Jan. 15, 1946. J. T. DAVIDSON 2,392,838

WRITING MACHINE ATTACHMENT

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Fig.8

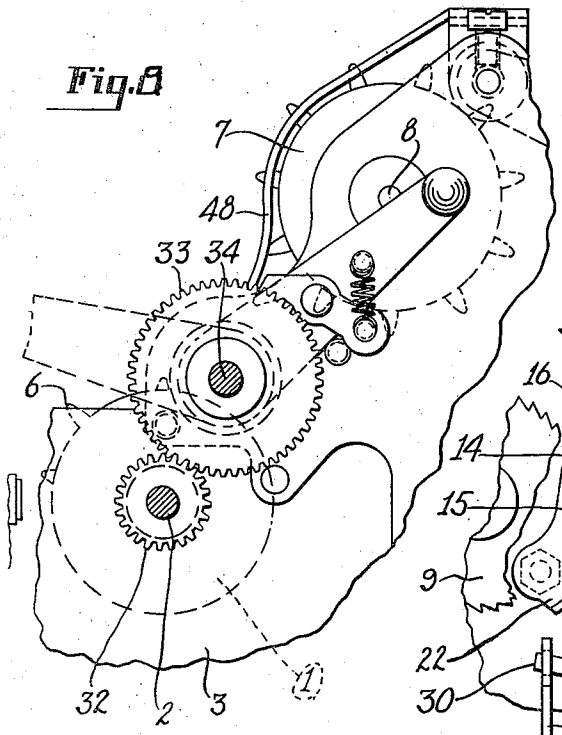


Fig.6

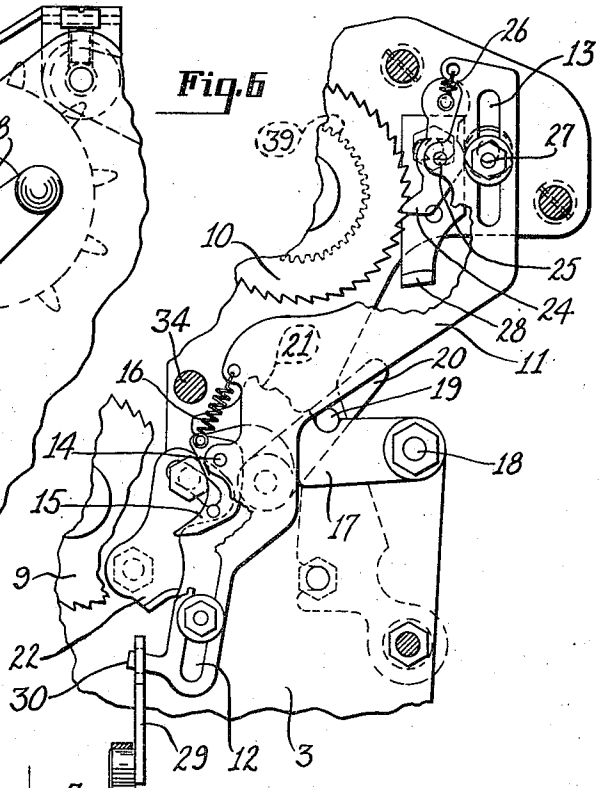
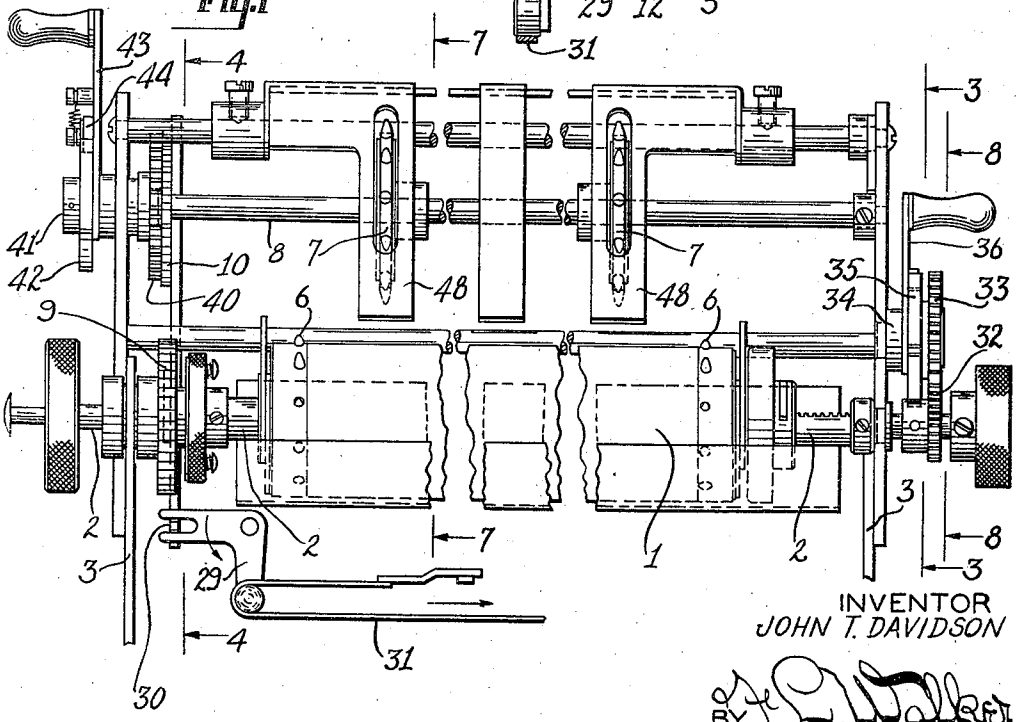


