Feb. 2, 1943. A. W. METZNER 2,309,656

PIN WHEEL FEED

Filed Dec. 9, 1937 2 Sheets-Sheet 1

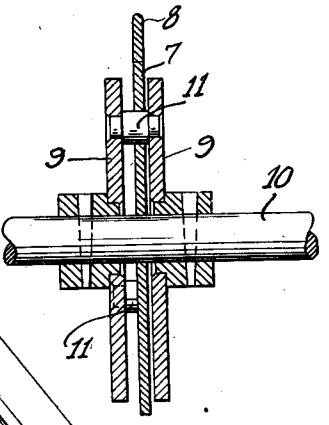


Fig. 4

Fig. 1

Fig. 8

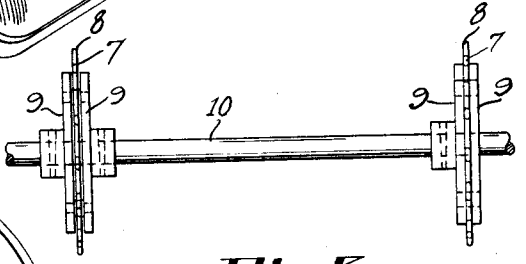


Fig. 5

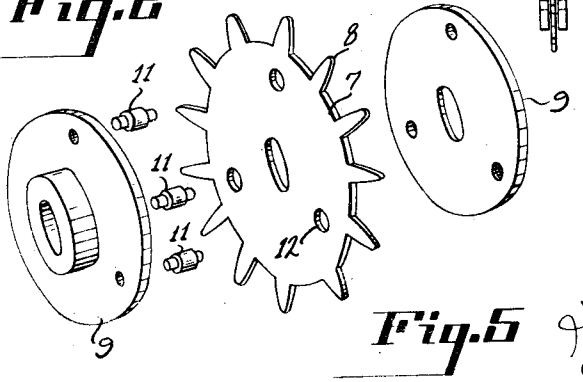


Fig. 6

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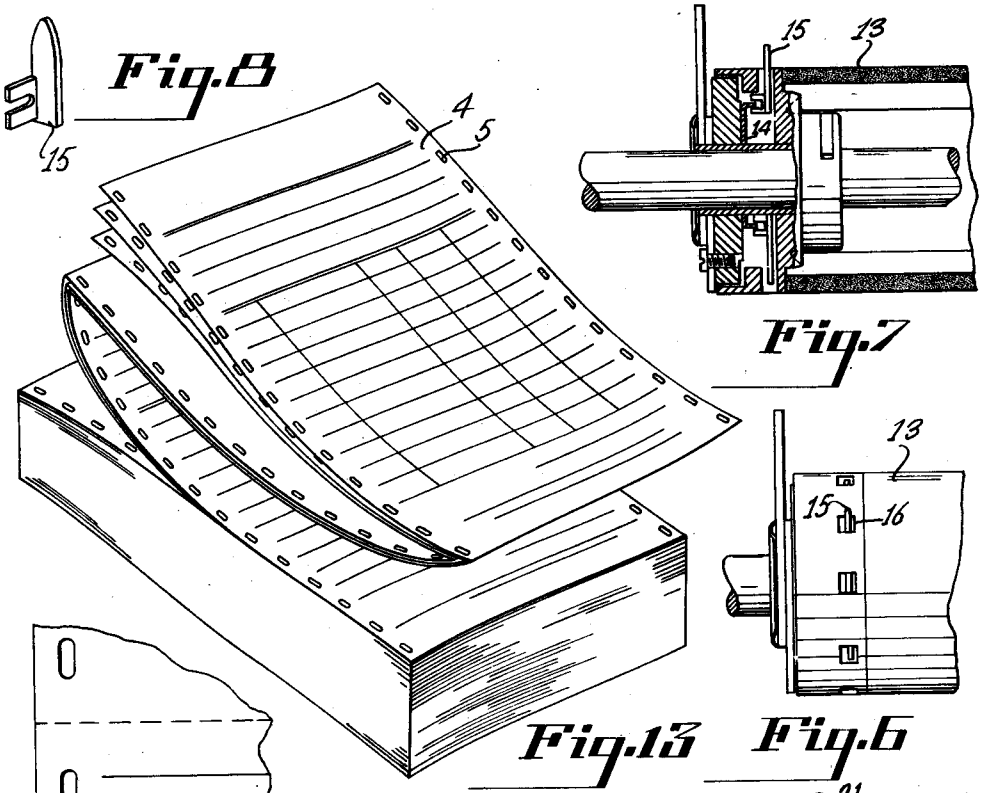


