May 4, 1943. J. Q. SHERMAN ET AL 2,318,020

DUAL PIN WHEEL FEED

Original Filed June 26, 1935 2 Sheets-Sheet 1

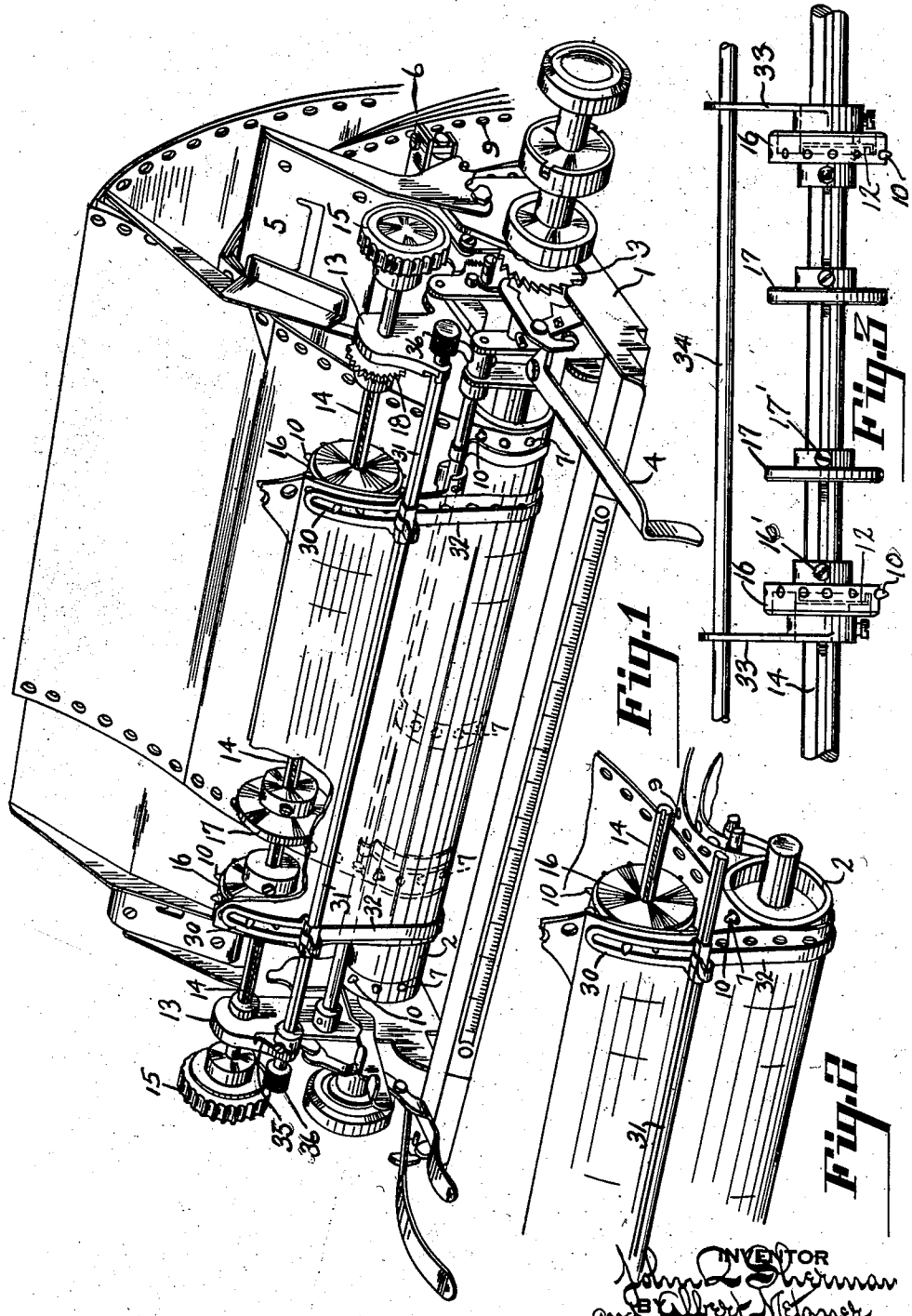


Fig. 1

Fig. 3

Fig. 2

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DUAL PIN WHEEL FEED

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