Fig.1



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Fig. 7

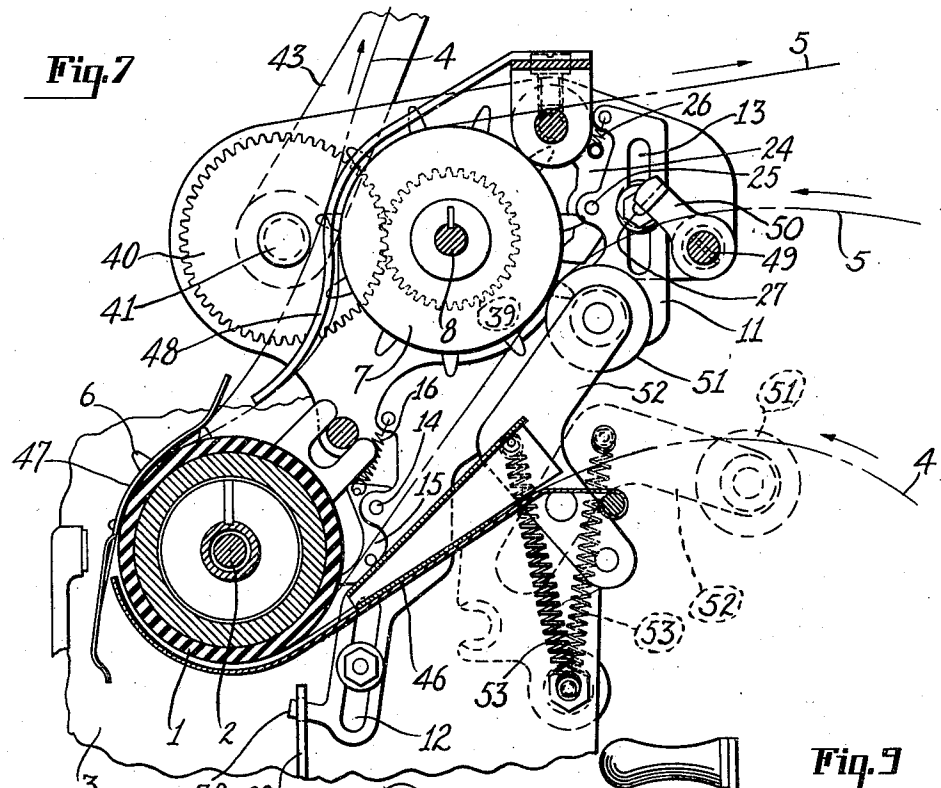


Fig. 9

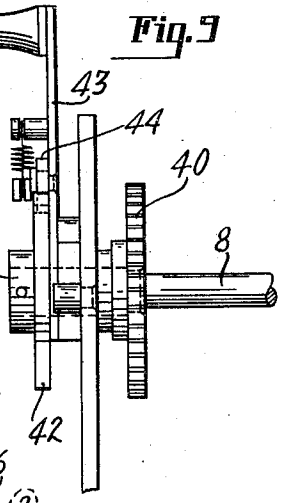
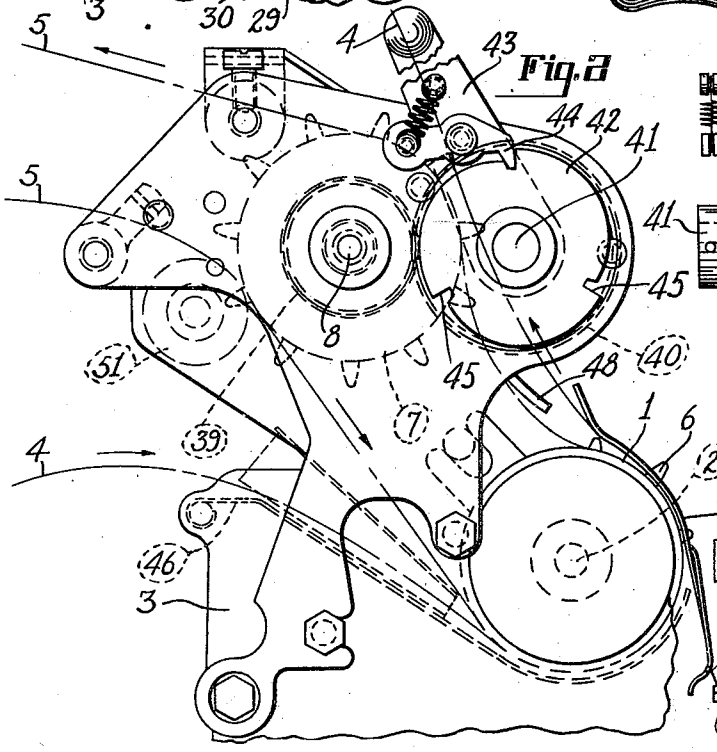


