Feb. 16, 1943. W. H. HOPE, JR 2,311,051

STRIP FEED FOR WRITING MACHINES

Filed July 25, 1940 3 Sheets-Sheet 1

Fig. 1.

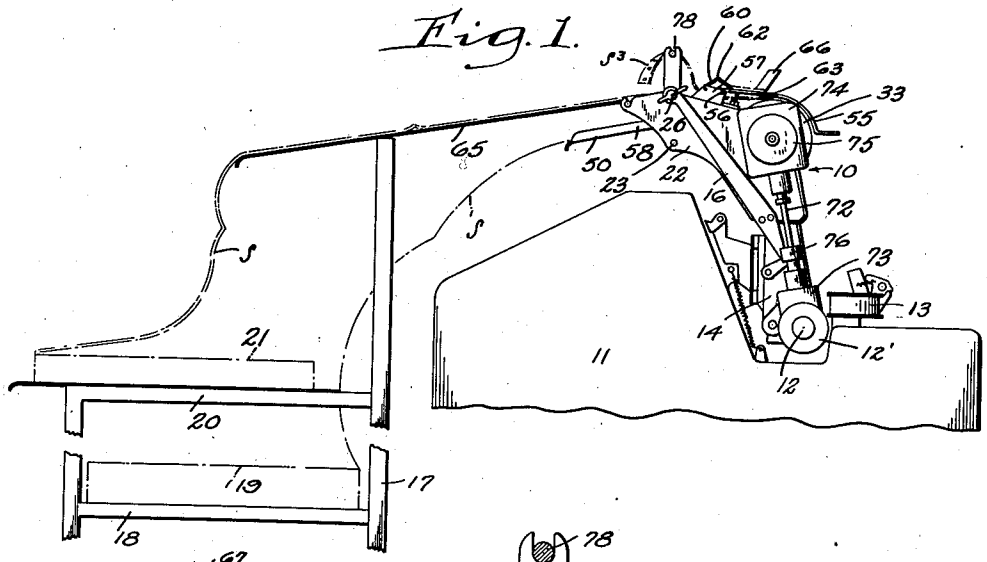
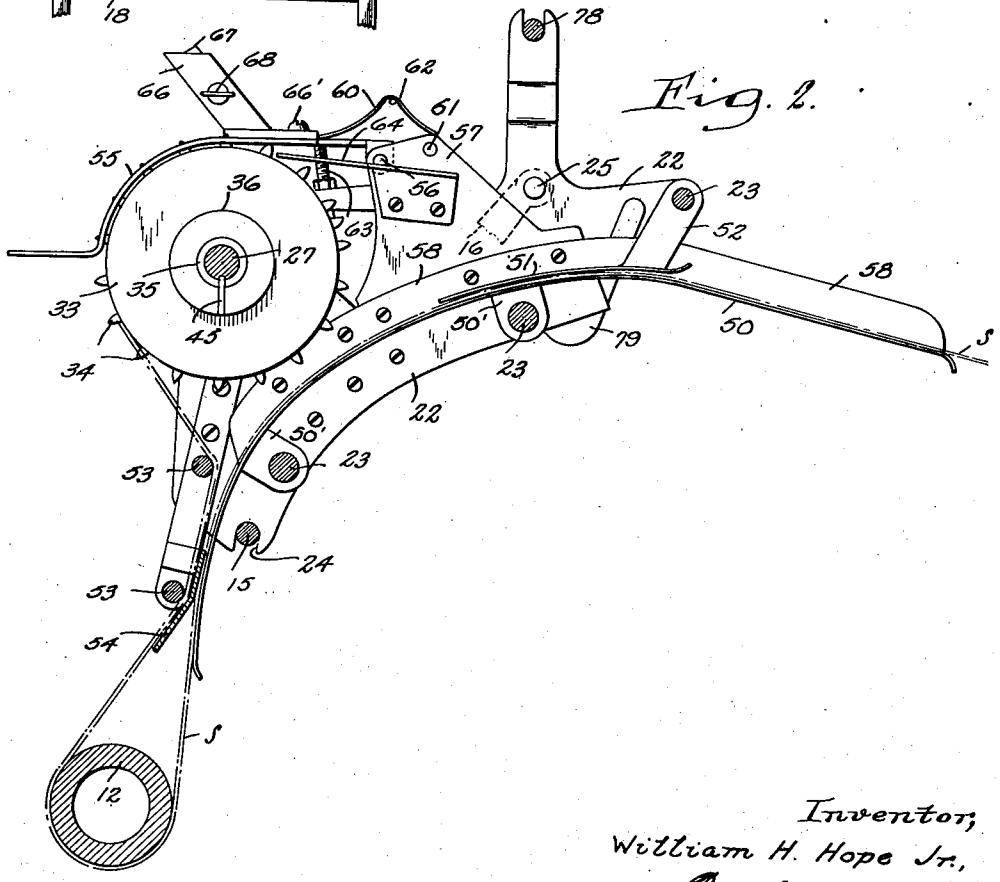