Fig. 8

Fig. 7

Fig. 13

Fig. 6

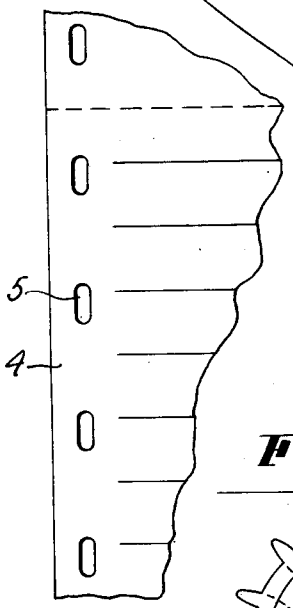


Fig. 14

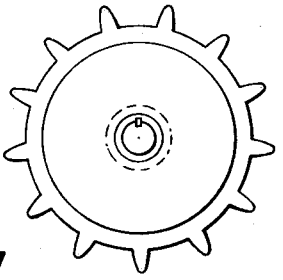


Fig. 9

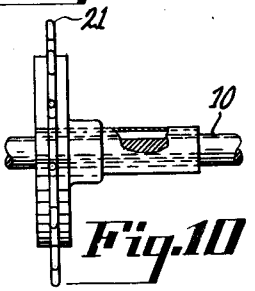


Fig. 10

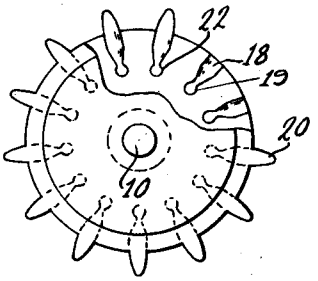


Fig. 11

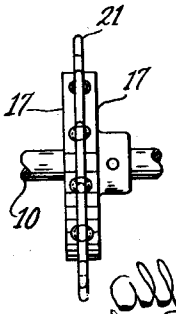


Fig. 12



Fig. 15

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Patented Feb. 2, 1943 2,309,656

UNITED STATES PATENT OFFICE

2,309,656

PIN WHEEL FEED

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Application December 9, 1937, Serial No. 179,021

11 Claims. (Cl. 271—2.3)

This invention pertains to strip feeding means for writing and imprinting apparatus, wherein a continuous strip of record receiving material having therein a succession of longitudinally spaced apertures is advanced past a record receiving position by progressive engagement of a traveling series of feeding pins in the longitudinally spaced apertures thereof, and comprises an improved pin wheel or sprocket feeding unit and correspondingly apertured material for use therewith.

It has long been the practice to feed one or more strips of record material having therein marginally punched round holes over a writing tablet or about a rotary platen and past an imprinting position by a sprocket or pin wheel having round tapered pins, as for example those shown in Sherman Patents Nos. 1,254,368, 1,372,460, 1,425,907, and others.

However, the necessary relatively large size of the round holes renders them conspicuous and materially reduces the available record area of the strip by shortening the writing lines. The removal of the marginal punched areas as sometimes is resorted to involves an additional operation and excessive waste. Moreover, the character of the conventional pin wheels or sprockets often fails to compensate for excessive variations in alignment of the holes and the width of the record strips due to expansion and contraction or inequalities of manufacture.