Fig. 8



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WRITING MACHINE ATTACHMENT

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Fig. 4

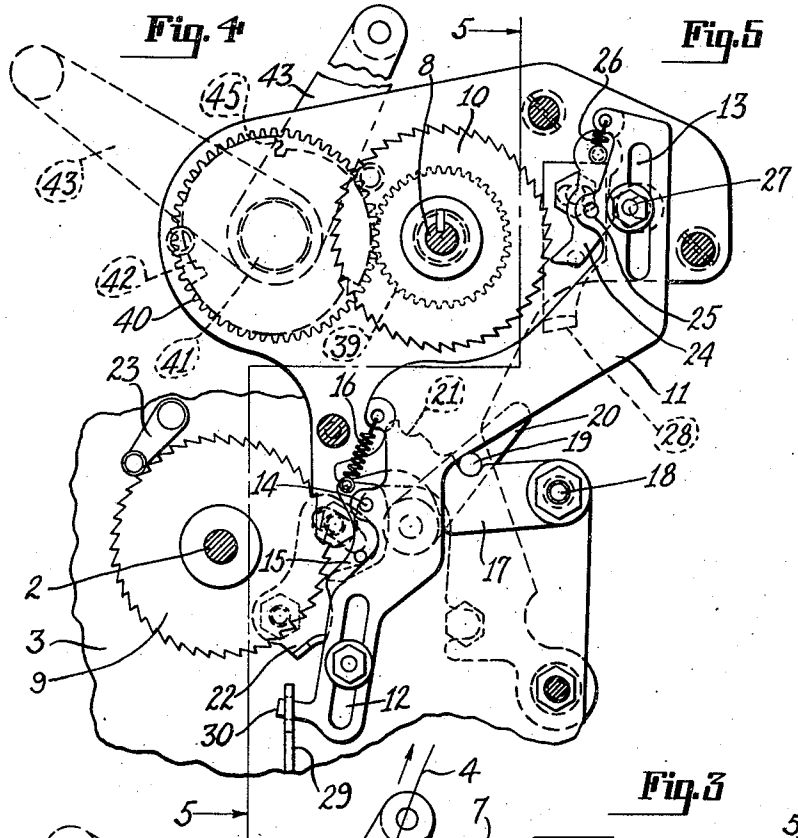


Fig. 5

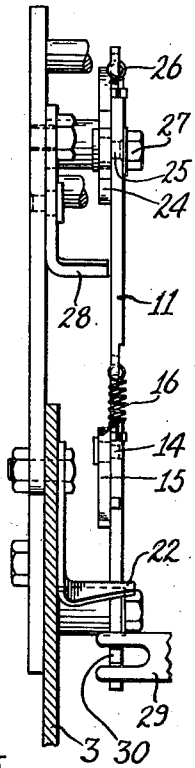
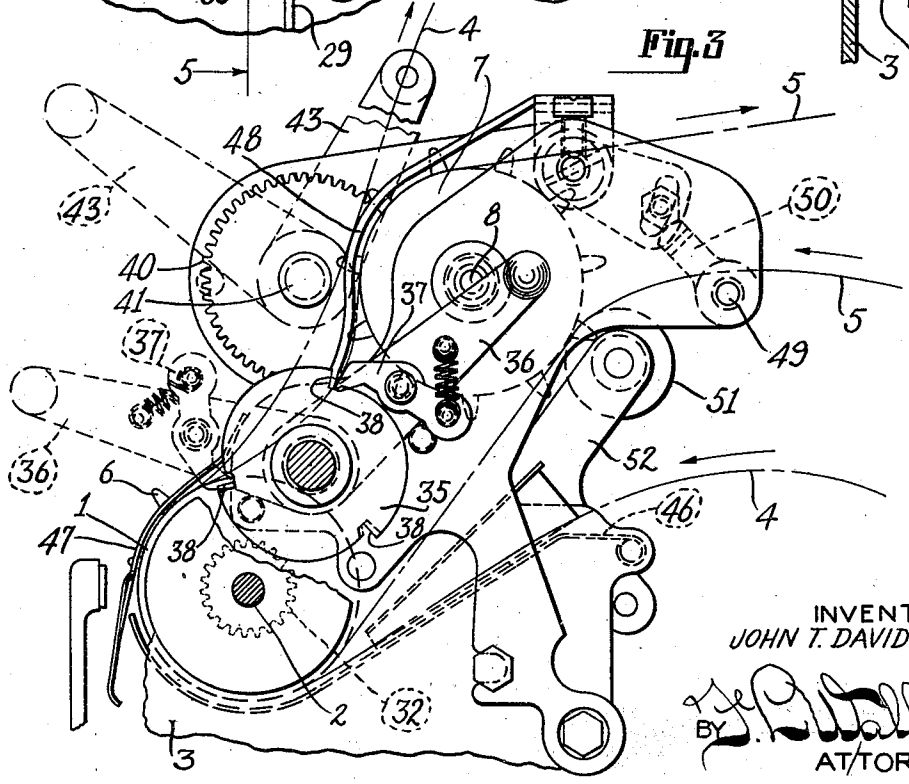


