Nov. 22, 1955 J. T. DAVIDSON 2,724,280

STRIP FEEDING DEVICE

Filed May 13, 1952

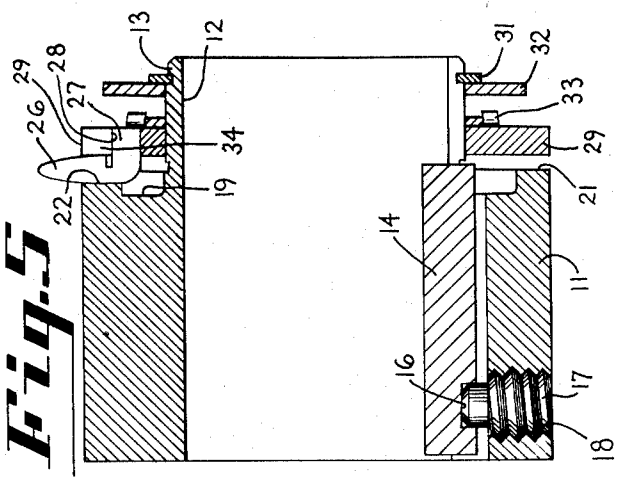


Fig. 5

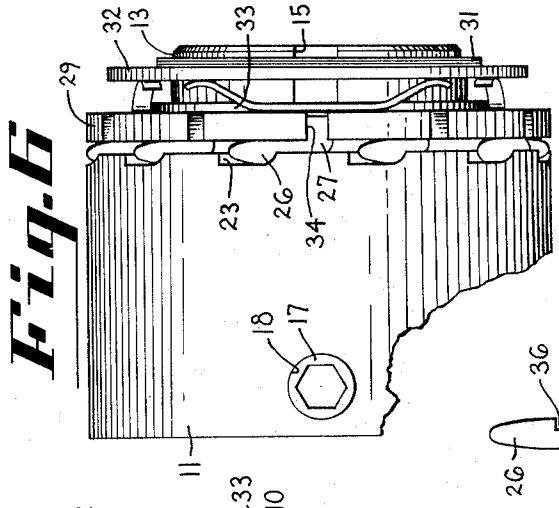


Fig. 6

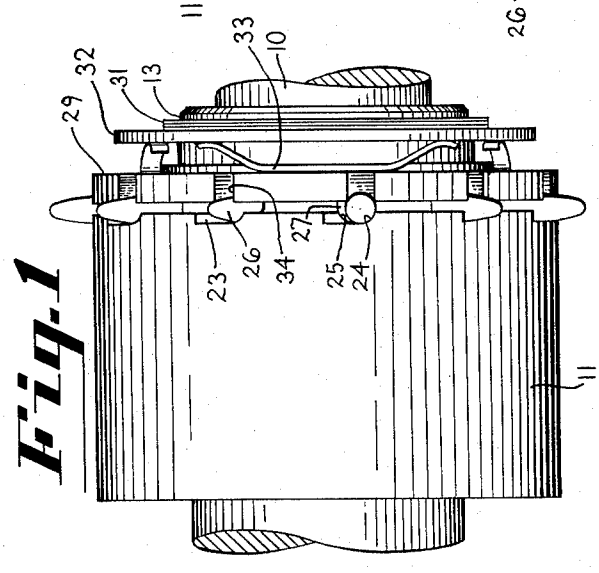


Fig. 1

Fig. 8

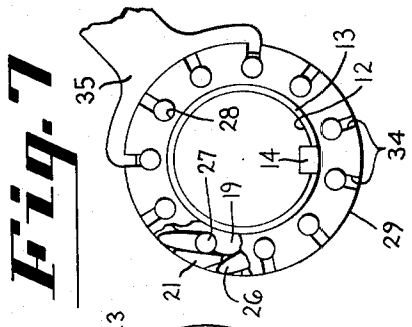


Fig. 7

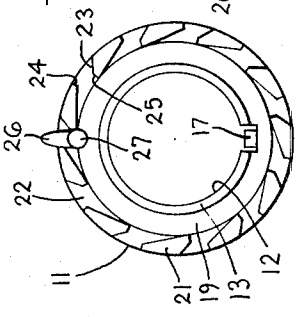


Fig. 4

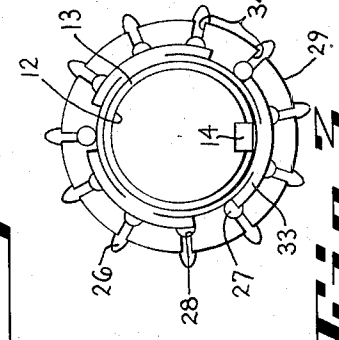


Fig. 3

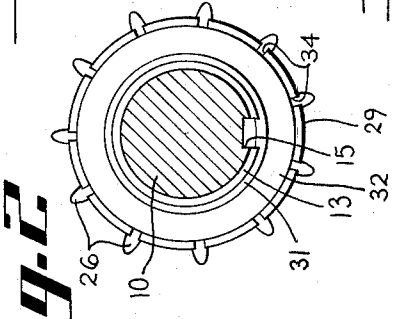


Fig. 2

INVENTOR
JOHN T. DAVIDSON
BY Tom Walker
ATTORNEY

United States Patent Office 2,724,280 Patented Nov. 22, 1955

2,724,280

STRIP FEEDING DEVICE

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

Application May 13, 1952, Serial No. 287,550

12 Claims. (Cl. 74—243)

This invention relates to pin type strip feeding devices, particularly as used in the feeding of continuous, series connected marginally perforated record forms. The invention has special reference to pin feed devices wherein the pins may be simultaneously retracted or extended, such devices being mounted on a rotary shaft, and rendered alternatively effective and ineffective. Thus a number of such devices may be mounted on a shaft, with each device being individually adjustable so that some may be made ineffective and others effective, in accordance with the width of the record forms being fed. Also a machine might present fixed end wheels and one or more auxiliary pin wheels adjustable relatively to the fixed pin wheels. Thus record forms of different widths can be accommodated by selecting varying combinations of fixed and adjustable pin wheels. When the auxiliary pin wheel or pin wheels are not in use it is desirable to retract the feeding pins thereof beneath the surface of the wheel so as to avoid interference with the record forms.

The object of the invention is to simplify the construction as well as the means and mode of operation of strip feeding devices, whereby such devices may not only be economically manufactured, but will be more efficient and satisfactory in use, adaptable to a wide variety of applications, having relatively few parts and be unlikely to get out of repair.

A further object of the invention is to present a generally new retractable pin type feed device, especially characterized by a novel means for mounting and controlling the feeding pins.

