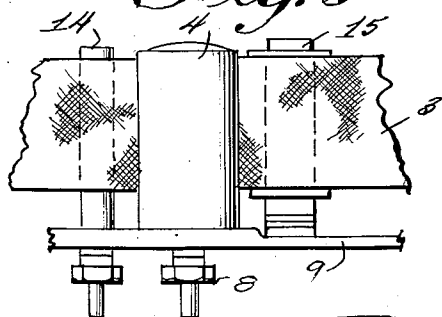


Fig. 4

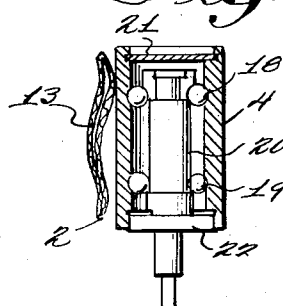
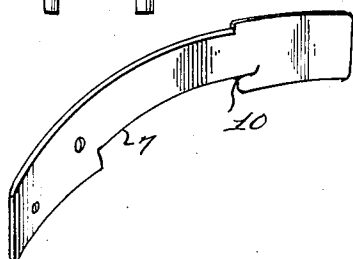


Fig. 5



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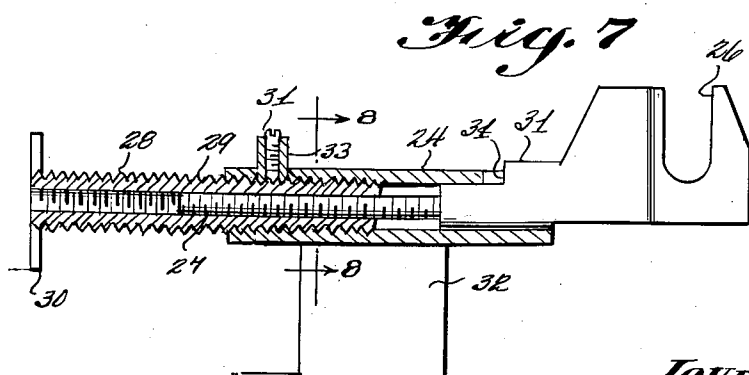
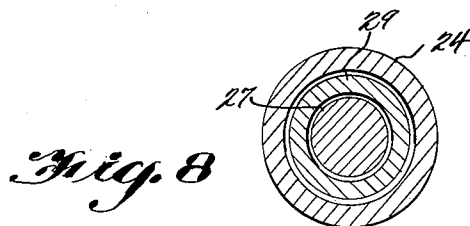
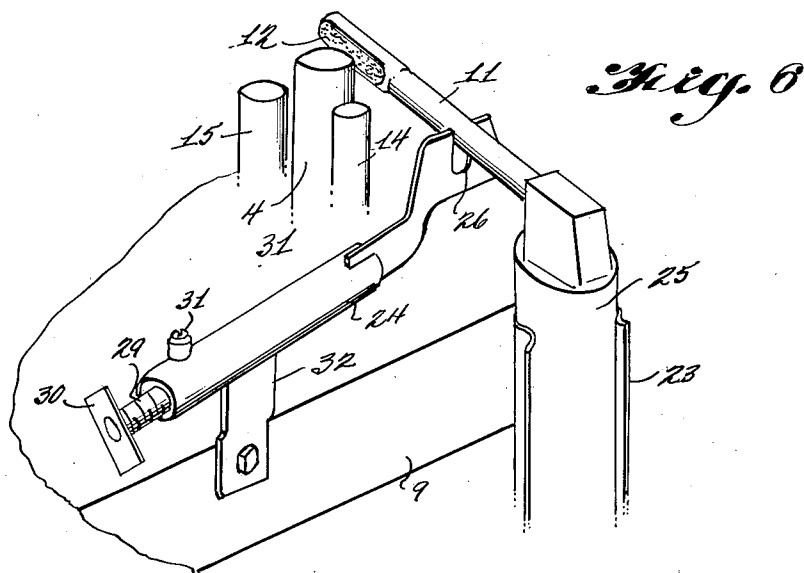
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TYPEWRITER RIBBON REGULATORS

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2 Sheets-Sheet 2



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TYPEWRITER RIBBON REGULATORS

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33 Claims. (Cl. 197—171)

This invention relates to improvements in typewriting machines, particularly to regularize feed of ink by ribbon to a typing area. A general object is to assure an even supply of ink at the typing area. Thus, the writings shall be of uniform darkness, even over long periods of typing. Advantages apply especially to heavy duty or high speed machines.