Fig. 3



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UNITED STATES PATENT OFFICE

2,392,838

WRITING MACHINE ATTACHMENT

John T. Davidson, Dayton, Ohio, assignor to The Standard Register Company, Dayton, Ohio, a corporation of Ohio

Application February 5, 1942, Serial No. 429,676

14 Claims. (Cl. 197—128)

This invention pertains to dual strip feeding devices for recording machines, and actuating means for differentially operating the respective feeding devices through variable ranges at the will of the operator.

In typewriting, tabulating, billing, computing and other recording machines, it is frequently desirable to produce manifold copies of records, a part of which may receive imprinted legends at differently spaced intervals from those of the remainder of the copies. For some conditions of use, it is equally desirable that the long and short spacing of the imprinted legends be produced on the strips fed by either of the devices. When inscribing series connected detachable forms, it is also desirable that the strips be advanced proportionate to any remaining uninscribed portions thereof at the completion of records upon corresponding forms, in order that the succeeding set of forms, which may be of different length, be simultaneously presented in recording position with their initial record receiving areas in registry.

In the present construction, reversible feed control means is provided whereby an optionally selected record strip may be advanced at accelerated rate of speed and the advancement of the remaining strip or strips retarded at the will of the operator, and further means by which the remaining uninscribed portions of corresponding forms of whatever length of the respective strips may be advanced at a single operation, and succeeding forms started in registry for a new cycle of recording operations.

The object of the invention is to improve the construction as well as the means and mode of operation of strip feeding mechanism for recording and writing machines, whereby they may not only be economically manufactured, but will be more efficient in use, automatic in action, uniform in operation, have relatively few operating parts, and be unlikely to get out of repair.

A further object of the invention is to provide means for simultaneously actuating each of dual strip feeding through different range of movement.

A further object of the invention is to provide means by which either of dual feeding devices may be given a range of movement greater than the other at will.

A further object of the invention is to provide improved ejector means for strip feeding devices, by which uninscribed portions of record material may be ejected by continuous operation.

A further object of the invention is to provide dual strip feeding devices for a recording machine having the advantageous structural features and inherent meritorious characteristics and mode of operation herein mentioned.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described or illustrated in the accompanying drawings.

In the drawings, wherein is illustrated the preferred but obviously not necessarily the only form of embodiment of the invention,

Fig. 1 is a front elevation of a strip feeding attachment for a recording machine, embodying the present invention.

Fig. 2 is a side elevation from the left of Fig. 1.

Fig. 3 is a side elevation from the right of Fig. 1.

Fig. 4 is a sectional view on line 4—4 of Fig. 1.

Fig. 5 is a detail front view of the mechanism shown in Fig. 4.

Fig. 6 is a detail view of the dual feed mechanism shown in Fig. 4.

Fig. 7 is a sectional view on line 7—7 of Fig. 1.

Fig. 8 is a detail view of a part of the mechanism shown in Fig. 3.

Fig. 9 is a detail of the ejector mechanism shown in Fig. 2.

Like parts are indicated by similar characters of reference throughout the several views.

The present strip feeding apparatus is an attachment for a writing, billing, tabulating or other recording machine, which is adapted to produce manifold copies, of which 1 is the platen roll carried by a revoluble shaft 2 journaled in spaced side frames 3—3, and about which superposed record strips 4 and 5 are advanced through a step by step movement past a recording position. The record strip 4 is progressively advanced about the platen roll and past recording position by strip feeding means associated with the platen roll, while the remaining strip 5 is advanced also about the roll 1 and past the recording position but at a different rate of speed, by additional feeding means in offset relation with the platen roll.

In the drawings the platen roll has been shown provided at each end with a series of feeding pins 6 engageable in longitudinally spaced holes in the record strip 4 for positively advancing the strip in unison with the platen roll. Above the platen roll are located a pair of pin wheels 7 mounted on a revoluble shaft 8 for feeding engagement with

the strip 5. However, it is to be understood that the present invention is in no way dependent upon or limited to the use of positive pin type feeding means, but is equally usable and effective in combination with conventional frictional strip feeding devices.