Another object of the invention is to provide a positive means for effecting quick movement of the feeding pins, to and from projecting or effective position, utilizing a combination of tilting and sliding movements of the pins.

Still another object of the invention is to provide a novel means for locating and holding the pins in projecting or feeding position.

A still further object of the invention is to adapt devices of the kind described for a more facile and efficient use in conjunction with trimmer means for removing perforate margins of the strips.

A further object of the invention is to provide a strip feeding device of the character described, possessing the advantageous structural features, the inherent meritorious characteristics and the mode of operation herein described.

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, as hereinafter described or illustrated in the accompanying drawings, or their equivalents.

Referring to the accompanying drawing, wherein is shown the preferred but obviously not necessarily the only form of embodiment of the invention,

Fig. 1 is a view in front elevation of a pin wheel unit mounted on a pin wheel shaft, in accordance with the instant invention;

Fig. 2 is an end view of the pin wheel unit, at a reduced scale;

Fig. 3 is a view similar to Fig. 2, with the washer forming the base for the thrust spring removed;

Fig. 4 is a view similar to Fig. 3, with the thrust spring and the adjustment collar also removed;

Fig. 5 is a view in longitudinal section of the pin wheel unit, showing the parts positioned as shown in Fig. 1, and at the same scale;

Fig. 6 is a view similar to Fig. 1, with the feeding pins retracted;

Fig. 7 is a view similar to Fig. 3, with the thrust spring removed and showing a spanner wrench applied to the adjustment collar; and

Fig. 8 is a detail view in side elevation of a feeding pin.

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

Referring to the drawings, there is shown in Fig. 1 an assembled strip feeding device embodying the present invention, mounted on a rotary shaft **10**. The feeding device comprises a smooth surfaced relatively broad body **11** having a through longitudinal bore **12**. At one end thereof the body is reduced in diameter to define a shoulder **13**.