The expansion and contraction of paper strips employed for record purposes, especially when the strips are of considerable width, as used in tabulating and computing machines, addressograph and other imprinting apparatus, presents a troublesome problem. Prior to printing and punching, the material is kept in tightly wound stock rolls in a comparatively dry condition as it comes from the mills. While in the stock rolls it is not exposed to atmosphere and does not readily absorb any appreciable degree of moisture. Consequently, when punched the material is ordinarily in condition of approximately maximum contraction. However, while being printed and punched it is exposed to atmospheric conditions. Many localities wherein the material is to be used after manufacture, are damp or subject to rainy weather, and the storage place may be in a mill or factory wherein manufacturing conditions necessitate a moist humid air condition. Under such conditions, the material printed and punched while dry absorbs moisture and expands to such degree that it will no longer fit the spaced pin feed devices for which it was originally intended, unless allowance has been made for such expansion. Inasmuch as the degree of expansion varies with changing atmospheric conditions and some grades of material are more susceptible than others to absorption of moisture and consequent expansion, it is difficult indeed to anticipate such dimensional variations. The present floating pin feed construction wherein the feeding pins may automatically change their plane of travel to coincide with that of the apertures to be engaged, solves this problem and renders the feeding devices universally adaptable to varying conditions.

The present design of pin wheel or feeding sprocket enables the use of relatively narrow apertures closely adjacent to the marginal edge of the record strip, which not only occupy less of the available area thereof, but are less noticeable.

In the present feeding unit there are contemplated floating or laterally movable feeding pins or teeth which will automatically accommodate themselves to relative displacement or unalignment of successive feeding apertures in the record strip, and which may be economically manufactured at low costs with minimum machine operations as by stamping process, wherein an entire group of feeding pins or teeth are laterally adjustable collectively or wherein the pins or teeth are individually and automatically adjustable laterally one relative to another.

The object of the invention is to improve the construction, as well as the means and mode of operation, of pin type strip feeding devices whereby they may not only be economically manufactured, but will be more efficient in use, automatic in operation, uniform in action, of simple construction and unlikely to get out of repair.

A further object of the invention is to provide a pin type feeding device which will automatically adjust itself laterally to compensate for expansion and contraction of the record strips being fed and inequalities in the relation of successive apertures therein engaged by the feeding pins or teeth, by automatically adjusting their position to the changed position of the feed holes.

A further object of the invention is to provide a pin type feeding unit wherein the feeding pins or teeth are individually laterally adjustable one relative to another.

A further object of the invention is to provide a pin type feeding device wherein a group of the feeding pins or teeth are collectively adjustable laterally.

A further object of the invention is to provide a pin type feeding device of which at least a

portion of the parts may be economically formed by stamping operations.

A further object of the invention is to provide an improved form of punched record strips wherein the feeding apertures are inconspicuous and occupy but a minimum area of the strip in close relation to the marginal edges thereof, leaving a greater proportion of the strip available for record purpose.

A further object of the invention is to provide a pin type feeding device and apertured record material usable therewith having the advantageous structural features and meritorious characteristics herein mentioned.

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 equivalents as hereinafter described and set forth in the claims.

In the accompanying drawings, wherein are shown the preferred, but obviously not necessarily the only forms of embodiment of the invention,

Fig. 1 is a perspective view of a popular type of portable manifolding register in which the present invention is embodied.

Fig. 2 is a sectional view of a portion of the register illustrated in Fig. 1.

Fig. 3 is an elevation of a pair of pin wheels embodying the present invention, removed from a register or imprinting apparatus.

Fig. 4 is a detail sectional view of a pin wheel or sprocket assembly embodying the present invention.

Fig. 5 is a detail disassembled view of the pin wheel parts.

Fig. 6 is a front elevation.

Fig. 7 is a sectional view of a writing or imprinting machine platen roll having radially disposed disappearing feeding pins, which, in accordance with the present invention, are individually laterally adjustable additionally to their radial adjustments.

Fig. 8 is a detail perspective view of one of the adjustable pin elements employed in the construction illustrated in Figs. 6 and 7.

Figs. 9 and 10 are respectively side and edge elevations of a further development, wherein the pin wheel unit is bodily adjustable laterally to accommodate variations in alignment of the apertures, or slight variations in the width of the record strip.

Figs. 11 and 12 are respectively side and edge elevations of a further modified embodiment of the invention having individually adjustable feeding pins.

Fig. 13 is a perspective view of a packet of stationary for use with the present type of feeding pins or teeth.

Fig. 14 is an enlarged fragmentary view of the marginally punched stationary.