Typewriting machines both compose and type their subject matter, as in the manner of the familiar office typewriter. Such include tape-operated machines broadly, as well as tabulating, calculating or addressing machines and others more specifically. To meet present demands such machines often operate for long periods of time, some at rather high speed. They should require but little attention. Some such machines must function for weeks without attention, as where operated electrically at inaccessible locations. Yet they should continue dependably to furnish inked characters of uniform darkness.

These machines usually operate by successive impacts between type elements, such as bars, and an inked ribbon. Usually the ribbon moves across an area where the characters are impressed by the type impacts. This in this description is termed the typing area.

Commonly in heavy duty typewriting machines the entire carriage or basket with type bars and ribbon moves across the typing area. This imposes considerable jar or vibration on the cooperating elements. In some machines, it is common for an eight pound carriage to type 360 characters a minute. That is, an eight pound mass must start and stop quickly six times a second. This jarring is a burden on the mechanism for inking the ultimate typed character.

Various arrangements have been proposed to feed ink by ribbon. But to provide even inking of the typed character is a delicate matter, particularly so in heavy duty machines. Many of the arrangements already proposed would require frequent adjustment and then not overcome tendencies to unevenly inked characters. Material of the ribbon has been varied to overcome wear from continued pounding by the type. Substitutions for cotton often sacrifice the quality of absorptive body in the ribbon and introduce a tendency for slippage. Such factors become magnified as serious obstacles to dependable, even supply of ink at the typing area of heavy duty machines.

To illustrate introduction of new problems by efforts to combat existing problems of heavy duty typewriting machines, one may note the placing of tension cylinders along the ribbon path. A tortuous travel of the ribbon around these cylinders is to increase friction against loose movement of the ribbon, but this may actually add to irregularity of the travel. Sticky deposits of ink on the guides increase jumpy movement of the ribbon. As the ribbon resists pull of the spool-winding mechanism the stress sometimes stretches the ribbon fabric at the typing area, where ink is forced out of the ribbon by impact of the type bar. Sometimes the ribbon, first resisting pull, may overcome its resistance suddenly and jerk free

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and belly relatively loosely. Ribbon looseness is illustrated by the numeral 3 in Fig. 1 or 13 in Fig. 4. Also, the ribbon tends to ride up on various guide rollers and even to work off from the rollers. In machines like the heavy duty type referred to, the jerkiness and impact of high speed starting and stopping several times a second simply worsen factors that already contribute to uneven ink in the typed character.

Such problems are illustrative. Many of these exist from quite minute factors that have been easily overlooked or ignored. They become exceedingly serious in heavy duty or high speed typewriting machines. The present invention is directed to such problems, though this invention may improve the typing quality of other typewriters as well.

Objects of this invention are to improve the feed of ink at the typing area, to provide reliability in continued and even inking of the typed characters over long periods of time, to improve inking operations of synthetic-fibre ribbons as well as cotton or silk ribbons, to lengthen the useful life of ribbons and to minimize, if not eliminate, the need for attention to regulating the inking ribbon.

A particular object is to extend the function of cylindrical rolls placed along the ribbon path and to provide adjustability in their operation. A special object is to combine an inking roller with other elements to regularize evenness of inking at the typing area. These objects and others appear in the following description of a preferred form of this invention. Novel features of this invention are pointed out in the appended claims.

In general, advantages of this invention result from means to coordinate delicate balancing of pressures in the path of the ribbon. Thereby is obtained continued and even supply of ink to the typed copy.