Fig. 2.



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Fig. 3.

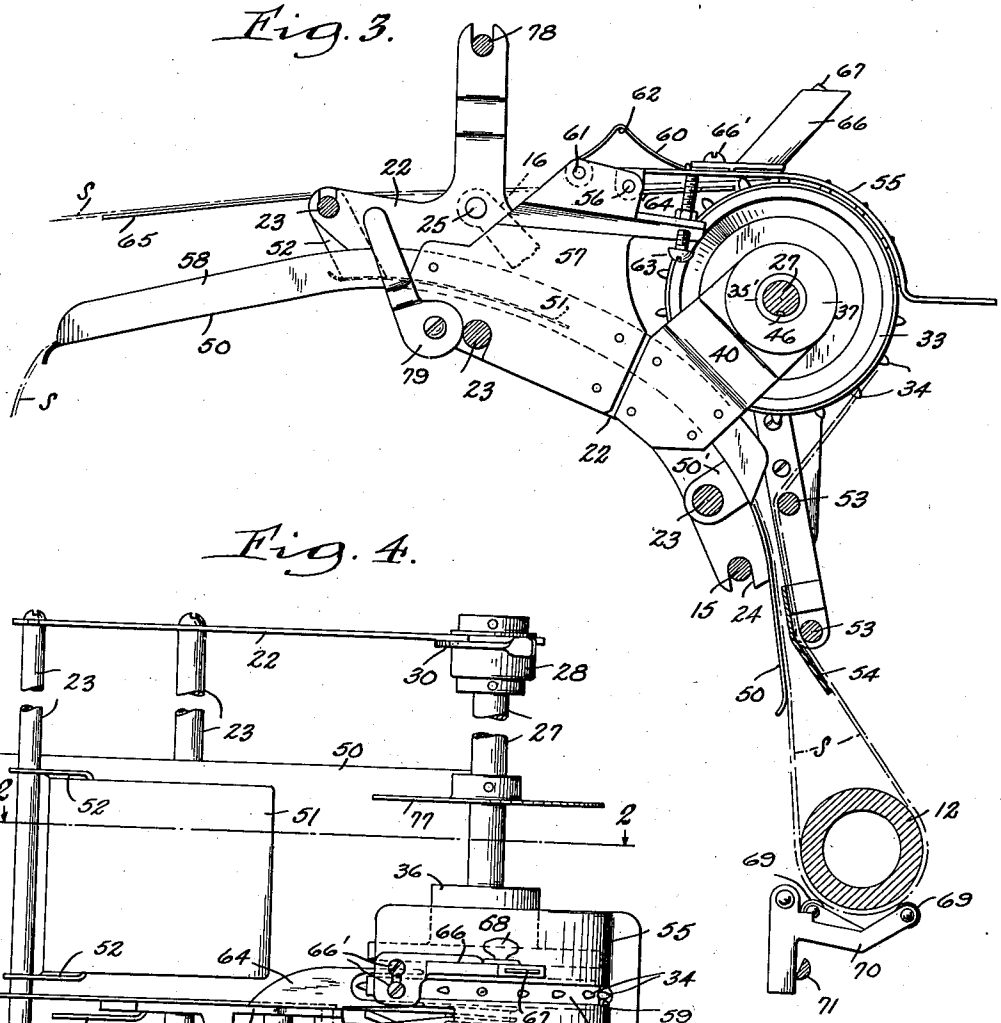


Fig. 4.

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Fig. 5.