Fig. 15 is a detail perspective view of one of the pins employed in the construction shown in Figs. 11 and 12.

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

While the present invention is herein shown and described in its relation with autographic or manifolding registers, it is to be understood that such disclosure is for illustrative purposes only and with no intent to unduly limit the invention which is applicable to a wide range of progressive strip feeding purposes. For use with continuous form stationery, the device is applicable to various types of writing and imprinting machines including typewriters, tabulating and billing machines, addressograph mechanisms, check writers and analogous apparatus wherein a strip of record material is progressively advanced past a writing position at which it receives a succession of longitudinally spaced inscriptions or recorded data. The present floating type of pin wheel or sprocket construction is also applicable to purposes other than feeding of continuous form stationery.

Referring to the autographic register illustrated in Figs. 1 and 2, 1 indicates the case or housing having in its top an opening 2, beneath which is the writing tablet 3, over which continuous strip stationery 4 is advanced from a supply compartment within the housing into writing position upon the tablet 3. The stationery strips 4, of which a packet is shown in Fig. 13, are provided with marginal longitudinally spaced apertures 5 for engagement of pin type feeding means, which in the present instance comprises the pin wheel unit forming the subject matter hereof.

In the particular type of autographic register illustrated, a pair of pin wheel feeding devices are rotatively mounted in the forward portion of the case or housing beneath the writing tablet, which is provided with slots 6 through which the feeding pins or teeth project into feeding engagement in the marginal apertures 5 of the strips 4.

In lieu of the conventional round tapered feeding pins having a fixed plane of rotation in which they engage in round holes in the record material substantially larger than the pins, the present feeding pins are flat and beveled or tapered. They are loosely mounted for to and fro lateral adjustment to automatically accommodate themselves to variations of position of the marginal apertures 5 due either to expansion or contraction of the material or to inequalities in the manufacture of the stationery.

Referring particularly to Figs. 3, 4 and 5, there is shown therein a relatively thin flat feeding disc 7 having about its periphery a succession of integral circumferentially spaced radial teeth or pins 8 for engagement in the apertures 5 of the stationery. The disc 7 and feeding teeth 8 are preferably stamped from sheet metal, fiber, composition or other suitable material. Such disc is interposed between two spaced discs 9—9 secured to a rotary shaft 10 and interconnected with each other by spacer studs 11 which extend loosely through spaced holes 12 in the toothed disc 7 and provide rotary driving engagement of the toothed disc with the spaced discs 9 and shaft 10. The spacing between the discs 9—9 is somewhat greater than the thickness of the feeding disc 7, which is capable of a lateral floating movement between the discs on the spacer studs 11. Such space is only sufficient to permit a range of movement ample to compensate for variations of expansion and contraction of the stationery material and probable inequalities of manufacture. It is not sufficient, however, to permit the toothed feeding disc 7 to become cocked or inclined to such degree that it will not readily right itself and respond to lateral guiding influence of the apertured strip.

By enabling the feeding teeth to be formed by stamping, the cost of manufacture of pin wheels or sprocket feeding devices is materially decreased. Such method of economical construction is desirable whether the feeding disc is to be permitted free lateral adjustment as described

or is to be fixedly held against such movement. Such pin wheel or sprocket units are ordinarily used in pairs. If so, it is not necessary that both sprockets or pin wheels shall be of the free floating type. As illustrated in Fig. 3, one of the units, that shown at the left, is of the floating type, while that at the right is of fixed construction wherein the feeding disc 7 is immovably clamped between the opposite discs 9—9. For some conditions of use and for feeding some materials, or in event only one pin wheel is used, the fixed construction shown at the right of Fig. 3 will be quite suitable and satisfactory. However, when two relatively spaced pin wheels or sprockets are simultaneously engageable in apertures in the opposite margins of the strips 4, as is the usual construction, one of the units is preferably of rigid form while the other is of adjustable or floating construction as is illustrated in Fig. 3.