Describing an illustrative form of this invention, with reference to the accompanying drawing,

Fig. 1 shows a top schematic view of a conventional ribbon spool and accompanying guides with a ribbon loosely moving therefrom;

Fig. 2 shows a top view under this invention of a guide train and ribbon with ribbon-regulating means;

Fig. 3 is a partial elevation of a guide cylinder and ribbon tension arrangement;

Fig. 4 is a vertical section of the central roller in the guide train of this invention, with schematic showing through an adjacent tubular ribbon;

Fig. 5 is a perspective view of a particular spring adapted to operate laterally against the central roller of Figs. 2 and 3;

Fig. 6 is a perspective view of micrometric pressure balancing means;

Fig. 7 is a partial longitudinal section of specific micrometric shifting means; and

Fig. 8 is a cross-sectional view of the micrometric adjustment means, taken along the line 8—8 of Fig. 7.

With detailed reference to Figs. 2 and 3, this invention is shown in relation to an inking ribbon 2 drawn from a spool 1 across the face of a roller 4, through guide bars 5 and across a type bar guide area 6 to a spool 24. The area across 6 will be termed the typing area. This is where the typed characters are inked. The area of the roller 4 with cylindrical guides 14 and 15 each side forms a wrap-around tension area for the ribbon and may be also a continuous inking area for the ribbon after the ribbon has left its spool. The path of ribbon travel in this area is fixed by fixed mounting of cylinders 14, 4 and 15 relative to a common frame 9 and to each other.

Also shown is an arm 11 adjustably mounted generally tangentially of roller 4 to apply pressure laterally against and radially of roller 4. In the pre-

ferred position shown in Fig. 2, arm 11 is aligned with an area of contact of ribbon 2 against the face of roller 4. Also as shown, arm 11 bears a lateral terminal area of preferably textured porous material 12, though such material may be felted, preferably of some resilience and somewhat soft contact. This terminal area is designated herein as control tip 12, with functions further to be described.

In addition, the drawings show a relatively hard resilient element in the form of a leaf spring 10. Spring 10 is mounted in fixed position to extend across the inner face of roller 4 in a wide area of dragging contact with ribbon 2.

Spring 10 is adapted to exert pressure laterally against ribbon 2 at the face of roller 4 so as to hold or align the ribbon evenly against the roller. Spring 10 preferably is formed of pretempered hardened steel to avoid any warping. This leaf spring is generally arcuate and of dimensions to fasten on the inner wall of spool cup 17. A free end of the spring is positioned and adapted for the ribbon to be dragged slidably thereacross and mounted to press the ribbon laterally against roller 4 to keep ribbon 2 lightly dragging on roller 4. Thus the ribbon is kept aligned against and longitudinally of the roller face. The tip of spring 10 curves in so as to avoid catching eyelets and threads that may extend from ribbon 2. The body of spring 10, as shown in Fig. 5, is built of diminished size, specifically of a narrowed intermediate portion relatively to the free end to minimize the stiffness and to avoid warpage. Thus leaf spring 10 keeps its free end parallel to the face of roller 4 and flexible with waves in the ribbon. Spring 10 not only flexes but twists or rotates laterally to follow the face of roller 4 in even the slight play or misalignments on its bearings that would tend to run the ribbon off the roller. The described structure facilitates that spring 10 maintain permanently its constantly self-aligning quality. It will be clear that spring 10 maintains a slight and evenly distributed dragging pressure on ribbon 2, of substantial constancy despite long use. This pressure is exerted laterally through ribbon 2 to bear on roller 4 sufficiently for the passing ribbon to rotate roller 4. This serves various functions.

Adjustable regulating effect on roller 4 is obtained from arm 11 mounted to swing radially of the roller so that tangential control tip 12 bears more or less slightly against the roller. Arm 11 is relatively long and is mounted in a vertical cylindrical clamp 23 for pivotal movement about a vertical axis of the clamp. Thus contact of tip 12 with roller 4 affords a variable but fine or delicate adjustability. This is within the low order of magnitude of the constant pressure of ribbon 2 against roller 4. A low adjustable pressure of tip 12 dependably and accurately represses spurts of speed and differences in inking or ribbon 2 in view of the low underlying pressure of leaf spring 10 as a basic pressure against sensitive roller 4.