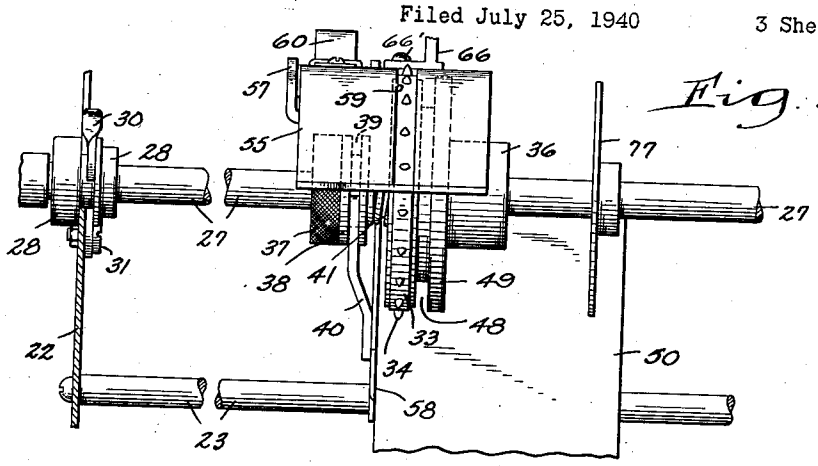


Fig. 6.

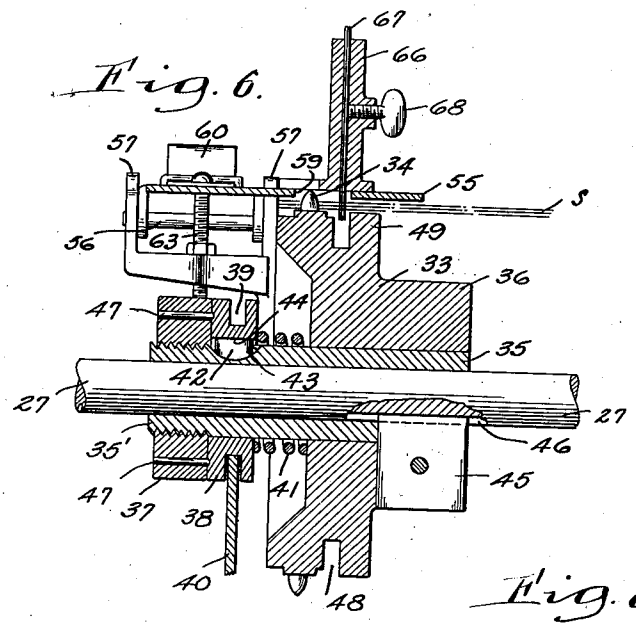


Fig. 8.

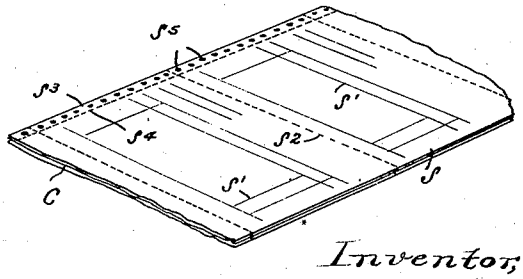
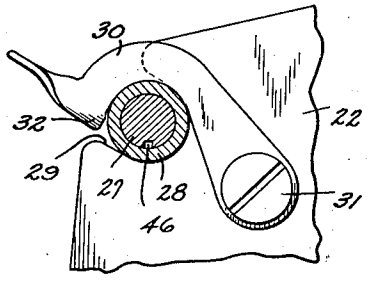


Fig. 7.



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UNITED STATES PATENT OFFICE

2,311,051

STRIP FEED FOR WRITING MACHINES

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Application July 25, 1940, Serial No. 347,457

7 Claims. (Cl. 197—133)

This invention relates to improvements of strip feeding mechanism, and more particularly to improvements in strip feeding mechanism in the form of an attachment adapted for installation on writing machines, such as tabulators, typewriters and the like, for feeding the record strips or assemblies of record and carbon strips of the long continuous traveler type into writing position on the machine platen.

It is a general object of the invention to provide an improved strip feeding mechanism of the class mentioned that may be quickly and easily applied in operative position upon the writing machine and to effect accurate feed of the strips into writing position upon the platen, and to maintain the strips at all times as feeding progresses so that the writing lines or spaces of the strips are positioned in accurate alignment with the writing line of the machine.