The respective strip feeding devices are actuated in unison, but to variable extent, by line spacing mechanism which is best shown in Figs. 4, 5 and 6. On the platen roll shaft 2 is a ratchet wheel 9, and on the pin wheel shaft 8 is a similar ratchet wheel 10. Supported on the inner side of one of the side frames 3, as shown in Fig. 5, is a reciprocatory slotted slide 11, having adjacent its opposite ends slots 12 and 13. The slots 12 and 13 may be parallel, thus directing the slide 11 in a straight line movement, but are preferably somewhat inclined relative one to the other, whereby the slide is directed in a slightly lateral swinging motion simultaneously with its reciprocation. Pivoted to the slide 11 at 14 is a pawl 15, which is engageable with the ratchet wheel 9 under influence of a spring 16.

The retractive influence of the spring 16 tends to oscillate the pawl 15 into engagement with the ratchet wheel 9 until arrested by engagement of the tail of the pawl 15 with an adjustable stop arm 17. The arm 17 is pivoted at 18 to the frame of the apparatus and is held in any one of three pawl arresting positions by a locking pin 19 upon a swinging arm 20, engageable in one or another of the notches 21. As illustrated in Fig. 4, the parts are in relative positions to permit the maximum operative throw of the pawl and advancement of the platen roll and strip 4. By depressing the stop arm 17 and engaging the locking pin 19 in another of the notches 21, the pawl will be held out of engagement with the ratchet wheel during a part of the operative movement, and be permitted to engage only during the completion of the movement of the slide, and so advance the ratchet wheel and with it the platen roll and strip 4 a lesser distance. The selective adjustment of the stop arm 17 enables the platen roll and strip 4 to be advanced through a single, double or triple space operation.

At the limit of its advancement, whether the ratchet wheel and platen roll be advanced one, two or three spaces, the actuating pawl 15 engages a stop finger 22 stationarily mounted on the frame 3 and projecting into the path of the pawl. This prevents overthrow by not only limiting the range of movement of the pawl, but also by temporarily camming the pawl into engagement with the ratchet wheel, between which and the stop 22 the pawl is wedged, to prevent further advance movement of the ratchet wheel. The final location of the platen roll at the end of each advancement is further assured by engagement of a yielding detent 23 with the teeth of the ratchet wheel.

Pivotally attached to the upper end of the slide bar 11 and operable in unison with the actuating pawl 15, is a second actuating pawl 24 engageable with the ratchet wheel 10 upon the shaft 8 to advance the pin wheels 7 and thereby the record strip 5.

The pawl 24, which is pivoted to the slide at 25, is subjected to the retractive influence of a spring 26, which tends to oscillate the pawl into engagement with the ratchet wheel 10. To vary the effective stroke of the pawl 24, the upper end of the slide 11 is adjustable toward and from the ratchet wheel. The slotted portion of the slide 11 is guided by an eccentrically mounted stud 27 having engagement in the slot 13. By rotating the stud 27 away from the ratchet wheel 10, whereby the slide is given a slight inclination to the vertical, and the pawl 24 is spaced farther from the ratchet wheel, the engagement of the pawl 24 therewith is delayed. The effective action of the pawl occurs only during the final range of movement of the slide 11. At the end of its range of movement the pawl 24 engages with a fixed stop 28 by which its range of movement is limited and by which it is temporarily locked in engagement with the ratchet wheel to prevent overthrow of the pin wheels 7 and the record strip 5.

As shown in Fig. 4, the slide is adjusted to afford the maximum range of effective movement of the pawl 24. However, by rotation of the eccentrically mounted stud 27 the pawl 24 may be optionally caused to advance the ratchet wheel 10 and with it the pin wheels 7 to advance the strip 5 through a single, double or triple space movement. The adjustments are such that, as illustrated in Fig. 4, both pawls are operative through their maximum ranges to advance both strips equally through the greatest degree. However, by adjusting the swinging arm 17 to engage the locking pin in another of the notches 21, to thereby correspondingly limit the effective range of the pawl 15 but leaving the stud 27 as shown, the strip 4 may be advanced a lesser distance than the strip 5. To the contrary, by changing the adjustment of the stud 27 without disturbing the adjustment of the stop arm 17 and hence without changing the effective range of the pawl 15, the strip 5 may be advanced a lesser distance than the strip 4.

The construction is quite flexible. Either strip may be advanced through single, double or triple spacing in unison with the advancement of the other through triple, double or single spacing. The greater movement may be imparted to either strip. The movement of either strip may be varied independently of the other strip at the option of the operator.