Pressure on roller 4, though delicate, could easily stop rotation of the roller. That is undesirable. In fact from various efforts to overcome erratic movement of roller 4 propelled by ribbon 2, it appears that even tiny particles of dust, lint or ink residue stop the roller. Efforts to prevent such particles from entering the roller mounting have failed. Axle seals themselves impede rotation. Sleeve bearings are quite unsatisfactory. Where there are moving parts, dirt in harmful amount enters the inking roller. Even with roller-bearing or needle-bearing mounting, the roller slows or stops erratically from dirt. This in turn makes the ribbon advancement irregular and promotes such billowing tendencies as shown by ribbon areas 3 in Fig. 1. Another past difficulty has been reliance on support arms near the top of the inking roller. Such arms hinder free insertion of ribbon to contact the roller. More than that such arms themselves tend to jar the roller out of strict

vertical alignment, particularly in heavy duty typewriters, where vibration often shakes the entire frame.

Under the present invention, inking roller 4 is best constructed as shown in Fig. 4. This comprises a cylinder 4 mounted vertically at the bottom with multiple point contact, as on a ring of ball bearings 19 upon a sturdy central axle 20. Lateral steadiness is imparted by an upper ball bearing ring 18. These races 18 and 19 are mounted with but slight radial play. A snap cap 21 fits into the upper end of cylinder 4 to exclude dirt, etc. At the bottom, a labyrinthine seal ring 22 is fixed on axle 20 with but slight running clearance. Otherwise roller 4 is free internally and it is entirely free externally above the bottom. This structure permits free rotation of cylinder 4 with but a minimum of side play. It appears that any slight amount of dust, etc., that may ultimately enter the interior of roller 4 encounters only point contact against the ball bearings and at these points the bearings work such particles free. Particularly with heavily vibrating machines, this ability to free itself of accumulations of dust and other particles is a primary advantage of this point mounting of cylinder 4. This is even more important in view of the low order of pressures of ribbon 2 and control tip 12 against cylinder 4.

In operation, ribbon 2 unwinding from spool 1 is dragged in constant contact with roller 4 under the constant lateral and twisting self-alignment of leaf spring 10. Supplemental pressure against roller 4, controlled by fine adjustment of tip 12, minimizes tendencies of roller 4 to move erratically and of ribbon 2 to press unevenly or to work off the roller. As has been noted, these various pressures are of such low order of magnitude that particles of dust constitute real problems except where eliminated by the multiple point movement within the roller.

Desirability of an even contact of the ribbon dragged across roller 4 is illustrated further in Fig. 4. An even distribution of the ribbon at its vertical line of contact with roller 4 is important. Fig. 4 shows a double wall ribbon 13 such as commonly made of a flattened tube of nylon or the like. Such a ribbon is described in Murphy Patent 2,728,439, for example. This ribbon is tough but it tends to be slick and irregular in ink feed. Also, as shown in Fig. 4, double-wall ribbon tends to pull into uneven contour. Clearly such ribbon neither receives nor distributes ink evenly. The constant drag of spring 10, applied at its line of contact against roller 4, benefits especially the inking qualities of such ribbon, keeping the ribbon flat and in uniform contact.

With travel of ribbon 2 along a fixed path in which it drags across a face of roller 4 in fixed position, suitable control focusses on delicate positioning of arm 11 and tip 12. This increases in importance in cases where arm 11 serves multiple functions, as both to regulate ribbon travel and to ink roller 4. Both friction and spread of ink are complex obstacles to nice inking in heavy duty typing machines. Structure of this invention combines balanced pressures to obtain long-lasting, accurate inking by these machines.

Structure to control tip 12 by exact pressure adjustment is described with reference to Figs. 6, 7 and 8. Fig. 6 illustrates a fixed inter-positioning of three elements with respect to a base or frame 32; namely, inking roller 4, cartridge clamp 23 and micrometric shifting means 24 for control tip 12. Their constant positioned relation reflects ultimately in inking performance of the typewriter.

Arm 11 engages opposite sides of a clamp or stirrup 26 that moves under micrometric control to rotate arm 11 about a vertical center in holder 23. The effective radius of this engagement is determined by desired offset in the element 26.

In the form shown, stirrup 26 extends as an arm provided with a fine-threaded screw element 27 of micrometric shifting means. This comprises a cylindrical shell 24 surrounding screw 27, but leaving screw 27 free to

slide therein. However, rotation of stirrup 26 is prevented by a detent fin or boss 35 of member 27 received in a slot 34 of shell 24. A hollow screw member 29 threaded internally and externally fits into the far end of shell 24. Member 29 interiorly screws onto the threaded arm 27 and exteriorly screws into shell 24 by threads 28. The outer end of member 29 carries a long finger grip 30, or other means, to rotate 29. Micrometric shell 24 is fixed by supporting arm 32 to the frame 9. Rotation of inner shell 29 affords micrometric pressure change between control tip 12 and roller 4, as will be explained.