A substantially rectangular key **14** is longitudinally disposed in the bore **12** and is bodily received in a longitudinal keyway **15** in the shaft **10**. The key **14** has a recess **16** in which is engaged the inner end of a set screw **17** mounted in a radial opening **18** in the body **11**. The interengagement of the screw **17** and recess **16** serves to locate the key **14** relatively to the body **11**. Further, rotary motion between the key **14** and the body **11** is prevented, and, since the key **14** is mounted in keyway **15**, relative rotary motion between the body **11** and shaft **10** also is prevented. A substantially integral relation between the parts is obtained by tightening the screw **17** downward upon the key **14**, seating this member firmly in the keyway **15**. The body **11** accordingly is rotatable with the shaft **10** and further normally is locked against relative longitudinal motion. By loosening the set screw **17**, the body **11**, of course, may be readjusted lengthwise along the shaft **10**.

The stepped down end of the body **11** is formed with a circular groove **19** defining an annular land **21**. The land **21** is in turn cut by a circumferential series of radial slots **22**. The latter are intersected by diagonal slots **23** opening at their one ends into the grooves **19** and opening at their outer ends through the surface of the body **11**. The radial slots **22** have a half round formation, and their intersection by the diagonal slots **23** is such as to provide radially spaced apart shoulders **24** and **25**.

The radial slots **22** are arranged to receive cylindrical tapered-nose feeding pins **26** held in an upright position by the shoulders **24** and **25**. The lower or inner ends of the feeding pins **26** extend into the annular groove **19** and each has a turned over or pivot portion **27** substantially at right angles to the main body portion of the pins. Such pivot portions **27** are received in respective holes **28** near the periphery of a collar **29** rotatably mounted on the reduced shoulder portion **13** of the body **11**. There is a circumferential series of the holes **28** corresponding in number to the radial slots **22**. Also mounted on the reduced diameter shoulder portion **13**, and seated in a groove in the periphery thereof is a retaining ring **31**. An abutment washer **32** limits against the retaining ring **31** and provides a seat for a thrust spring **33**, interposed between the washer **32** and the collar **29**, and exerting an axial pressure upon the collar **29** toward the adjacent end of the body **11**. By reason

of such pressure the feeding pins **26**, which occupy positions between the collar **29** and the body **11**, are pressed against the annular land **21** and may be considered to be yieldingly gripped between the land **21** and the collar **29**.

Extending outwardly from each pivot hole or opening **28** in the collar **29** is a slot **34**. The slots **34** are smaller in width than the opening **28** so that the feeding pins **26** cannot drop out of the collar **29**. The slots **34** are, however, of sufficient width partly to embrace the rounded vertical portion of the feeding pins **26** and so exert a detenting action resulting from and supplementing the pressure of the spring **33** and the static reactant force provided by the body **11**. Thus, with the feeding pins **26** in a radial position relative to the axis of the collar **29** the pins are aligned with the slots **34** and are engaged thereby to resist relative rocking motion of the pins as well as rotary motion of the collar **29** upon the reduced diameter shoulder **13**.

As indicated in Fig. 7, the slots **34** may serve the further function of providing a means of engagement of the collar **29** by a spanner wrench **35** to turn the collar **29** relatively to the body **11** upon the reduced diameter shoulder **13**. The wrench may be readily engaged with the collar in any rotative position of adjustment of the pin feeding device.

With the feeding pins **26** positioned as above described, that is in a position radial with respect to the axis of the collar **29** and the body **11**, the pins are seated in the radial slots **22** in the annular land **21**. The pivot holes **28** for the pins **26** are in this position of the parts aligned with the slots **22** so that the feeding pins **26** are in an upright or projecting position with respect to the body **11**, the upper ends of the pins extending above the surface of the body in feeding position. The parts are, moreover, yieldingly locked in this position by the spring **33** which, as before described, acts through the collar **29** to hold the feeding pins frictionally in the slots **22**.

Referring to Fig. 4, a rotary adjustment of the collar **29** in a clockwise direction is prevented by reason of the shoulders **24** and **25** of the slots **22** which preclude rocking motion of the feeding pins **26** in a counterclockwise direction. Rotary adjustment of the collar in the opposite or counterclockwise direction is possible, however, and when initiated causes pivotal or rocking movement of the pins about the respective shoulders **24**. The pins **26** may in this manner be brought substantially into alignment with the diagonal slots **23**, continued counterclockwise movement of the collar **29** resulting in the pins **26** sliding inward in the slots **23** to bring the outer ends thereof beneath the surface of the body **11**. The position of the parts with the feeding pins so retracted is shown in Figs. 6 and 7.