The application of floating or laterally adjustable feeding pins to a pin type platen roll for a writing or imprinting machine is illustrated in Figs. 6, 7 and 8. The construction is of the type described and claimed in Patent No. 2,000,649, of May 7, 1935, wherein a series of radially disposed feeding pins are progressively extended and retracted within circumferentially spaced holes in the platen roll by rotation of the latter. This is effected by providing within the platen roll 13 a temporarily stationary cam 14 about which the radially adjustable feeding pins 15 are caused to travel as the roll rotates.

In the present construction, the feeding pins 15 are flat and the circumferentially spaced holes 16, within which the pins are mounted for reciprocation, are somewhat wider than the thickness of the pins to permit to and fro lateral motion within the limits of the holes. The pins 15 which may be stamped from sheet material are formed with a slotted wing 16 within the slot of which the lateral flange of the cam 14 engages. As the pins travel about the stationary cam 14 they are reciprocated into and out of the platen roll and are free for lateral adjustment additional to their reciprocatory motion. The slot in the wing 16 and cam flange engaging therein are of sufficient depth to retain operative interengagement throughout the full range of lateral movement of the pins permitted by the size of the holes 16.

In this instance, the pins 15 are free for individual lateral movement each relative to the others, whereas in the previously described construction embodying the axially adjustable toothed disc 7, the entire series of peripheral teeth or pins 8 are collectively adjustable.

A further variation of the individually adjustable pins is that illustrated in Figs. 11 and 12, wherein two discs 17 fixedly connected with each other have in their contiguous faces registering radial slots 18, which at their inner ends communicate with spherical sockets 19. The pins 20 flattened at their outer ends 21 and are formed with spherical heads 22 at their inner ends engageable in the sockets 19 for to and fro swinging or wobble movement within the limits of the registering slots 18. Each pin 20 is capable of a limited individual to and fro adjustment independently of the other pins. Such movement influenced by the relative positions of succeeding apertures in the strips enables automatic accommodation of the pin wheel to different locations of the apertures incident to expansion or contraction and imperfections of manufacture of the stationery.

In Figs. 9 and 10 there is shown a pin wheel having rigidly mounted pins, wherein the entire wheel is bodily movable in an axial direction to accommodate the wheel to the mentioned variations of the stationery. In this construction, the pin wheel unit is of the particular construction shown at the right of Fig. 3 and is keyed or splined upon the shaft 10 for free to and fro sliding motion, to maintain its agreement with the apertures of the stationery, but has positive driving engagement with the shaft for unison rotation.

As shown in Figs. 13 and 14 the marginally punched stationery is provided with a succession of longitudinally spaced elongated apertures or slots 5. Such slots being relatively narrow may be located closely adjacent to the lateral margin of the strip where they will occupy materially less portion of the strip than the usual round holes and such narrow slot like apertures are much less conspicuous.

Whether the record material is expanded or contracted by varying weather conditions or the apertures are misplaced due to imperfections in manufacture, there will be no decided or abrupt offset of succeeding apertures and points of the pins will readily find the succeeding apertures, and by lateral pressure upon the side of the aperture slot will shift laterally into a common plane with the aperture. The lateral adjustment of the feeding pins or teeth, whether affected individually or collectively, is due to the camming influence of the engaging pin or tooth on the side of the aperture. Due to such lateral pressure of the record material and feeding pin one against the other, the pin will yield laterally until it assumes a plane of travel coincident with the marginal apertures.

While for the reasons stated flat feeding pins cooperating with slotted apertures in the record material are quite desirable, the present invention is not limited thereto, but the floating pin construction therein described, whether individually or collectively adjustable, may embody conventional round tapered pins engageable in round longitudinally spaced holes in the record material. Since such round tapered pins and round holes are well known in this art, and their illustration in the present yielding or floating pin feed construction would necessitate substantial duplication of the present drawings, such specific illustration has been omitted, but the use of such floating round pins is deemed to be within the scope of the invention as expressed in the claims hereof.

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. In a pin type feeding device for feeding continuous strips of material having therein longitudinally spaced holes, a toothed disc, the teeth of which are progressively engageable in the spaced holes in the strips and a pair of spaced mounting discs spaced apart a distance greater than the thickness of the toothed disc between which the toothed disc is interposed and with which the toothed disc is connected for unison rotation.