A further object is to provide a strip feeding attachment of the class mentioned having an improved strip feeding mechanism that can be quickly and easily connected for being driven by the rotary platen of the writing machine.

Still another object is to provide a feeding attachment of the class mentioned having an improved strip feeding mechanism of the pin wheel type, constructed and arranged for feeding the strips and pulling them with a tractive effort with micromatic accuracy into writing position upon the platen.

Still another object of the invention is to provide a strip feeding attachment of the class mentioned having an improved arrangement for mounting a feed wheel of the feed pin type so that it can be accurately adjusted into different feeding positions laterally of the strip path by a simple and easily operated adjusting mechanism.

A further object of the invention is to provide, for strip feeding mechanism of the class mentioned, an improved severing device, whereby the feed bands of the record strips having the feed apertures can be severed from the strips while avoiding irregularities and mutilation in the severed strip edges.

A further object of the invention is to provide an improved mounting for the rotary shaft carrying the strip feeding pin wheel whereby it can be quickly and easily detached from operative position and quickly and easily installed.

Other objects of the invention will be in part pointed out in the following detailed description of an illustrative but preferred embodiment of the invention, and will be in part obvious as the disclosure proceeds.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a more comprehensive disclosure of the nature, objects and advantages of the invention reference is had to the following description of the illustrative embodiment, and to the accompanying drawings, in which:

Fig. 1 is a fragmentary side elevation, partially diagrammatic, of the improved feeding mechanism as applied to a tabulating machine of known construction.

Fig. 2 is an enlarged vertical longitudinal section of the improved strip feeding mechanism taken approximately on the line 2—2 of Fig. 4, looking in the direction of the arrows, parts being in elevation.

Fig. 3 is a vertical sectional view similar to Fig. 2 taken on the line 3—3 of Fig. 4, looking in the direction of the arrows.

Fig. 4 is a fragmentary plan view of the improved strip feeding mechanism.

Fig. 5 is a fragmentary elevation showing details of the strip feeding pin wheel, parts being in section.

Fig. 6 is a detailed sectional view of the mounting of the pin wheel, showing the adjusting means and the strip guiding and slitting attachments.

Fig. 7 is a detailed section and elevation showing the mounting of the drive shaft for the pin wheel; and

Fig. 8 is a fragmentary perspective view showing one form of record assembly with which the improved feeding mechanism is adapted to cooperate in feeding relation.

Referring to the drawings for a full detailed description of the invention, the improved strip feeding attachment generally indicated at 10 is shown in Fig. 1 as being applied to a tabulating machine 11 of known construction having a cylindrical platen 12 mounted for rotation on the tabulator. Type bars (not shown) are mounted in known manner on the tabulator for impressing the written characters upon the paper supported on the platen surface, such as the record strips S of the long continuous traveler type, as shown. An inking ribbon is used for inscribing the characters on the top or original record strip being mounted on supply spools in the usual man-

ner, one of which is shown at 13. Frame or end plates 14 are mounted upon the tabulator adjacent to opposite ends of the platen 12 for supporting certain operative parts, and a transverse shaft or bar 15 is attached permanently in position on the tabulator. Supporting arms 16 are attached in position on the tabulator, extending upwardly and rearwardly and being ordinarily utilized for supporting a transverse shaft or rod for carrying a supply roll of paper.

When the improved strip feeding attachment is applied to the tabulator the supply of record strips S is ordinarily carried by a support or stand 17 having a lower shelf 18 upon which the supply of strips rests. The supply shown is in the form of a supply pack 19 in which the strips S are zigzag folded to form a compact package. The upper shelf 20 of the supply stand is arranged to receive the strips S as they emerge from the writing machine after inscription thereof. These inscribed strips will be refolded again on the shelf 20 in the form of a zigzag folded pack 21.