Exact shifting of arm 11 and control tip 12 is accomplished by providing inner screw 27 and outer screw 28 with fine and coarse threads relatively to each other, but threaded similarly. Thus both are right hand screws or both are left hand screws. In the form shown, the inner thread 27 is relatively the finer and outer thread 28 is relatively the coarser. Thus a differential screw is provided, which in this case is a reducing screw. Turning finger grip 30 to screw cylinder 29 into shell 24 effects counter movement of inner screw 27 into cylinder 29. This constitutes a compound, or telescoping micrometer in which primary means for fine adjustment of the wick cooperate with secondary means to reduce the amount of said adjustment to less than that produced by the primary means. The stirrup 26 moves away from outer shell 24 to the net distance between movements of cylinder 29 and screw 27. This difference may be as close or fine as desired. Advantages of this in accuracy and in permanence reside in this form of control. For example, it would be technically difficult to produce a single thread having a value of 0.002 unit. Yet it is entirely feasible to produce a thread having a value of 0.249 unit and another of 0.247 unit. The practical effect in this control is a single thread having a value of 0.002 unit. This slight movement is further reduced by the relatively large radius of rotation means 30; turning grip 30 a considerable distance effects only a slight arc of travel and corresponding slight change of the differential screw. Even if grip 30 is turned inadvertently, delicate adjustment of tip 12 is maintained against roller 4, and consequently delicate control of ribbon 2.

Preferred structure of shifting means 24 maintains a given position for long periods of time. Self-seating means to lock the screw elements together is shown in Figs. 6, 7 and 8. Outer shell 24 is perforated to receive a plug 31 having the resilience of nylon. Nylon is well-known material having the property of returning elastically to a given position after deformation. Nylon plug 31, pushed and held against hollow screw 29, becomes fitted tightly into outer threads 28, especially as movement of threads 28 completes formation of engaging threads in the end of plug 31. On repeated insertions of plug 31, threads 28 cut anew into the end of plug 31 to lock the screw 29. This structure herein is termed self-locking or self-seating.

Further to improve the self-locking structure of this adjustment, plug 31 preferably is caused to fasten with appropriate screw threads through the wall of casing 24 and against threads 28 of cylinder 29. Nylon element 31 first is screwed into the path of cylinder 29; then as cylinder 29 advances its threads 28 cut their way into the end of element 31.

A boss or shoulder 33 on casing 24, internally threaded, fits around and into the threads of nylon screw 31. This holds the compressed screw tightly for a long time as well as protects this nylon element. Thus control for ribbon 2 remains effective even against long-continued jarring by automatic and heavy duty carriage shifting hundreds of times a minute.

Certain secondary effects of control under this invention become of paramount importance in providing evenly inked characters at the typing area. For example, rate of ink flow is correlated to time of ribbon contact and tautness of ribbon, making for improved movement

and distribution of ink in ribbon 2. Finely adjustable, slight change of pressure at control tip 12, acting through sensitive point-mounting of roller 4 is magnified by its pilot-control of drag of ribbon 2. This is of increased importance in the case where tip 12 serves the additional function of conveying ink from a reservoir 25 to roller 4. In this case the fine balance of pressures of tip 12 and ribbon 2 readily alters the rate and angle of capillary ink flow to and from roller 4.

These effects carry over to the typing area. This is true not merely of the even advance of inking ribbon to that area. It is true as to the spread of ink and of ribbon texture at that area. It must be noted that in these type-writing machines energy is applied to the typing bar only to a point short of its entire throw. Momentum of the bar, now freely-swinging, is depended on to carry the type face against ribbon 2 and then to impress the ribbon ink against the receiving surface, or to type the character. Thus, it is clear that ink quantity and its spread in the ribbon texture at the typing area are exceedingly important to constant darkness of the typed characters. These in turn result from the nice balances of small pressures obtained by this invention.

