RIBBON FEEDING MECHANISM

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Fig_1

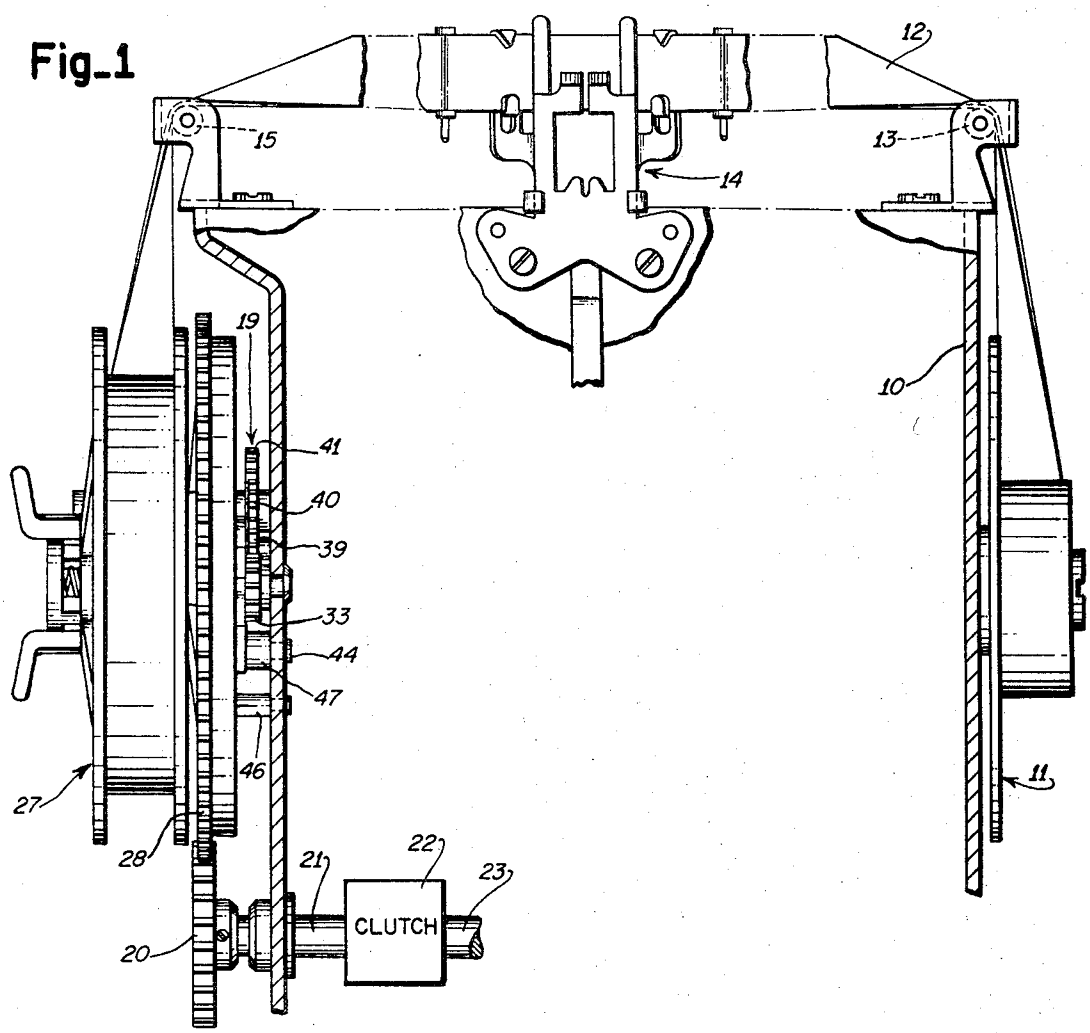
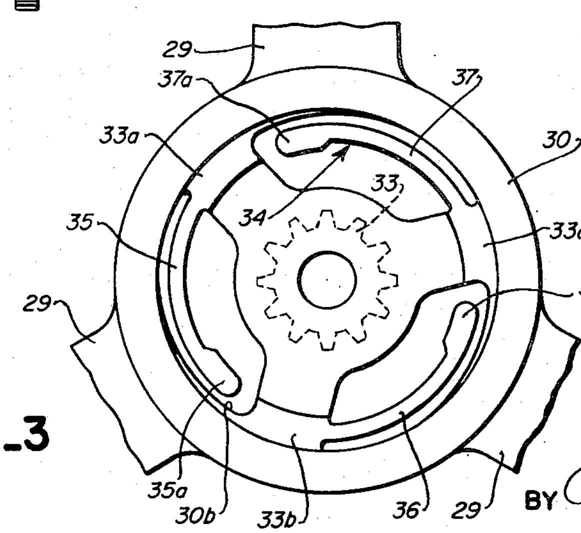