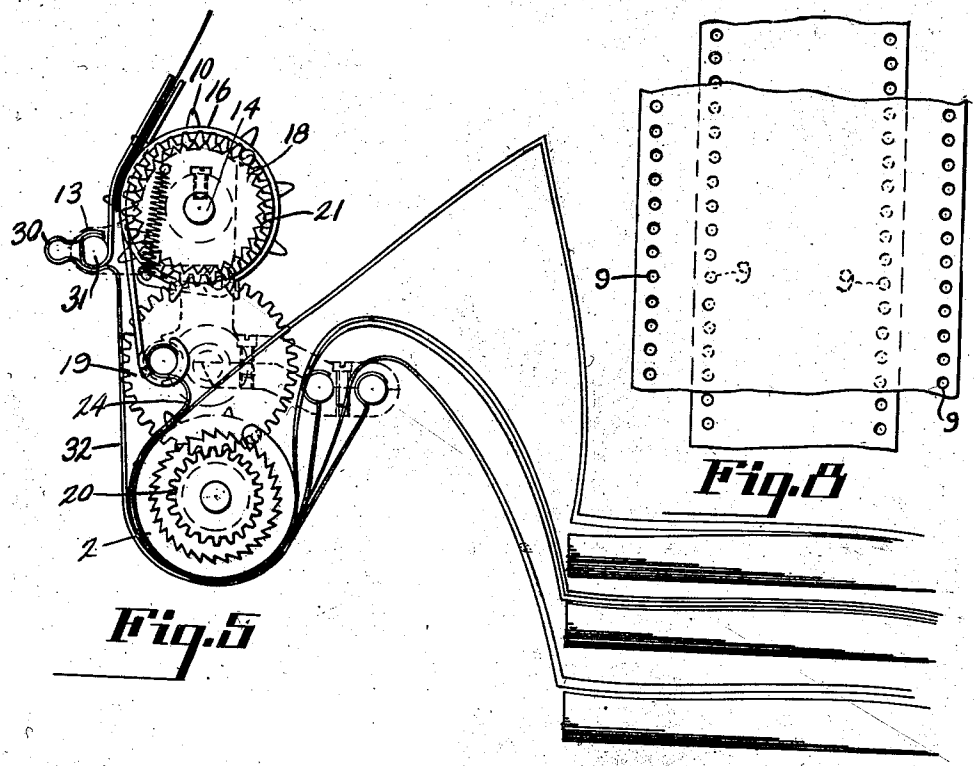


Fig. 5

Fig. 8

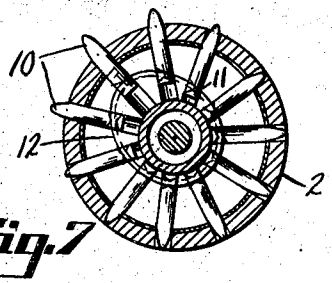


Fig. 7

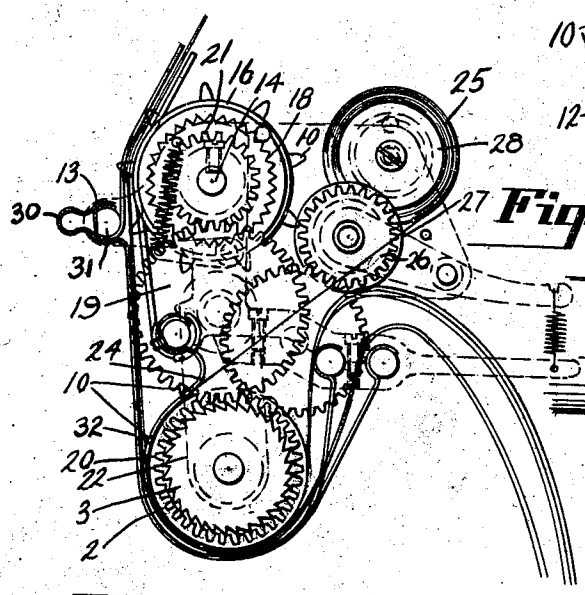


Fig. 4

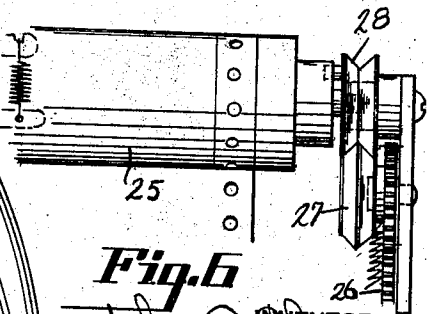


Fig. 6

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Patented May 4, 1943 2,318,020