Although the best mode of operation and construction of this invention are described in accordance with the patent statutes, the principles set forth will enable those skilled in the art to understand how to modify these specific illustrative structures within the scope of the appended claims.

What is claimed is:

1. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising in combination with a roller in the path of travel of a ribbon, a leaf spring mounted to press the ribbon laterally against the roller face.

2. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising in combination with a wrap-around group of tension rollers in the path of travel of a ribbon, a leaf spring mounted to press the ribbon laterally against a roller of the group.

3. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising, in combination with a roller in the path of travel of a ribbon, a leaf spring mounted to press the ribbon laterally against the roller face, and an arm adjustably mounted to apply pressure laterally against the roller face.

4. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising, in combination a roller in the path of travel of a ribbon, the roller being mounted on a double row of ball bearings, a leaf spring fixed in position to press the ribbon laterally against the roller face, and an arm adjustably mounted to apply regulable pressure laterally against the roller face.

5. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising, in combination with a vertical roller in the path of travel of a ribbon, the roller being mounted on a vertically double row of ball bearings, a leaf spring fixed in position to press the ribbon laterally against the roller face, and an adjustable arm mounted to apply regulable pressure laterally against the roller face, the arm contacting the face opposite the area of ribbon pressure against the face.

6. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising in combination a vertical roller in the path of travel of a ribbon, the roller being mounted on a vertically double row of ball bearings, a leaf spring fixed in position to press the ribbon laterally against the roller face, and an arm tangential to the roller wall and having a textured tip adjustable radially of the roller to apply regulable pressure against the roller face.

7. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising in combination with a train of vertical cylindrical guides in the path of travel of a ribbon, the train comprising a middle roller

mounted on a vertically double row of ball bearings and open circumferentially at the bottom for escape of particles, a leaf spring mounted to press the ribbon laterally against the roller face, and an arm adapted to counter-balance the ribbon pressure on the roller and having a textured tip adjustable radially of the roller and against the face opposite the area of ribbon pressure against the face.

8. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising a vertical roller in the path of travel of a ribbon, the roller being mounted on a vertically double row of ball bearings and being open circumferentially at the bottom for escape of dirt particles, and means disposed to apply radial pressures at substantially opposite areas of the roller.

9. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising an inking roller adapted to mount vertically in the path of travel of a ribbon, the roller being supported internally with multiple point contact, having a labyrinth seal at the bottom and shielded at the top, and otherwise being free internally, and at its top exteriorly being free and accessible for insertion of ribbon in contact with the roller.

10. Improvement in means to regularize feed of ink in a typewriter to the typing area comprising, in combination with a vertical roller in the path of travel of a ribbon, said roller being mounted with multiple point contact, a leaf spring mounted at one end and at its other end positioned to press the ribbon laterally against the roller wall, the spring being narrower in its middle portion than at the ends to facilitate rotational flexibility and self-alignment of the spring.

11. Apparatus to control supply of ink by ribbon to a typing area of a typing machine, comprising a low friction inking roller mounted on a frame, means to drag a ribbon across one side of the roller, a support mounted on the frame to hold an arm in fixed relation to the roller, an arm adapted for support thereby and for movement against and radially of the roller, adjustment means mounted on the frame in fixed relation to the roller and adapted to adjust the arm contact radially of the roller, said adjustment means having a micrometer movement comprising means having threads and means cooperative therewith to reduce the amount of adjustment to less than that produced by the pitch of the threads, whereby ribbon drag is adjusted with the ribbon and the roller in fixed relation to the frame.

12. Apparatus to control supply of ink by ribbon to a typing area of a typing machine, comprising a low friction inking roller mounted on a frame, ribbon guide rollers on each side of the inking roller and means to drag a ribbon therethrough across a face of the inking roller, a spring positioned to press the ribbon against the inking roller, a cartridge support mounted on the frame in fixed relation to the inking roller, an ink cartridge comprising an arm containing a wick positioned for lateral contact against and radially of the roller, adjustment means mounted on the frame in fixed relation to the inking roller and adapted to adjust the wick contact radially of the roller, said adjustment means having a micrometer movement and locking means therefor, whereby ribbon drag is adjusted with the ribbon and the roller in fixed relation to the frame.