Fig_3



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RIBBON FEEDING MECHANISM

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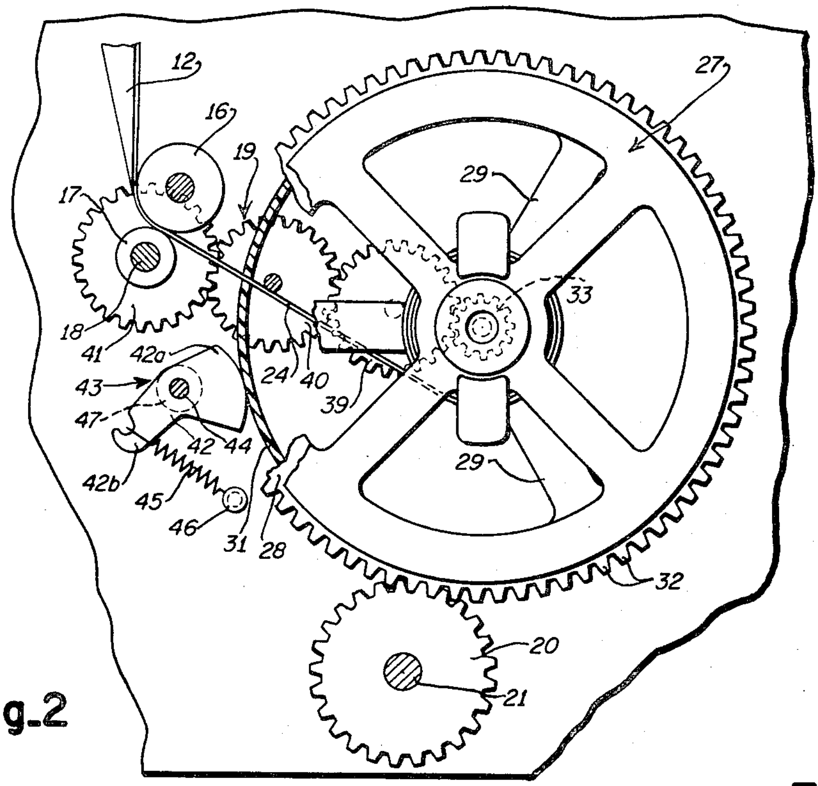
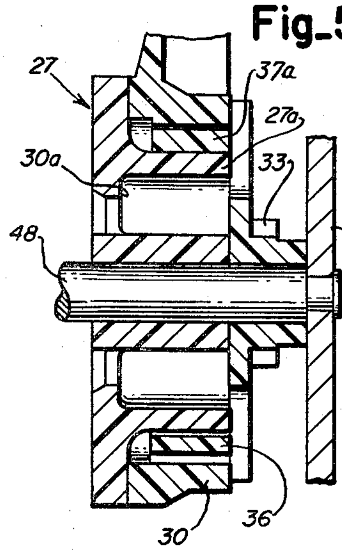


Fig.2

Fig.5



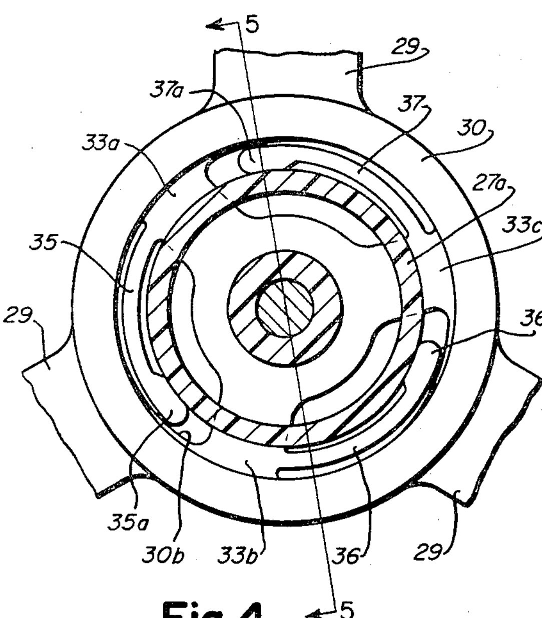


Fig.4

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RIBBON FEEDING MECHANISM

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ABSTRACT OF THE DISCLOSURE

In a typewriter ribbon feed mechanism, a slip drive having a plurality of cantilever mounted arcuately shaped fingers extending radially in the same circular plane from hands symmetrically disposed around the circumference of a first hub which is positively driven, to frictionally engage a second hub, the fingers rotating the second hub with the first hub and slipping in response to load on the second hub.