UNITED STATES PATENT OFFICE

2,318,020

DUAL PINWHEEL FEED

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Application June 26, 1935, Serial No. 28,480
Renewed February 21, 1939

8 Claims. (Cl. 197—128)

This invention relates to an attachment for writing and computing machines, and more particularly to a differential feeding apparatus for positively feeding superposed record sheets of a manifolding assembly past a writing position at different rates of speed.

The present apparatus is especially adapted for feeding through a writing machine, checks, statements, utility bills, such as gas and electric light bills, and other analogous record forms of prescribed length, and advancing therewith an accompanying ledger, tally, or other condensed record sheet to receive thereon duplicate inscriptions in line spaced relation.

The check, statement, or bill forms are provided in series connected continuity and are separable on transverse weakened division lines into individual forms. The accompanying record material is also preferably of continuous strip form which may or may not be transversely scored or perforated for division into successive sheets. The series connected separable forms and the accompanying duplicate record material may be of the same or of different width.

Pin type feeding means is provided for positively advancing the forms and record material at different rates of speed past the writing position, whereby the forms may be advanced a full form length at each operation, while the accompanying record material is advanced through successive line space distances only. The more rapid moving material may be disposed either on top or beneath the more slowly advanced strip, and likewise either the overlying or underlying material may be of greater or less width than the accompanying material.

These capabilities for variably arranging the wide and narrow and the fast and slow moving materials according to specific requirements is quite desirable and a great convenience in enabling the adaptation of the apparatus to different conditions of commercial usage. The feeding operation of the respective materials may be effected simultaneously by common actuating means, or they may be advanced separately and indepeendently of each other by individual motion transmitting means.

The object of the invention is to improve the construction as well as the means and mode of operation of differential feeding mechanism for writing and computing machines whereby such apparatus may not only be economically manufactured but will be more efficient in use, more rapid and accurate in operation, positive and uniform in action, easily operated, and unlikely to get out of repair.

A further object of the invention is to provide means for positively advancing the respective superposed strips of material at predetermined relative rates of speed, and to provide means whereby the feeding action pertaining to one strip of material will not interfere with nor in any way affect the feeding of the accompanying strip of material being advanced at a different rate of speed.

A further and important object of the invention is to provide means for advancing the respective strips of material in accurately timed relation so that one strip of material will not creep upon the other and so cause the writing areas of the respective materials to be shifted out of registering relation although the respective materials are advanced through different distances at each operation.

A further object is to provide an apparatus which will be simple in construction and of compact form having relatively few operating parts.

A further object of the invention is to provide such dual feeding mechanism which will be applicable to conventional styles of writing and computing machines now in common use.

A further object of the invention is to provide dual feeding devices for independently advancing different strips of record material past a writing position which may be operated in unison or separately at the will of the operator.

A further object of the invention is to provide dual feeding devices operable at different rates of speed to present predetermined differently spaced areas of different strips in registry at the writing position at the end of definite relative travel movements of the strips.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivlents, as hereinafter described and set forth in the claims.

Referring to the accompanying drawings, wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a perspective view of the platen carriage of a conventional form of writing machine, to which the present invention has been applied.

Fig. 2 is a detail perspective view, illustrating superposed record strips having aligned side margins arranged to be separately advanced at differ-

ent rates of speed by the herein described dual feeding mechanism.

Fig. 3 is a detail view of one of the pin type feeding assemblies.

Fig. 4 is an end elevation of a duel feeding apparatus, showing the respective feeding devices operatively interconnected for unison movement at different rates of speed, and also automatic winding means for retrieving one of the inscribed strips.

Fig. 5 is a similar end view of a modification wherein the inner or underlying strip may be caused to travel more rapidly than the overlying material.