13. Apparatus to control supply of ink by ribbon to a typing area of a typing machine, comprising a pair of ribbon guide rollers mounted on a frame, an inking roller supported on ball bearings mounted on the frame in fixed position between the guide rollers, means to drag a ribbon through the guide rollers across one side of the inking roller, a spring mounted on the frame in position to press the ribbon against the inking roller, a cartridge support mounted on the frame in fixed relation to the inking roller, an ink cartridge comprising a wick-containing arm adapted to swing laterally about an axis of the cartridge for lateral wick contact against and radially of the inking

roller, adjustment means mounted on the frame in fixed relation to the inking roller and engaging the wick arm in opposing lateral contacts to adjust the arm against the ink roller, the adjustment means having a differential screw arm of opposing threads as a micrometer movement, and locking means therefor, whereby ribbon drag across the inking roller is adjusted with the ribbon and the roller in fixed relation to the frame.

14. Apparatus to control supply of ink by ribbon to a typing area of a typewriting machine comprising an inking roller mounted on a frame and guide rollers to maintain a ribbon against one side of the inking roller, an ink cartridge having a wick-containing arm adapted to rotate laterally about an axis of the cartridge to contact the inking roller, and micrometer adjustment means having opposed elements to engage the wick arm for lateral movement of the arm, said adjustment means comprising telescoping differential screws similarly threaded, one screw being connected to said arm-engagement and being of finer thread than the other, whereby ribbon ink adjustment is effected.

15. Apparatus to control supply of ink by ribbon to a typing area of a typing machine comprising an inking roller mounted on a frame and means to contact a ribbon therewith, an ink cartridge having an inking wick and means to contact the wick with the roller, and a micrometer means adapted to adjust contact between the wick and the roller comprising telescoping differential screws similarly threaded, the inner screw being of relatively finer thread than the outer and being connected to the cartridge, the outer thread engaging a housing affixed to the frame, whereby ribbon ink adjustment is effected.

16. Apparatus to control supply of ink by ribbon to a typing area of a typewriting machine, comprising an inking roller fastened to a frame in the path of travel of an inking ribbon, means to drag an inking ribbon across a face of the inking roller, and guide rollers to maintain the ribbon against the face, an ink cartridge mounted on the frame and having a wick-containing arm adapted to swing laterally about an axis of the cartridge for variable wick contact with the inking roller, and micrometer means to adjust said contact, comprising an externally threaded screw member, adapted to engage the wick arm, a hollow internally-threaded screw member fastened to the frame and an intermediate hollow cylinder having similar internal and external threads to fit respectively said externally and internally threaded screw members to form a telescoping screw, said internal and external threads differing from each other in pitch to form a micrometric differential, whereby to adjust drag pressure between inking roller and ribbon.

17. Apparatus to control supply of ink by ribbon to a typing area of a typing machine comprising an inking roller, means to drag a ribbon in fixed position across a face of the roller, an ink cartridge having a wick adapted for adjustable contact with the roller, and self-locking micrometer means acting on the wick to adjust contact thereof with the roller, said micrometer means comprising primary means for fine adjustment of the wick position and secondary means cooperative with said primary means to reduce the amount of said wick adjustment to less than that produced by said primary means.

18. Means to control supply of ink by ribbon to a typing area of a typing machine, comprising an inking roller, means to drag a ribbon along a fixed path of travel across a face of the roller, means exerting constant drag against the ribbon at the roller face, adjustable means to apply additional pressures against the roller, micrometric means acting on said adjustable means to regulate said additional pressures and thereby the drag between ribbon and roller, said micrometric means having fine adjustment elements and means cooperative therewith to reduce the amount of adjustment of said additional pressures to less than that produced by said fine adjustment elements, and

means to lock said micrometric means at various pressures of said adjustable means against the roller.

19. Apparatus to control supply of ink by ribbon to a typing area of a typing machine, comprising a ribbon-inking roller, means adapted to feed a variable supply of ink to the roller, and micrometric means effective on feed supply to vary the ink feed, said micrometric means comprising a differential reducing screw, and means to lock the screw at various ink feeds.