This invention relates to a ribbon feeding mechanism for a carbon ribbon and more particularly to a mechanism for tightly winding the ribbon onto a take-up spool, and more specifically to a mechanism for permitting the ribbon take-up spool to slip with respect to a take-up spool driving member when the ribbon is not being fed.

Carbon ribbon is being increasingly used on correspondence typewriters because of the excellence and clarity of the copy produced thereby. Unfortunately, this type of ribbon may only be used once, and therefore it is desirable that the take-up spool accommodate at least all of the ribbon being dispensed from the supply spool so as to minimize the number of disposals of used ribbon from the take-up spool. To accomplish this objective with a take-up spool of similar dimension as the supply spool, the run of the carbon ribbon between the ribbon index rollers and the take-up spool must be maintained under tension thereby to wind the ribbon as tightly as possible on the take-up spool. Moreover, since the take-up spool may be driven through a larger angle than that of the ribbon feed rollers, pursuant to the changing diameter of the take-up spool as the used ribbon is wound thereon, a means for slipping the take-up spool with respect to its drive must be provided to maintain the tension and still prevent tearing of the ribbon.

In accordance with the invention there is provided a slip drive characterized by a plurality of cantilever mounted arcuately shaped fingers which lie in one and the same circular plane. The fingers may be integrally supported within a housing hub of a driving member and adapted to couple to an engaging hub on a take-up spool or alternatively the fingers may be integrally supported within a housing hub of the take-up spool, and in this event an engaging hub would be formed on the driving member. In either case, the hub and fingers form a releasably securing drive which permits the take-up spool to rotate when the ribbon index rollers feed the ribbon and to slip with respect to the rotating drive member whenever the index rollers are not feeding ribbon.

Accordingly an object of the invention is in the provision of a slip drive which permits uniform feeding and tight winding of ribbon on a take-up spool.

Another object of the invention is to provide a drive for rotating a ribbon take-up spool only when the ribbon is being advanced.

Still another object of the invention is in the provision of a slip drive which permits slip between a take-up spool and the take-up spool driving member.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following

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detailed description when considered in connection with the accompanying drawing in which like reference numerals designate like parts through out the figures thereof and wherein:

FIGURE 1 is a fragmentary front elevation showing a carbon ribbon supply and take-up spool operatively mounted to portions of the frame of a typewriter;

FIGURE 2 is an outside left elevation of the carbon ribbon take-up spool, the ribbon index wheels, and the gear train for driving the index wheels;

FIGURE 3 is a fragmentary elevational view showing the slip drive;

FIGURE 4 is a fragmentary elevational view similar to FIGURE 3 showing the slip drive engaged with the take-up spool hub; and

FIGURE 5 is a fragmentary sectional view taken along line **5—5** of FIGURE 4 showing the slip drive and take-up spool assembly on a frame mounted spindle.

Referring now to the drawing wherein like reference numerals designate like or corresponding elements throughout the several views and wherein a preferred embodiment is illustrated, there is shown in FIGURE 1 a typewriter frame **10** which rotatably supports on the right side of the machine a carbon ribbon supply spool **11** associated with conventional drag means (not shown), which prevents too rapid turning of the spool. A ribbon **12** from the supply spool is directed around a right guide roller **13**, through a ribbon vibrator structure generally designated by reference numeral **14** and around a left guide roller **15**. As viewed in FIGURE 2, the ribbon after passing around the left guide roller, shown in FIGURE 1, passes between ribbon indexing rollers **16** and **17**, which normally grip the ribbon and permit a predetermined amount of ribbon to be drawn from the supply spool **11** during each type stroke. More particularly, the roller **16** is supported for rotation on a bracket (not shown), which is spring biased toward roller **17**, and roller **17** is rotatably mounted on a shaft **18** and indexable on each type stroke, whereby the ribbon is permitted to be drawn between the rollers and wound on a take-up spool **27** whenever roller **17** is indexed. The roller **17** is integrally formed with an indexing roller drive gear **41**, which forms a part of a gear train, generally designated by reference numeral **19**, and comprised of a pinion **33** driving a pair of identical intermediate gears **39** and **40**, which in turn drive the roller drive gear **41** (FIGURE 2). Pinion **33** is integrally formed with a take-up spool gear **28**, which is driven by a drive gear **20** mounted to rotate with a shaft **21** (FIGURE 1) when a clutch **22** is actuated on each type stroke, by a conventional mechanism well known in the art, thereby coupling shaft **21** to a constantly rotating power shaft **23**. Thus, the indexing roller **17** provides a uniform ribbon feed on each type stroke, and inasmuch as the take-up spool diameter is constantly increasing as the used ribbon is wound thereon, and it is desirable to maintain a length of ribbon **24** taut between the index rollers and the take-up spool, the ratio of gear train **19** is designed to drive the index roller **17** through a much smaller angle than the angle through which the take-up spool gear is driven. Consequently, a slip drive, generally designated by reference numeral **34**, must be provided to permit the take-up spool to slip, with respect to the rotating take-up spool drive gear, thereby maintaining the ribbon taut at all times, as will be described below.