Fig. 6 is a detail view of a frictional driving connection for the retrieving roller illustrated in Fig. 4.

Fig. 7 is a detail sectional view of the retractable pin feeding unit.

Fig. 8 is a detail view of superposed strips of record material of different widths adapted for use in the present apparatus.

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

Referring to the accompanying drawings, 1 is the traveling platen carriage of a writing machine in which is mounted the rotary platen roll 2 adapted to be rotated through successive partial rotations by the usual line spacing mechanism 3 actuated by a manually operated spacer lever 4. The carriage is provided with the usual paper guide 5 for directing the incoming record material supply, indicated at 6, to the platen roll 2 about which it passes coincident with the writing position to receive the imprinted inscription thereon.

The platen roll 2 is provided at spaced intervals throughout its length with pin type record material feeding units 7—7, having disappearing feeding pins 10 which reciprocate radially relative to the platen roll into and out of feeding engagement in marginally punched feed holes 9 in the record material strips.

The pin wheel feeding units 7 form the subject matter of, and are fully set forth and described in Letters Patent Nos. 2,000,649; 2,000651, and No. 2,000,650, dated May 7th, 1935, and the platen roll assembly, including such relatively spaced pin wheel units and means for rendering them independently effective and ineffective at will, forms the subject matter of and is fully described in Letters Patent No. 2,000,650, dated May 7th, 1935.

Such pin wheel units may be briefly described as comprising discs having therein radial guide bores in which are positioned reciprocatory feeding pins 10. The feeding pins 10 are provided with lateral notches 11 which engage over the marginal flange of an eccentric cam 12 which is normally stationarily positioned within the mounting discs of the pin wheel units and about which the feeding pins travel incidental to the rotation of the mounting disc and platen relative thereto.

The eccentric cams 12, pertaining to the different pin wheel units disposed in spaced relation throughout the length of the platen roll 2, are carried by concentric sleeves surrounding the platen roll shaft and independently adjustable by rotation of discs carried by the respective sleeves beyond the end of the platen roll whereby the cams 12, of different pin wheel units, may be rotatively adjusted and thereupon held in their adjusted positions. By such adjustment of the cams 12 rotatively, the feeding pins 10 may be caused to be projected beyond the periphery of the roll at different circumferential positions, in one of which the pins may operatively engage in the feeding holes 9 of the material, while in another position of adjustment the pins will be projected idly in a non-feeding position.

Thus any pin wheel units located in the platen roll 2 intermediate the punched margins of overlying record material may be rendered ineffective and inoperative by so adjusting the control cam 12 thereof that the pins 10 will not be projected against the overlying record material while other pin wheel units positioned coincident with the punched margins of the record material are rendered effective for feeding engagement therewith by otherwise adjusting their control cams 12 to project the feeding pins at the desired circumferential position.

Such description of the pin type feeding units is here made for convenience of explanation and to enable a better understanding of the present apparatus. It is to be understood, however, that such pin type unit forms no part per se of the present invention but comprises the subject matter of other Letters Patents heretofore identified.

Located in suitable standards 13, projecting upwardly from the writing machine carriage 1 and positioned in elevated relation above the platen roll 2, is a rotary counter shaft 14 which may be interconnected with the platen roll shaft for unison rotation but at different rates of speeds by intermediate gearing, as shown in Figs. 4 and 5, or which may be rotated manually independently of the platen roll 2 by means of knobs 15 upon the extremities of the countershaft 14.

The countershaft 14 carries thereon pin wheel units 16 axially adjustable along said shaft toward and from each other to enable them to accommodate marginally punched record material of different widths. While only a single pair of such pin wheel units 16 has been shown in the drawings, it will be understood that either more or less such feeding units may be employed as will best meet operating conditions.

In order to support the record material medially between its lines of marginal engagement with the pin type feeding units 16, a plurality of idler discs 17 are adjustably mounted upon the shaft 14 intermediate the pin wheel units 16. These discs 17 have diameters substantially equal to those of the pin wheel units in spaced relation with which the discs are mounted upon the shaft 14. In the event that the shaft 14 and pin wheel feeding devices carried thereby are to be manually operated independently of the line spacing mechanism of the platen roll, the shaft 14 is provided with a star wheel or notched disc 18 with which a suitable spring pressed detent engages in the usual manner to yieldingly hold the shaft and pin wheel devices in their operative position of rotary adjustment.