While strip assemblies of different forms or single strips may be utilized with the improved feeding mechanism, for illustrative purposes a record strip assembly S is shown having two or more record strips of the long continuous traveler type in superposed relation, each strip being preferably provided with blank forms S' in longitudinal series therealong and having transverse lines or spaces in which the inscriptions are to be received. Each of the record strips is ordinarily provided with transverse weakened severance lines S^2 dividing it into form sheets, and a longiutdinal feed band S^3 separated from the body of the strip by weakened severance lines S^4 formed by perforating or slitting the strips or by other known means. Each of the feed bands S^3 has a series of pin feed apertures S^5, the apertures of the different bands being in respective depthwise alignment for the reception of the feed pins. In some cases the longitudinal weakened lines S^4 may be omitted. A long continuous carbon strip C is positioned in transfer relation between each two adjacent record strips S so as to transfer the inscriptions to the lower or copy record strips. The carbon strips C may have longitudinal marginal portions interposed between the feed bands S^3 and be similarly provided with feed apertures, or the adjacent edges of the carbons may terminate inside of the feed bands. The assembly strips are usually connected together at various points along the assembly by suitable securing devices, or the record strips may be connected together by longitudinal marginal folds as in the well known fanfold structure.

The improved strip feeding attachment has a unitary supporting frame so that the complete attachment can be quickly and easily installed as a unit upon the writing machine and can be similarly removed therefrom. This supporting frame includes end brackets or plates 22 and transverse connecting or tie rods 23 to the opposite ends of which the end plates 22 are connected. The lower edges or extensions of the end plates 22 are formed with supporting pockets or seats 24 for receiving the transverse rod 15 of the writing machine for supporting the feeding attachment in operative position. Additional supports for the feeding attachment are provided by the upwardly and rearwardly extending supporting arms 16 having at their upper ends attaching devices or bolts 25 that are received in apertures in the end brackets 22 and provided with threaded wing nuts 26 for securing the feeding attachment firmly in operative position. The feeding attachment 10 can thus be quickly and easily installed in writing position upon the writing machine by placing the supporting seats 24 upon the supporting rod 15 and tightening the attaching bolts 25 in attaching position.

The main drive shaft 27 for the feeding mechanism is rotatably mounted in bearings 28 that are detachably supported in operative position in seats 29 formed in the edge portions of the end plates 22. These bearings 28 are clamped or supported in position by clamping levers 30 pivoted at 31 to the end plates 22 and each having a projection or overhanging lip 32 adapted to engage with the bearing periphery when the clamping lever is forced downwardly into clamping position as shown in Fig. 7. When the levers are in their holding positions the lips 32 function to hold the levers in clamping position and to prevent accidental release thereof. However, the clamping levers can be easily moved to releasing position by exerting upward pressure thereon, whereupon the drive shaft 27 with attached parts can be lifted as a unit from the supporting seats 29.

The strip feeding wheel 33 is mounted upon the drive shaft 27 for rotation therewith but may be slidably adjusted along the shaft. This feed wheel is provided with a series of feed pins 34 arranged in equally spaced relation peripherally of the wheel so as to engage in feeding relation in the feed apertures of the strips S. Mounted also upon the shaft 27 is a sleeve 35 extending into the hub 36 of the feed wheel and firmly attached to the latter by any appropriate means, such as by means of a set screw or by shrinking the hub into tightly contacting relation with the sleeve. The sleeve has an extension 35' at one side of the feed wheel threaded to receive a threaded adjusting nut 37. An anchoring collar 38 is mounted upon the sleeve 35 just inside of the adjusting nut 37, forming an abutment for the latter and having a peripheral groove 39 in which an anchoring plate 40 is slidably received and firmly attached in stationary position upon the frame. A coiled compression spring 41 is interposed between the stationary collar 38 and the adjacent face of the feed wheel 33. The sleeve 35 extends through a centrally disposed aperture in the collar 38 and the collar is constrained for rotation with the sleeve by means of a key 42 seated at its inner surface in a concave depression 43 in the sleeve, and seated at its outer surface in a groove or keyway 44 in the collar. In this manner the collar is constrained for rotation with the sleeve but the sleeve may slide longitudinally in either direction through the collar. The feed wheel 33 and sleeve 35 are anchored for rotation with the feed shaft 27 by means of a key 45 pinned in a seat or slot to the hub 36 of the feed wheel and extending through a slot in the sleeve into an elongated groove or keyway 46 in the feed shaft.