Return motion of the collar **29** in a clockwise direction results in a reverse motion of the pins **26**. Thus there is an initial sliding movement in the slot **23**, followed by a rocking movement about the shoulder **25** and terminating with the feeding pins in an upright projecting position as the pivot holes **28** in the collar **29** are brought into alignment with the half round slots **22**. The slots **34** serve as a locating means in this connection and the arrival of the collar **29** in the described position will be a snap action as the slots **34** achieve aligned, cooperative relation with the pins **26**. The pins are accordingly held and steadied in projecting position. The position of the parts in retracted position is yieldingly maintained by the spring **33** which exerts a continuous pressure upon the collar **29**, which in turn presses the pins **26** against the annular land **21**.

The diameter of the body **11** and the diameter of collar **29** are the same. The collar is in effect a continuation of the body, on the opposite side of the pins **26**. The surface of the body is smooth whereby rotary slitters, often used in conjunction with pin type feeding devices may have a bearing directly on the feeding device.

In addition, with further regard to the engagement of the feeding pins **26** by the slots **34**, it will be noted in Fig. 8 that each pin **26** is undercut by a slot **36** at the base of the main body portion of the pin. The collar **29** is accordingly enabled to achieve an intimate contacting relation with the pins **26** in order to insure a better engagement of the slots **34** therewith and to provide a more closely adjacent relationship between the collar and the surface of the body **11**.

Reference is made to copending applications Serial Nos. 138,226 and 138,233, filed January 12, 1950, now matured into Letters Patents Nos. 2,663,196 and 2,663,197, respectively, and also application Serial No. 287,549, filed concurrently herewith, for a disclosure of other structures of a similar nature.

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 but one of several modes of putting the invention into effect.

Having thus described my invention, I claim:

1. A pin type strip feeding device wherein a series of feeding pins are adjustably mounted for simultaneous movement into and out of operative position, including a pin supporting body, a circumferential series of radial slideways in said body, opposed cut-out portions in said slideways in radially offset relation to one another, pins in said slideways, and a collar carried by said body for relative rotary movement, said pins being pivotally connected at their one ends to said collar to be rocked thereby into and out of said cut-out portions.

2. A pin type strip feeding device wherein a series of feeding pins are adjustably mounted for simultaneous movement into and out of operative position, including a cylindrical body having a reduced diameter shoulder at one end thereof, a collar rotatably mounted on said shoulder, a circumferential series of feeding pins mounted between said collar and said body, said pins being pivotally connected at their inner ends to said collar, and a grooved formation in said body receiving said pins and shaped to effect retracting and extending motions of said pins with respect to the circumferential surface of said body in response to relative rotary adjustment of said collar.

3. A pin type strip feeding device wherein a series of feeding pins are adjustably mounted for simultaneous movement into and out of operative position, including a cylindrical body having a reduced diameter shoulder at one end thereof, a collar rotatably mounted on said shoulder, spring means urging said collar toward said one end of said body, a circumferential series of pins gripped by the pressure of said spring means between said collar and the body, said pins being pivotally connected at their one ends to said collar and arranged to have their opposite ends project above the surface of said body to an operative or feeding position, and abutment formations on said one end of the body engageable with each of said pins intermediate the ends thereof for effecting retracting and extending movements of said pins relative to the surface of the body in response to to and fro rotary motion of said collar relative to said body.

4. A pin type strip feeding device according to claim 3, characterized in that said abutment formations comprise a pair of radially spaced apart abutments for each

pin, each pair of abutments being further spaced apart in a circumferential direction to define radial slideways for said pins within which said pins may rock bodily in response to shifting of the point of pivotal connection of said pins to said collar into and out of alignment with said slideways.