Referring now to FIGURES 3 through 5 which best show the structural details of the invention, the take-up spool gear **28** is preferably made of plastic and comprised of an inner hollow hub **30**, supported by webs **29**, drive gear teeth **32**, the pinion **33** and the slip drive **34**. Pinion **33** is concentric with hub **30** and supported therefrom on a protruding rear face **30***a* by three hands **33***a*, **33***b* and

33*c* symmetrically disposed around the circumference of the inner hub (FIGURE 3). The slip drive **34** is housed within the hollow hub **30** and includes three arcuate fingers **35**, **36** and **37** respectively, which are located in one and the same radial plane within the hollow hub, and are each integrally formed and supported at one end by one of the pinion supporting hands. The unsupported end portions **35***a*, **36***a* and **37***a* of the fingers are formed such that they will engage and be expanded outwardly toward the wall **30***b* of hollow hub **30** when a protruding hub **27***a* of the take-up spool **27** is inserted into the hollow hub **30** (FIGURES 4 and 5). Consequently, the take-up spool is frictionally coupled to the fingers and rotates in synchronism with take-up spool gear **28**, on a frame mounted spindle **48**, as long as there is no load imposed on the take-up spool. However, whenever the index rollers grip the ribbon, a load is produced which is transmitted to the take-up spool and causes the spool to slip with respect to the rotating take-up spool drive gear, which rotates through a greater angular distance than the index roller, as hereinbefore described.

Since the ribbon is being urged in the wind direction, the length **24** of ribbon between the indexing roller and the take-up spool (FIGURE 2) will be maintained in a relatively taut condition. Furthermore, a brake or no-back assembly **43** prevents the take-up spool gear from rotating in the reverse or clockwise direction, as viewed in FIGURE 2, thereby sustaining the length **24** of ribbon taut. Brake assembly **43** is comprised of an arm **42** pivotally mounted to the machine frame by means of a boss **47** and a stud **44**. A spring **45** secured to the lower end **42***b* of the arm and to a frame supported stud **46** biases the upper end **42***a* of arm **42** into engaging outer ring **31** of the take-up spool. The upper arm end **42***a* has an arcuate shape which is eccentric with respect to the pivotal mounting of arm **42** whereby the take-up spool gear is free to rotate in a counterclockwise direction and prevented from rotating in a clockwise direction.

The take-up spool **27** may be any conventionally shaped spool consisting of two end flanges separated by a hub for accommodating the ribbon, provided one of the flanges has a protruding hub for engaging the slip drive. Thus, for example, the spool may be similar to that disclosed in copending patent application Ser. No. 461,653, filed June 7, 1965, by Carl A. Geissler, now Patent No. 3,317,155 issued May 2, 1967, except the grooved pulley **24** described in the reference application must be replaced with a hub similar to hub **27***a* of this application. It is, of course, axiomatic that one of the ribbon spool flanges may be formed to house the integral slip drive instead of the drive gear, in which case the take-up spool gear would have a hub for engaging the slip drive.

It will now appear that I have provided a slip drive that attains the several objects set forth above in a thoroughly practical and efficient manner.

The invention claimed is:

1. In a typewriter having, a carbon ribbon supply spool,

a ribbon vibrator,

a pair of ribbon feed rollers for indexing the ribbon upon each typing stroke,

ribbon take-up means including a drive gear member and a take-up spool member each of which has a hollow hub concentrically mounted for rotation,

a drive shaft operable on each type stroke to rotate said drive gear member,

and a gear train coupled to said drive gear member and said feed rollers to drive said feed rollers through a smaller angle than the angle said drive gear member rotates on each stroke,

the improvement comprising,

a slip drive having releasable securing means integrally formed and housed within the hollow hub of one of said members, said releasable securing means including a plurality of cantilever mounted arcuately shaped fingers extending radially in the same circular plane from one of a plurality of hands symmetrically disposed around the circumference of said hollow hub housing said releasable securing means to frictionally engage the hub of the other member, whereby said releasable securing means will rotate said take-up spool member with said drive gear member and slip in response to load on said take-up spool member.

2. A mechanism as recited in claim **1** including a braking assembly comprising a pivotally mounted arm having an arcuate end eccentrically formed to frictionally engage said take-up spool member and thereby prevent said take-up spool member from rotating in any direction other than a wind direction, and a spring means connected to said arm for biasing said arcuate end into engagement with said take-up spool member.

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