Thus the feed wheel with assembled parts is constrained for rotation with the feed shaft 27 but may be adjusted longitudinally thereof, that is transversely of the path of strip feed. Adjustments of the pin wheel transversely of the strip path are effected by turning the adjusting nut 37 in one direction or another, and the wheel is retained in adjusted position by means of detents or pins 47 mounted in the nut and projecting at their inner end portions into seats or de-

pressions in the adjacent abutting surface of the collar 38.

Adjacent to the series of pins 34 the feed wheel 33 is formed with a peripheral groove 48 and inside of this groove is an annular support 49 for the strips. The strips are thus supported on one side of the groove 48 by the wheel and pins and on the other side thereof by the annular support 49. The purpose and function of this arrangement are set forth below.

Strip guiding means is provided for guiding the strips from the supply 19 to the platen, including a guide plate 50 attached by means of lugs or brackets 50' to the tie rods 23. Also, a guide plate 51 overlies the plate 50 and is mounted for upward swinging movement by means of supporting arms 52 upon one of the transverse tie rods 23 and rests by gravity upon the upper surface of the advancing strips. The guide plate 50 is curved to guide the strips in a smooth even path to the rear side of the platen 12. Also, transverse guide bars 53 and a transverse guide plate 54 are mounted upon the frame for guiding the strips in their movement away from the platen to the feed wheel 33. The guides 53 and 54 are positioned inwardly to increase the arc of contact of the strips with the platen 12 and also to increase the arc of contact with the feeding periphery of the feed wheel.

For guiding and holding the strips in feeding engagement with the feed pins and the periphery of the feed wheel there is a guide plate 55 pivoted at 56 to a supporting bracket 57 attached to one of the longitudinal strip guiding end flanges 58 of the guide 50. The guide plate 55 is curved to conform to the periphery of the feed wheel and is provided with an elongated slot 59 in which the feed pins run. A positioning and retaining leaf spring 60 is attached to the guide plate 55 engaging with a transverse retaining roller 61 to the rearward of the pivot 56 tensioned to urge the guide plate toward the feed wheel in strip guiding relation. The spring 60 is provided with a pocket or stop formation 62 adapted to engage with the roller 61 carried by the bracket 57 when the guide plate is lifted on its pivot away from the feed wheel so as to hold it in raised position when the strips are being placed in operative position upon the feed pins. An adjusting screw 63 is threaded to an arm or support of the bracket 57, having its upper free end engaging with the lower surface of the guide plate 55 at the left of the pivot 56 in Fig. 2, whereby the position of the guide plate may be adjusted and maintained in adjusted position with reference to the periphery of the feed wheel.

As best seen in Fig. 2, there is a stripping plate 64 secured in position to the bracket 57 and having its free end adjacent to the periphery of the feed wheel near the point where the record strips emerge from engagement with the wheel and feed pins. This plate 64 functions as a stripper or separator to separate the record strips from engagement with the feed pins during the strip feeding action. A strip guiding and supporting plate 65 conducts the record strips emerging from the feed wheel into position to be refolded on the shelf 20 into the zigzag folded pack 21.

Also, mounted upon the pivoted guide plate 55 and secured thereto by screws 66' is a feed band separator or slitter 66 that is adapted to sever or separate the feed bands S^3 from the strips as soon as they have performed their strip feeding function. The guide plate 55 with its mountings thus provides a movable carrier or support for the strip separator which is movable with the guide plate into and away from its operative position.

As best shown in Fig. 6, the strip separator 66 includes a separator element 67 shown in the form of a blade having a sharp cutting edge directed against the advancing record strips so as to cut or slit the feed bands from the main bodies of the strips. This slitter blade is received in a supporting slot or pocket and clamped in position by a set screw 68. The lower end of the slitter blade runs in the peripheral groove 48 of the feed wheel and its cutting edge is inclined forwardly against the moving strips so that the strips are directed against the cutting edge with a wiping action to facilitate the severance. Also, at the point that the severance takes place the strips are supported at the opposite sides of the peripheral groove 48 by the surface of the feed wheel at the bases of the feed pins and by the annular support 49. By these means the severance of the feed bands is facilitated and a clean smooth severed strip edge is assured. Although the record strips are shown as having longitudinal weakened severance lines along the feed bands S^3, for some purposes where a sharp edged slitter blade is used these weakened lines may be omitted so that the slitting action occurs along unweakened parts of the strips. In cases where the separator 67 has a blunt or rounded severing edge the weakened lines S^4 are needed.