To impart movement to the slide 11 in timed sequence with the recording operation of the writing machine, a bell crank lever 29 (Figs. 1, 4, 5, 6 and 7) engages with a stud or lug 30 projecting from the lower end of the reciprocatory slide 11 and is oscillated in timed sequence with the recording operation by a retractive belt 31 connected to a moving part of the writing machine. The oscillation of the bell crank lever 29 by whatever moving part of the writing machine, effects a downwardly retraction of the slide 11, by which the pawls 15 and 24 are caused to actuate the ratchet wheels 9 and 10 through the range of movements for which the pawls have been set and come to rest against their stops 22 and 28 simultaneously.

By the feeding means thus described, the strips 4 and 5 may be differentially fed in varying ratio, and the imprinted legends thereon may be differently spaced. Such feeding apparatus also enables use of series connected forms of different lengths. For example, one feeding device may be utilized to feed three and a half inch forms and the other may feed eleven inch forms, or one may be adapted to feed five and one-half inch forms and the other seventeen inch forms.

In such event, it is desirable that the corresponding forms of the respective series, although of different lengths, be started evenly with the initial legend receiving lines of the superposed forms in registry. To this end, ejector means is provided for enabling the unused portion of each

form to be advanced and an additional advancement of the succeeding forms sufficient to compensate for a heading space, to be effected at a single stroke. The ejector means is manually operated and, as shown, is separably operable for each feeding device.

Mounted on the platen roll shaft 2 is a gear pinion 32, which meshes with a gear 33 journaled on a stud 34 projecting from the side frame 3. Attached to the gear 33 for unison rotation is a notched disc 35, the spacing of the notches of which is proportionate to the total length of the form being fed. The gear ratio of the gears 32—33 is such that during the rotation of the platen roll 1 and pin type feeding devices 6 sufficient to advance the record strip 4 the distance of one complete form, the disc 35 will have been advanced in unison therewith the distance between succeeding notches.

Mounted on the trunnion stud 34 for free swinging motion through a predetermined range of movement is an operating lever 36. Carried by the lever 36 is a spring actuated pawl 37 which rides upon the periphery of the notched disc 35. When the record strip is adjusted to present the initial writing line of the form at the recording position, the pawl 37 will rest in a notch of the disc 35 in contact with the shoulder 38 thereof. As the platen roll and the record strip are advanced through successive step by step movements, the disc 35 is proportionately idly advanced in unison, thereby carrying the shoulder 38 away from the pawl 37. When the record strip has advanced through the desired number of step by step movements, according to the number of inscribed legends, whether they are few or many, the hand lever 36 is drawn from the solid line position to the dotted line position in Fig. 3. In such operation the pawl 37 will ride idly on the periphery of the disc through the range of movement that the disc has been advanced by the step by step actuation, before the pawl engages the shoulder 38. During the remainder of the movement of the hand lever 36, the pawl 37 by its engagement with the shoulder 38 will advance the disc in unison with the lever movement to the end of the predetermined range of movement of the latter. Such movement of the disc 35 under manual actuation of the hand lever 36 is transmitted through the intermeshing gears 33—32 to the platen roll and pin feed 6. The record strip is thus advanced through whatever portion of the form length remains after the step by step advancement thereof, and presents the succeeding form length of the record strip in position to receive the initial inscription thereon.

The same general construction is embodied in the ejector mechanism for the second feeding device. As shown at the left in Fig. 1 and in Figs. 2 and 4, the shaft 8 of the pin wheels 7 carries a gear wheel 39, which meshes with a gear 40 loosely journaled on a stud 41. Attached for unison rotation with the gear 40 is a notched disc 42. Mounted on the stud 41 is an oscillatory hand lever 43, which carries a spring actuated pawl 44 riding upon the periphery of the disc 42 as the latter is advanced by step by step actuation of the pin wheels 7 by the pawl 24 and ratchet wheel 10. During such step by step advancement of the pin wheels 7 and unison advancement of the disc 42, the shoulder 45 of the disc is carried away from the pawl 44. At the completion of the line by line recording upon the strip 5, the hand lever 43 is pulled forward. During the initial portion of the lever stroke the pawl 44 will ride idly upon the periphery of the disc 42 until it engages the previously advanced shoulder 45 of the disc. During the remainder of the hand lever stroke, whether short or long, the pawl 44 will advance the disc 42 in unison with the lever movement until the latter is arrested at the limits of a prescribed range of movement. Such additional partial rotation of the disc 42 is transmitted through the gears 40—39 to the shaft 8 and pin wheels 7, to correspondingly advance the record strip 5 sufficiently to present the initial writing line of the succeeding form in registry with the recording position.

Thus, the respective record strips, although comprising forms of different lengths receiving differently spaced inscriptions, will be presented with the initial writing lines of corresponding forms of the respective strips simultaneously at the recording position and in registry with each other. Such condition will prevail regardless of which strip is intermittently advanced through step by step movements of greater extent, and which strip movement is of lesser degree.