5. A pin type strip feeding device wherein a series of feeding pins are adjustably mounted for simultaneous movement into and out of operative position, including a body having a reduced diameter shoulder at one end thereof, a collar rotatably mounted on said shoulder, spring means urging said collar toward said one end of the body, a circumferential series of feeding pins mounted between said collar and said one end of the body to have their outer ends project radially above the surface of the body, pivotal connections between the inner ends of said pins and said collar, and abutment shoulders on said one end of the body engageable with said pins intermediate the ends thereof to effect a tilting motion of said pins beneath the surface of the body in response to movement of said collar relative to said body in one direction.

6. A pin type strip feeding device wherein a series of feeding pins are adjustably mounted for simultaneous movement into and out of operative position, including a cylindrical body having a reduced diameter shoulder at one end thereof, a circumferential series of radial slots in said one end of the body, diagonal slots intersecting said radial slots and opening through the outer surface of the body, said diagonal slots defining radially spaced apart shoulders in said radial slots, feeding pins received in said radial slots to have their outer ends project above the surface of the body and tiltable relatively to said spaced apart shoulders into said diagonal slots to withdraw the outer ends of said feeding pins beneath the surface of said body, and a collar rotatably mounted on said reduced diameter shoulder and pivotally connected to the inner ends of said pins, said collar being rotatably adjustable to effect tilting movements of said pins out of and back into said radial slots.

7. A pin type strip feeding device according to claim 6, characterized by spring means urging said collar toward said one end of the body.

8. A pin type strip feeding device wherein a series of feeding pins are adjustably mounted for simultaneous movement into and out of operative position, including a cylindrical body having a reduced diameter shoulder at one end thereof, a collar rotatably mounted on said shoulder and spring urged against the said one end of said body, a circumferential series of feeding pins interposed between said collar and said one end of the body, said pins being pivotally connected at their inner ends to said collar, a circumferential series of radial slots in said one end of the body receiving said pins, and diagonal slots intersecting said radial slots, relative rotatary adjustment of said collar resulting in said pins occupying alternative positions in said radial slots and in said diagonal slots.

9. A pin type strip feeding device according to claim 8, characterized in that said collar has a circumferential series of pivot positions for said pins, the aforementioned rotary adjustment of said collar consisting of shifting said pivot positions into and out of alignment with said radial slots.

10. A pin type strip feeding device wherein a series of feeding pins are adjustably mounted for simultaneous movement into and out of operative position, including a cylindrical body having a reduced diameter shoulder, a circumferential series of radial slots in said one end of the body, diagonal slots intersecting said radial slots and opening through the outer surface of the body, said diagonal slots defining radially spaced apart shoulders in said radial slots, feeding pins received in said radial slots, to have their outer ends project above the surface of the body and tiltable relatively to said spaced apart shoulders into said diagonal slots to withdraw the outer ends of the feeding pins beneath the surface of said body, a collar rotatably mounted on said reduced diameter shoulder and having a circumferential series of holes near its periphery, said feeding pins having turned over portions at their inner ends received in said holes, said feeding pins being thus pivotally connected to said collar to effect tilting movement of said pins in response to relative rotary motion of said collar, spring means urging said collar toward said one end of the body, and radial slots in said collar opening through the peripheral edge thereof coincident with said holes to facilitate rotary adjustment of said collar and to provide a detenting force inhibiting movement of said feeding pins out of alignment with said radial slots.

11. A pin type strip feeding device, including a rotary body, radial slideways in said body opening through the periphery thereof, feeding pins in said slideways, means defining radially spaced apart shoulders in each of said slideways, and a collar supported in concentric relation to said body and relatively adjustable in a rotary sense, said feeding pins being pivotally connected to said collar alternatively to assume projected and retracted positions relatively to the periphery of said body.

12. A pin type strip feeding device, including a rotary body presenting a peripheral surface having a series of slideways opening therethrough, a manipulative member supported in concentric relation to said body and relatively rotatable, feeding pins received in said slideways and pivotally connected at their one ends to said member and radially spaced apart abutment portions in said slideways engageable with said pins intermediate their ends to enforce a tilting motion thereof in response to rotary rocking motions of said member relatively to said body, projecting and retracting the opposite ends of said feeding pins with respect to the peripheral surface of said body.

References Cited in the file of this patent

UNITED STATES PATENTS

598,654	Cleland	Feb. 8, 1898
2,112,833	Dybvig	Apr. 5, 1938
2,271,306	Nichols	Jan. 27, 1942
2,401,597	Winter	June 4, 1946