However, in lieu of independent manual rotation, the shaft 14 may be automatically rotated in timed relation with the platen 2 by means of an intermediate gear wheel 19 meshing with a driving gear 20 mounted upon the shaft of the platen roll 2 and in turn meshing with a driven gear 21 upon the rotary shaft 14. This intermediate transmission gear may be mounted upon a swinging arm 22, shown by dotted lines in Fig. 4, by swinging adjustment of which the gear may be moved into and out of intermeshing relation with the respective driving and driven gears

20 and 21, thereby enabling the shaft 14 and the pin wheel feeding devices carried thereby to be actuated either automatically in unison with the adjustment of the platen roll 2, or by separate manual adjustment independently fo the platen roll. Also, by suitably proportioning the gear train 19, 20 and 21, the shaft 14 and pin wheel devices 16 carried thereby may be driven at an increased rate of speed relative to that of the platen roll, as is illustrated in Fig. 4, or the shaft 14 and pin wheel devices carried thereby may be actuated at a reduced rate of speed, as illustrated in Fig. 5.

The superposed marginally punched strips of record material comprising the manifolding assembly are collectively advanced over the paper guide 5 at the rear of the apparatus and thence beneath the platen roll 2 past the writing position where the imprinted inscription is reproduced upon one or more underlying record strips by interposed carbon transfer material. Beyond the writing position, the paths of travel of different record strips of the manifolding assembly diverge.

The overlying strip or strips, which may be either those of greater or those of lesser width, are directed upwardly into feeding engagement with the pin wheel units 16 carried by the shaft 14 while the remainder of the manifolding assembly is directed rearwardly at 24 over the top of the platen roll 2 and thence from the machine. Such duplicate record strip may, if desired, be wound upon a receiving roll 25 at the rear of the apparatus, as shown in Fig. 4. Such retrieving roll 25 is rotated in unison with the platen roll by an intermediate gear train 26, the final gear pinion of which is connected with a friction roller 27 having driving engagement with a grooved roll 28 upon the shaft of the retrieving roller 25.

The construction is such that as the diameter of the retrieving roll 25 increases due to accumulation of record material thereon, the friction drive rolls 27 and 28 may slip sufficiently to compensate for such increased size and consequent tendency to more rapidly retract the duplicate record strips. If the overlying record strip, engaging with the elevated pin wheel members 16, is of less width than the underlying strip and is adjusted so that the punched margins are offset, the cams 12, controlling the pin wheel units of the platen roll 2 operatively engaging the underlying strip, may be set to project the pins into feeding engagement substantially at the writing line. Likewise, the feeding pins 10 of the upper set of pin wheel units 16 are caused to be projected within the forward arc of such units.

However, if the overlying strip of record material extends coincident with or beyond the position of the operatively engaged pin wheel units feeding the underlying strip or strips, the control cams 12 of the latter are adjusted to project the feeding pins 10 into engagement with such underlying record strip or strips through an upper segment of the platen roll and beyond the point at which the paths of travel of the over and underlying strips diverge. Thus the feeding pins 10, having operative engagement with the underlying record strip or strips, will emerge from the pin wheel units 7 into operative feeding engagement with the marginally punched holes 9 of the underlying strips in such relation that they will not conflict nor interfere with the travel movement of the overlying record material being fed by the elevated pin wheels 16.

Such independent feeding engagement of the respective pin wheel units 7 and 16 with the under and overlying record strips and operating in the same plane of rotation is clearly illustrated in Fig. 2. Likewise, if the overlying record material extends beyond the operatively engaged pin wheel units 7 of the platen roll, as illustrated at the left of Fig. 1, the control cam 12 of such underlying pin unit is adjusted to project the pins at or near the top of the platen roll beyond the path of travel of the overlying material.

The overlying material is held in operative relation with the feeding pin wheel units 16 by slotted paper guides 30 adjustably mounted upon a transverse supporting rod 31 mounted in the uprights 13 of the platen carriage. The paper guides 30 are provided with dependent guide arms 32 which are directed rearwardly beneath the platen roll 2, thereby loosely confining the paper to its predetermined path of travel.