While only single strips 4 and 5 have been illustrated and mentioned, it is to be understood that multiple superposed strips may be utilized in each instance. The strip or strips 4 enter over a conventional paper guide 46 and after passing circumferentially about the platen roll 1 in superposed relation with the strip or strips 5 and beneath paper guides or hold down fingers 47, they are discharged upwardly and rearwardly in a direction tangential to the platen roll 1 over paper guides or hold down fingers 48 associated with the pin wheels 7. The record strip or strips 5 enter the apparatus from the rear above the strip 4 and over a guide rod 49 and intermediate lateral guide fingers 50. They pass thence tangentially to the rear sides of the pin wheels 7, the pins of which engage therewith as the strips advance. The strips are held in feeding engagement with the rear sides of the pin wheels by rollers 51. Passing downwardly from the pin wheels 7 the strips 5 circumferentially traverse the platen roll and pass the writing position beneath the record strips 4. The record strips 5 leave the platen roller in an upwardly and rearwardly tangential direction beneath the paper guides 48 by which the strips 5 are held again in feeding engagement with the pin wheels 7. Thus, the strips 5 are positively engaged, although not necessarily so, both during their entry into and during their exit from the strip feeding apparatus.

The guide rollers 51 are mounted on swinging elbow levers 52 and are urged by springs 53 toward the pin wheels 7 to maintain the strips 5 in feeding relation therewith. By swinging the levers past dead center relation with the points of attachment of the springs 53, the rollers may be held in retracted relation to facilitate initially inserting the strips 5.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited

to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. A writing machine wherein separate strips of record material are progressively advanced past a recording position and corresponding differently spaced writing positions thereon are successively registered with each other and with the recording position, dual feeding devices therefor, common actuating means for the respective feeding devices, including a ratchet wheel associated with each feeding device, a reciprocatory slide, a pair of pawls carried thereby and engageable with the respective ratchet wheels to advance the wheels and therewith the feeding devices through predetermined degrees of movement at each reciprocation, an operative connection between the slide and operating part of the writing machine for reciprocating the slide in synchronism with recording operations of the machine, variable means for delaying the engagement of the respective pawls each independently of the other with their related ratchet wheels, relative to the movement of the slide, including means for bodily adjusting at least a portion of the slide toward and from one of the ratchet wheels, a shouldered disc mounted for rotation in unison with each ratchet wheel, a manually operated oscillatory lever mounted concentrically with each shoulder disc, a pawl carried by each hand lever and freely riding upon the disc during oscillation of the lever until it engages with the shoulder of the disc, and upon continued movement of the lever actuates the disc through a further rotative movement, and gears for transmitting the further rotation of the discs to the respective feeding devices to thereby complete cycles of operation thereof of predetermined extent.

2. A writing machine wherein separate strips of record material are differentially advanced in unison past a recording position and corresponding differently spaced writing positions thereon are successively registered with each other and with the recording position, dual feeding devices therefor, common actuating means for the respective feeding devices operative in alternation with the recording operations of the writing machine, control means for varying the extent of the feeding operations of the respective feeding devices, whereby either feeding device may be intermittently operated through a longer or shorter range of step by step movement simultaneously with the operation of the other feeding device and the ratio of feeding movements of the respective feeding devices may be reversed at the will of the operator, said feeding movements being cumulative and ejector means for each of the feeding devices for actuating the respective feeding devices through variable additional advance movements inversely proportionate to the prior step by step movements of the feeding devices in completion of cycles of operation thereof of predetermined total extent.

3. A writing machine wherein separate strips of record material are differentially advanced in unison past a recording position and corresponding differently spaced writing positions thereon are successively registered with each other and with the recording position, dual feeding devices therefor each operable through varying range of movement independently of the other, a ratchet wheel associated with each feeding device, a reciprocatory actuating slide common to both ratchet wheels, an operative connection between the slide and a moving part of the writing machine by which the common actuating slide is reciprocated to energize the feeding devices alternately with recording operations of the writing machine, a pair of pawls carried by the slide engageable with the respective ratchet wheels, means for independently varying the period of engagement of the respective pawls with the ratchet wheels during the movement of the slide, said actuation of the slide being effective to advance the dual feeding devices through successive step by step movements of different extent, and additional actuating means for advancing the dual feeding devices through additional ranges of movement supplemental to the step by step movements thereof of sufficient extent to complete predetermined cycles of operation of each of the feeding devices.

4. A writing machine wherein separate strips of record material are differentially advanced in unison past a recording position and corresponding differently spaced writing positions thereon are successively registered with each other and with the recording position, dual feeding devices therefor each operable through varying range of movement independently of the other, a ratchet wheel associated with each feeding device, a reciprocatory actuating slide common to both ratchet wheels, an operative connection between the slide and a moving part of the writing machine by which the common actuating slide is reciprocated to energize the feeding devices alternately with recording operations of the writing machine, a pair of pawls carried by the slide engageable with the respective ratchet wheels, and a mounting upon which said reciprocatory slide is adjustable in its relation with at least one of the ratchet wheels to vary the period of engagement of the corresponding pawl carried by the slide with such ratchet wheel to vary the effective movement of the corresponding feeding device.