20. Apparatus to control ribbon-inking of a typing machine, comprising variable means to supply ink to a ribbon, a differential reducing screw of micrometric structure effective on said means to vary the supply to the ribbon, and self-locking means effective on the screw at various ink supplies.

21. In apparatus to control supply of ink to a ribbon of a typing machine, a micrometer of differential structure comprising means adapted to vary the supply of ink, the micrometer comprising telescoping similar screws, and a nylon locking element therefor.

22. In apparatus to control supply of ink to a ribbon of a typing machine, a micrometer of differential structure comprising means adapted to engage an inking arm, the micrometer comprising telescoping similar screws.

23. Means for supplying ink to an ink carrying ribbon of apparatus wherein the ribbon supplies ink to type indicia on paper or the like comprising, an inking roller mounted in fixed position on a frame in the path of travel of a ribbon, an ink supply cartridge having a wick adjustable to engage the inking roller, a support in fixed position on the frame to hold the ink cartridge, micrometric means to adjust the wick comprising a screw having engagement to move the wick with respect to the roller, and reducing means meshing with the screw for reducing the movement of the screw and of the wick.

24. In apparatus to control supply of ink to a ribbon of a typewriter, self-locking micrometer means adapted to vary supply of ink to the ribbon, comprising telescoping screws of similar thread and differential pitch and a nylon plug engaging therewith.

25. In apparatus to control supply of ink to a ribbon of a typewriter, micrometer means of differential structure to adjust a supply of ink to the ribbon, the micrometer comprising telescoping screws of similar thread and differential pitch and self-locking means engaging said micrometer screws to hold a given position of adjustment.

26. Apparatus to control ribbon inking of a typing machine, comprising an ink supply having a wick adjustable to supply ink to a ribbon, means to adjust the wick comprising a differential reducing screw of micrometric structure effective on said wick to vary the supply to the ribbon, and self-locking means effective on the screw at various ink supplies.

27. Apparatus to control an inking wick in a typewriter comprising a micrometer adjusting engagement for the wick, said micrometer being constructed with differential reducing screw threads and self-locking means comprising a resilient plug expanding under pressure and positioned in the path of said screw threads for engagement thereby.

28. Apparatus to control an inking wick in a typewriter comprising a micrometer adjusting engagement for the wick, said micrometer having a casing, differential

reducing screws threaded therein and self-locking means comprising a resilient plug expanding under pressure and directed through the casing against threads of a screw therein, the casing comprising a shoulder supporting the plug.

29. In apparatus to control supply of ink to a ribbon of a typewriter, micrometer means adapted to vary supply of ink to the ribbon, comprising telescoping screws of similar thread and differential pitch and detent means engaging one of the screws to prevent rotation thereof with the other.

30. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising, in combination with an inking roller face longitudinally positioned across the path of travel of a ribbon, means to mount the ribbon to travel in a constant path against the inking roller face, and means to cause the ribbon to travel with constant pressure and contact against the inking roller face and thereby rotate the inking face comprising yieldable means mounted to slidably press against the ribbon along its contact with the roller and maintain the ribbon in constant tension and alignment in rotating the inking roller.

31. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising in combination an inking roller having a face longitudinally positioned across the path of travel of a ribbon, yieldable means mounted to slidably press the ribbon along a line of contact at the roller and impart yieldable pressure and align the sliding ribbon in longitudinal contact with the roller face, and an arm tangential to the roller wall and having a soft, resilient tip adjustable radially of the roller to apply regulable pressure against the roller face.

32. Apparatus to control an inking wick in a typewriter comprising micrometer adjusting engagement means for the wick, said micrometer being constructed with differential reducing screw threads and self-locking means comprising a resilient plug expanding under pressure and positioned in the path of said screw threads for engagement thereby, and means to vary the area of engagement between the plug and the micrometer screw threads.

33. Improvement in means to regularize feed of ink in a typewriter to the typing area, comprising, in combination with a roller face in the path of travel of a ribbon, a leaf spring having a free end positioned and adapted for the ribbon to be dragged slidably thereacross and mounted to press the ribbon laterally against the roller face to keep the ribbon aligned against and longitudinally of the roller face, the body of the spring having an intermediate portion of diminished size relatively to the free end to facilitate flexing and twisting self-alignment of the spring against the ribbon.

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