The respective strips of record material being operatively engaged with different feeding devices, and the feeding pins 10 of the lowermost group of pin wheel units 7 being engageable with the underlying strip or strips throughout a top segment of the platen roll beyond the point of separation of the paths of travel of the over and underlying materials, the respective groups of feeding devices may be operated at different rates of speed to advance one strip of material relative to the other without interference or conflict since there is no frictional resistance or pressure device imposed upon the material beneath the platen roll as is customary.

While the feeding pins 10 of the units 7 embodied in the platen roll 2 are necessarily reciprocatory, whereby they emerge into engagement with the material through only a very limited arc of the platen roll, and are withdrawn within the periphery of the roll throughout the major portion of their paths of travel, the feeding pins 10 of the pin wheel units 16 may be either fixed in the carrying discs as illustrated in Fig. 1, or they may also be of the disappearing type illustrated in Fig. 7 and other views.

Such reciprocatory or disappearing feed pin construction is shown in Fig. 3 wherein the pin carrying discs are secured in any position of axial adjustment by set screws 16' engaging in a key way in the shaft 14 and the hubs of the pin control cams 12 are provided with arms 33 engaging a transverse rod 34 to hold the cams 12 in their proper positions of rotative adjustment. The intermediate supporting discs are also secured in their adjusted positions by set screws 17' engaging the key way of the shaft 14. The pin wheel units and supporting discs may be adjusted along the shaft 14 to various positions in accordance with the width of the material to be fed and also the desired relation of one strip to the other.

The paper guide supporting rod 31 is provided with a stop arm 35 which engages the upright 13 to limit the rotation of the supporting rod while the terminal screws 36 are being tightened. The stop arm 35 thus prevents the paper guides 30 from being forced against the pin wheel units while tightening the screws. Sufficient clearance is insured to afford a loose free relation of the marginally punched material upon the feeding pins, from which their escape is prevented by the slotted guides 30.

While in Figs. 4 and 5 the respective strip feeding devices are shown as being actuated in unison at different rates of speed by the interme-

diate gear train, it is to be understood that, if desired, the interconnecting gear train may be entirely omitted as in Fig. 1 wherein the shaft 14 and pin wheel feeding units carried thereby are rotated manually by rotation of the terminal knobs 15.

By mounting the intermediate trnasmission gear 19 upon a swinging arm 24, as shown in Fig. 4, the gear may be oscillated into and out of driving relation with the upper feeding devices, thereby enabling the uppermost feeding units 16 to be operated either in unison with the platen roll 2 and feeding units 7 by the actuation of the line spacing mechanism 3–4, or independently thereof by manual actuation through the knobs 15.

Under certain conditions of use the capability for separate and independent operation of the secondary feeding devices 16 is found quite advantageous.

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 arrangements 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 our invention, we claim:

1. In a conventional typewriting machine or the like, dual pin type feeding devices progressively engageable in longitudinally spaced holes in different strips of material, the pins of the devices carried by one of the feeding devices being arranged to engage the longitudinally spaced holes in one only of the strips of material and the pins of the other of the feeding devices being arranged to engage the longitudinally spaced holes in another only of the strips of material for independently advancing separate strips of series connected forms past a writing position, means for actuating the feeding devices at different speeds whereby said pin type devices serve to limit the advancement of one strip relative to the other to a predetermined ratio, thereby insuring that predetermined areas of the respective strips will be simultaneously presented in registry at the writing position, a guide extending from the writing position to the pin feeding device for guiding the record material, and actuating means for operating the feeding devices simultaneously.

2. In a conventional typewriting machine or the like, dual pin type feeding devices progressively engageable in longitudinally spaced holes in different strips of material, the pins of the devices carried by one of the feeding devices being arranged to engage the longitudinally spaced holes in one only of the strips of material and the pins of the other of the feeding devices being arranged to engage the longitudinally spaced holes in another only of the strips of material for independently advancing separate continuous strips of record material past a writing position, means for actuating the feeding devices at different speeds whereby said pin type feeding devices serve to limit the advancement of one strip relative to the other to a predetermined ratio, thereby insuring that given areas of the respective strips shall be simultaneously presented in registry with each other at the writing position, interconnecting motion transmitting means by which the respective feeding devices are operatively connected for simultaneous operation, said interconnecting means being capable of being rendered inoperative at the will of the operator whereby either feeding device may be operated independently of the other, and record material guiding means extending from one of the feeding devices to the other for guiding the record material.