5. A writing machine wherein separate strips of record material are differentially advanced in unison past a recording position and corresponding differently spaced writing positions thereon are successively registered with each other and with the recording position, dual feeding devices therefor each operable through varying range of movement independently of the other, a ratchet wheel associated with each feeding device, a reciprocatory actuating slide common to both ratchet wheels, an operative connection between the slide and a moving part of the writing machine by which the common actuating slide is reciprocated to energize the feeding devices alternately with recording operations of the writing machine, a pair of pawls carried by the slide engageable with the respective ratchet wheels, and a mount upon which the slide is adjustably supported for swinging motion relative to at least one of the ratchet wheels to thereby vary the period of engagement of the corresponding pawl carried by the slide with such ratchet wheel to vary the effective movement of the corresponding feeding device.

6. A writing machine wherein separate strips of record material are differentially advanced in unison past a recording position and corresponding differently spaced writing spaces thereon are registered with each other and with the recording position, dual feeding devices therefor, com-

mon actuating mechanism for differentially energizing the dual feeding devices through step by step movements control means for varying the extent of step by step operative movement of each of the respective feeding devices independently of the other and enabling ratio of movements thereof to be reversed at the will of the operator, and additional feeding means for actuating each of the dual feeding devices through additional movement independent of the aforementioned step by step operation through distances inversely proportionate to the combined extent of the step by step movements thereof to complete predetermined total range of feeding cycle of each feeding device.

7. A writing machine wherein separate strips of record material are differentially advanced in unison past a recording position and corresponding differently spaced writing spaces thereon are registered with each other and with the recording position, dual feeding devices therefor, common actuating mechanism for differentially energizing the dual feeding devices through step by step movements, and additional actuating means for the dual feed devices operable independently of the step by step actuating means for advancing each of the feeding devices distances inversely proportionate to the distances said devices have been advanced by the step by step actuating mechanism to complete predetermined cycles of operation of the dual feeding devices.

8. In a recording apparatus, dual strip feeding devices for progressively advancing separate strips of record material simultaneously through parallel paths of travel past a common recording position, a common actuating means therefor including a ratchet wheel associated with each feeding device for intermittent step by step movement, an intermittently operated reciprocatory actuator common to the respective feeding devices and associated ratchet wheels, a pair of pawls carried by the reciprocatory actuator, a different one of which is engageable with each ratchet wheel, and means for varying the effective stroke of each pawl independently of the other pawl whereby the ratio of feed of the dual feeding devices may be reversed at will.

9. In a recording apparatus, dual strip feeding devices for simultaneously advancing separate strips different distances through parallel paths of travel past a common recording position, common actuating means therefor, and manual control means by which the range of operation of either of the respective feeding devices may be altered independently of the other.

10. In a recording apparatus, dual feeding devices for simultaneously advancing separate strips of record material differentially through concentric paths of travel past a common recording position, common actuating means therefor and manually adjustable means for varying the range of operation of either feeding device independently of the other feeding device whereby either of the feeding devices may be caused to advance the corresponding record strip a greater distance than that through which the other feeding device advances its corresponding strip.

11. A recording apparatus including dual strip feeding devices for advancing separate record strips different distances through parallel paths of travel past a common recording position, a ratchet wheel associated with each feeding device, a pair of actuating pawls, one for each ratchet wheel, common actuating means for the pawls, and adjustable control means for differentially limiting the operative range of each of the pawls independently of the other whereby either of the pawls may be permitted a greater range of operative movement than the other at will.

12. A recording apparatus including dual strip feeding devices each operative through variable range of movement to simultaneously advance separate strips of record material, through parallel paths of travel past a common recording position one through a greater distance than the other, and means for reversing the range of operation of the respective feeding devices whereby either of the record strips may be advanced the greater distance at the will of the operator.

13. A recording apparatus, wherein dual record strips are differentially advanced past a common writing position at which manifold records are produced on the respective strips, including separate feeding devices for the respective record strips, a common actuating means therefor, means for optionally changing the ratio of advancement of the strips by the corresponding feeding devices whereby the range of advancement of either strip at each operation may be increased or decreased relative to the advancement of the other strip, and additional actuating means for completing the advancement of the respective strips through a predetermined range of movement and compensating for the previous advancement thereof by the common actuating means.

14. A recording apparatus, wherein dual record strips are differentially advanced through step by step movement past a common record receiving position and subsequently advanced through the remainder of a predetermined range at each cycle of operation, including separate strip feeding devices for advancing the separate strips differentially past a single writing position at which the strips receive manifold records, common actuating means therefor, regulatory means for varying the ratio of advancement of the respective strips, and additional actuating means for said strip feeding devices constructed and arranged to compensate for the previous step by step advancement of the strips and complete the advancement of the strips through a predetermined range of movement.

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