2. In a pin type feeding device for feeding continuous strips of material having therein longitudinally spaced holes, a toothed disc, the teeth of which are progressively engageable in the spaced holes in the strip and a pair of spaced mounting discs spaced apart a distance greater than the thickness of the toothed disc between which the tooth disc is interposed, eccentrically disposed studs interconnecting the mounting discs on which the toothed disc is slidingly adjustable laterally into agreement with the holes in the strip and serving to drive the toothed disc in unison with the rotation of the mounting discs.

3. In a pin type feeding device for feeding continuous strips of material having therein longitudinally spaced holes, a toothed disc, the teeth of which are progressively engageable in the spaced holes in the strips and a pair of spaced mounting discs, and a mounting therefor with which the toothed disc is connected for axial shifting adjustment relative thereto into agreement with the holes in the strips and for unison rotation therewith.

4. In a pin type feeding device for advancing continuous relatively adjustable superposed strips of material each having therein a succession of longitudinally spaced lineal slots for engagement of traveling feeding pins, a relatively thin flat disc including a succession of radial spaced flat teeth progressively engageable in the spaced slots of the strips, and a pair of rotary mounting discs, between which the flat toothed disc is interposed and with which the disc is connected for unison rotation.

5. In a pin type feeding device for advancing continuous strips of material having therein a succession of longitudinally spaced lineal slots for engagement of traveling feeding pins, a relatively thin flat disc including a succession of radial spaced flat teeth progressively engageable in the spaced slots of the strips, and a pair of rotary mounting discs, spaced apart a distance substantially greater than the thickness of the disc, between which the toothed disc is interposed in free relation for lateral shifting motion into agreement with the slots in the strips, and driving means interconnecting the toothed disc with the mounting discs for unison rotation in different positions of lateral adjustment thereof.

6. In a pin type feeding device for advancing and aligning a plurality of superimposed continuous strips of writing material having therein a succession of longitudinally spaced lineal slots for engagement of traveling feeding pins, a relatively thin flat disc including a succession of radial spaced flat teeth progressively engageable in the spaced slots of the strips, and a pair of rotary mounting discs, between which the flat toothed disc is fixedly clamped for unison rotation therewith.

7. In a pin type feeding device for advancing and aligning a plurality of superposed continuous strips of writing material having therein a succession of longitudinally spaced holes for engagement of traveling feeding pins, a pin wheel including a relatively thin flat disc having a succession of radially disposed spaced flattened pins, a drive shaft upon which the disc is mounted for to and fro axial movement relative to the shaft into agreement with the holes in the strip and an operative driving means interconnecting the shaft and the disc for unison rotation in different positions of lateral adjustment of the disc on the shaft including a pair of rotary mounting discs spaced apart a distance greater than the thickness of the disc.

8. As an article of manufacture, a record strip to receive a succession of written or imprinted legends having therein a succession of longitudinally spaced elongated slots in close proximate relation to and having their major axes parallel with the longitudinal margin of the strip for progressive engagement thereof of a series of traveling flattened feeding pins by which the strip is advanced past a record receiving position.

9. A manifolding assembly including a plurality of relatively adjustable superposed record strips each having a succession of longitudinally spaced record receiving areas to be progressively aligned and registered at a record receiving position with like areas of another strip of the assembly, each strip having therein a succession of longitudinally spaced elongated slots in close proximate relation to and having their major axes parallel with the longitudinal margin of the strip for progressive engagement thereof with a series of traveling flat feeding pins by which the strips are advanced past a record receiving position.

10. A manifolding assembly including a plurality of relatively adjustable superposed record strips each having a succession of longitudinally spaced record receiving areas to be progressively aligned and registered at a record receiving position with like areas of another strip of the assembly, each strip having therein a succession of spaced longitudinally elongated marginal slots for progressive engagement of the strip with a series of traveling flat feeding pins by which the strips are advanced past a record receiving position.

11. In a pin type feeding device for continuous superposed strips of record material having therein longitudinally spaced feeding configurations, spaced rotary discs mounted for rotation in predetermined planes and held against axial movement therefrom, and a plurality of strip engaging pins mounted intermediate the discs for limited axial movement independently of the rotary disc but for unison travel motion therewith.

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