During initial threading of the record strip assembly into feeding position in the improved feeding mechanism, the strips are led forwardly from the supply 19 over the guide plate 50 and beneath the gravity guide plate 51 which may be raised for this purpose. The strips are then advanced downwardly around the platen 12 and upwardly over the front surface thereof and into guiding relation with the guide rods 53 and guide plate 54. If it is desired to write on the forward end portions of the strips before they reach feeding engagement with the feed wheel 33, the preliminary strip feed may be effected by rotating the platen 12 by means of the knob or handle 12'. Pressure rolls 69, mounted upon a suitable carrier 70 with a manual control 71 are provided for pressing the strips against the platen during this initial feeding. As soon as the forward ends of the strips reach the feed wheel 33 the feed pins are engaged with the apertures in the strips and the guide plate 55 moved into guiding relation with the strips. Subsequent feeding of the strips will be by means of the feed wheel 33, the pressure rolls 69 being released.

As shown in Fig. 1, the main drive shaft 27 for the feeding mechanism is coupled by driving connections including a driving shaft 72 with the rotary platen 12 of the writing machine. These driving connections are diagrammatically shown and include the driving shaft 72 connected at its lower end with a bevelled toothed gear meshing with a similar gear on the platen shaft and mounted in the housing 73. At its upper end the drive shaft is connected to another toothed bevelled gear meshing with a similar gear on the main drive shaft 27, these bevelled gears being mounted in the housing 74. A micromatic adjustment controlled through a knurled head 75 may be mounted in the housing 74 for adjusting the feed shaft 27 angularly through small increments independently of movement of the platen. The drive shaft 72

is connected to the bevelled gear in the housing 73 by means of a coupling 76.

After the strips have been engaged with the pins of the feed wheel 33, strip feed is continued through action of this feed wheel which is driven step by step by the driving connections with the platen. The strips at points spaced laterally from the feed wheel are supported in line with the feed wheel periphery by means of circular supporting disks 77 mounted upon the drive shaft 27. As the strips are advanced by the feed wheel the feed bands are separated or cut from the strips by action of the feed band separator 66, the severed bands S^3 being conducted to one side by a guide rod 78. During the slitting or cutting action, the strips are supported and steadied by engagement with the feed pins and also by means of the periphery of the feed wheel at the bases of the pins, and by the annular support 49. Clean, even severance is thus assured, and tearing and mutilation of the strips avoided. The slitting action occurs substantially at the point at which the feed pins have completed their strip feeding action.

Adjustments of the feed wheel along the shaft 27 bring the feed pins in accurate alignment with the feed apertures, and adjust the writing line of the strips with reference to the writing line of the platen. The writing lines of the strips and of the platen are thus brought into exact alignment and angular deviation thereof is avoided. This is accomplished by means of the adjusting mechanism, particularly shown in Fig. 6 and described in detail above. Adjustments of the feed wheel in one direction or another transversely of the strip path will be effective to angularly adjust the writing lines or spaces of the strips with reference to the writing line of the platen so as to bring the two in accurate alignment with each other, whereby the inscribed characters will be accurately positioned on the lines or spaces provided therefor on the record strips. In this connection it will be noticed that the part of the strips engaged by the feed pins are spaced from other strip parts engaged by the strip guiding means including the guide plates 50 and edge flanges 58. Due to this arrangement, the strips will engage and cooperate with the strip guiding means when the feed wheel 33 is laterally adjusted as described, with the result that the writing lines or spaces of the record strips will be angularly adjusted with reference to the writing line of the platen and brought into accurate registry therewith.

The feeding mechanism can be adjusted laterally upon the supporting rods 23 and is maintained in adjusted position by means of pivoted clamping levers 79 having eccentric clamping surfaces engaging with the rods 23.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a strip feeding mechanism, in combination, a feed wheel having a series of feed pins for engagement with strip apertures to effect strip feed, a rotary drive shaft on which said feed wheel is mounted so as to be rotatably driven, a sleeve mounted on said shaft to which said feed wheel is attached and having a threaded extension at one side of the wheel, means for mounting said sleeve for slidable adjustment along said shaft but constraining it for rotation with the shaft, an adjusting device including an adjusting nut threaded to said sleeve extension for adjusting the sleeve and feed wheel along said shaft, an anchor for said nut, and yielding means urging said anchor and nut together.