3. In a conventional typewriting machine or the like, a plurality of pin type feeding and aligning devices engageable in marginally punched holes in different superposed strips of record material for independently advancing the strips through substantially coincident paths of travel past a writing position and actuating means therefor by which one of said pin type feeding and aligning devices is caused to feed one or more record strips at a speed faster than the strip or strips being advanced by the other of said feeding and aligning devices, means for guiding the record material from writing position to each of the pin type feeding devices, and means for synchronizing the action of the respective feeding devices to bring designated areas of the respective strips of record material into registry with each other at the end of definite relative travel movements of the strips.

4. In a writing machine, a plurality of strip feeding and aligning devices for independently advancing superposed strips of record material of different widths at different rates of speed past a writing position, actuating means operating the feeding and aligning means in synchronism whereby designated areas of the respective strips will be simultaneously presented in registry with each other at the writing position, means for guiding the strips from the writing position to their respective strip feeding and aligning devices, and means whereby one feeding and aligning device may be actuated independently of the other at the will of the operator.

5. In a typewriting machine or the like wherein superposed strips of record material are advanced through coincident paths of travel past the writing position beyond which the strips pursue divergent paths of travel, including a platen roller about which the strips are advanced past the writing position, a group of feeding pins carried by the platen roller and engageable with some of the strips to the exclusion of others for positively advancing the engaged strip past the writing position, a second feeding device engageable with said other strip or strips for advancing such other strip past the writing position to the exclusion of the first mentioned strip, means for actuating the platen and the second feeding device, and guide means for guiding said other strip from the writing position to the feeding device, said guide means including a member extending parallel to the platen supporting a pair of guide members extending from the writing position guiding said other strip to its feeding device.

6. In a typewriting machine or the like where-

in superposed strips of record material are advanced through coincident paths of travel past the writing position beyond which the strips pursue divergent paths of travel, including a platen roller about which the strips are advanced past the writing position, a group of feeding pins carried by the platen roller and engageable with one of the strips to the exclusion of the other for positively advancing the engaged strip past the writing position, a second group of feeding pins offset with respect to the platen engageable with such other strip for positively advancing such other strip past the writing position to the exclusion of the first mentioned strip, means for actuating at least one of said feeding devices, and guide means for guiding said other strip from the writing position to the second group of feeding pins, said guide means including a rod extending parallel to the platen supporting guide members extending from the writing position to said second group of feeding pins.

7. In a typewriting machine or the like wherein superposed strips of record material are advanced through coincident paths of travel past the writing position beyond which the strips pursue divergent paths of travel, including a platen roller about which the strips are advanced past the writing position, a group of feeding pins carried by the platen roller and engageable with one of the strips to the exclusion of the other for positively advancing the engaged strip past the writing position, a second group of feeding pins arranged in pairs and adjustably mounted relatively to each other, engageable with such other strip for positively advancing such other strip past the writing position to the exclusion of the first mentioned strip, means for driving at least one of said groups of feeding pins and guide means for guiding said other strip from the writing position to said second group of feeding pins, said guide means including a pair of members adjustably mounted to cooperate with said second group of feeding pins to advance said other strip past writing position.

8. In a typewriting machine or the like wherein superposed strips of record material are advanced through coincident paths of travel past the writing position beyond which the strips pursue divergent paths of travel, including a platen roller about which the strips are advanced past the writing position, a group of feeding pins carried by the platen roller and engageable with one of the strips to the exclusion of the other for positively advancing the engaged strip past the writing position, a second group of feeding pin devices including at least a pair of pin wheels mounted for axial adjustment engageable with strips of various widths for positively advancing said strips past the writing position to the exclusion of the first mentioned strip, guide discs disposed intermediate the feeding wheels for supporting the record material, and guide means engaging the side of the strips opposite said discs for guiding the strips from the writing position to said pin wheel.

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