2. In a strip feeding mechanism, in combination, a feed wheel having a series of feed pins for engagement with strip apertures to effect strip feed, a rotary drive shaft on which said feed wheel is mounted so as to be rotatably driven, a sleeve mounted on said shaft to which said feed wheel is attached and having an extension at one side of the wheel, means for mounting said sleeve for slidable adjustment along said shaft but constraining it for rotation with the shaft, an adjusting device connected to said sleeve extension for adjusting the sleeve and feed wheel along said shaft, an anchoring device for said adjusting device including an anchoring collar mounted on said sleeve, and a resilient compression device positioned between said collar and said feed wheel to exert yielding pressure on the latter.

3. In a strip feeding mechanism, in combination, a feed wheel having a series of feed pins for engagement with strip apertures to effect strip feed, a rotary drive shaft on which said feed wheel is mounted so as to be rotatably driven, a sleeve mounted on said shaft to which said feed wheel is attached and having an extension at one side of the wheel, means for mounting said sleeve for slidable adjustment along said shaft but constraining it for rotation with the shaft, an adjusting device connected to said sleeve extension for adjusting the sleeve and feed wheel along said shaft and including an adjusting nut threaded to said sleeve extension, an anchoring device for said nut including an anchoring collar mounted on said sleeve inside of said adjusting nut and forming an abutment for the latter, and a resilient compression device positioned between said collar and said feed wheel to exert yielding pressure on the latter.

4. In a strip feeding mechanism, in combination, a feed wheel having a series of feed pins for engagement with strip apertures to effect strip feed, a rotary drive shaft on which said feed wheel is mounted so as to be rotatably driven, a sleeve mounted on said shaft to which said feed wheel is attached and having an extension at one side of the wheel, means for mounting said sleeve for slidable adjustment along said shaft but constraining it for rotation with the shaft, an adjusting device connected to said sleeve extension for adjusting the sleeve and feed wheel along said shaft and including an adjusting nut threaded to said sleeve extension, an anchoring collar mounted on said sleeve inside of said adjusting nut and forming an abutment for the latter, and a resilient compression device positioned between said collar and said feed wheel to exert yielding pressure on the latter, said collar being constrained for rotation with said sleeve and having a peripheral groove, and an anchor slidable in said groove.

5. A strip feeding device for a writing machine with a rotary cylindrical platen including, in combination, a supporting frame for the feeding device having means for attaching it in operative position on the writing machine to one side of said platen and including end plates and trans-

verse supporting rods, a strip guide on said supporting frame and spaced rearwardly of said platen for guiding the strips to said platen, a driving shaft rotatably mounted on said end plates, a feed device having only a single series of feed pins for engagement with strip apertures to effect strip feed with a tractive effort over said platen and being mounted on said drive shaft for rotation therewith but being adjustable therealong, and an adjusting nut having threaded adjusting connection with said feed device for adjusting it along said drive shaft, whereby the strips cooperating with said strip guide are moved to angularly adjust the inscription receiving lines or spaces thereof with reference to the writing line of the platen.

6. In a machine of the character described, in combination, a pin feed unit having pins for engaging and feeding strips, supporting means for supporting said feed unit for adjusting movements transversely of the path of strip feed, a threaded adjusting device connected to said feed unit for adjusting the latter on said supporting means transversely of the path of strip feed, and a resilient positioning device cooperating with said feed unit in opposition to said adjusting device to maintain accurate positioning of the feed unit in its different adjusted positions.

7. In a machine of the character described, in combination, a pin feed unit having only a single series of feed pins for engaging and feeding strips, supporting means for supporting said feed unit for adjusting movements transversely of the path of strip feed, a threaded adjusting device connected to said feed unit for adjusting the latter on said supporting means transversely of the path of strip feed, a strip guide spaced longitudinally of the strip path from said pin feed unit for guiding the strips and for adjusting them when said feed unit is moved by said adjusting device, so as to adjust the inscription receiving lines or spaces of the strips with reference to the writing line of the platen, and a resilient positioning device cooperating with said feed unit in opposition to said adjusting device to maintain accurate positioning of the feed unit in its different adjusted positions.

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